

**NEEDS ASSESSMENT FOR A TUBERCULOSIS (TB) AND HUMAN  
IMMUNODEFICIENCY VIRUS/ACQUIRED IMMUNODEFICIENCY SYNDROME  
(HIV/AIDS) COLLABORATIVE PROGRAM IN SASKATCHEWAN**

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In Partial Fulfillment of the Requirements  
For the degree of Doctor of Philosophy  
In the Department of Medicine  
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Saskatoon

By

Abayomi Toluwalaju Olaniyi

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## ABSTRACT

The purpose of this thesis is to assess the need for TB/HIV collaborative programming in Saskatchewan through a needs assessment process.

Globally, the occurrence of Tuberculosis (TB) and Human Immunodeficiency Virus/Acquired Immunodeficiency Deficiency Syndrome (HIV/AIDS) in a population has always turned out to be a deadly combination with each disease entity potentiating the prevalence, morbidity and death rate of the other. According to the World Health Organization (WHO, 2012) this syndemic and synergistic interaction between both diseases resulted in one-third of people living with HIV/AIDS worldwide being infected with TB. HIV-positive people are nearly twenty times more probable to develop TB when compared to HIV- negative people (WHO, 2012). Thus, both diseases acts in synergy to potentiate the deterioration of immunological functions thereby leading to an elevated mortality rate. According to the Public Health Agency of Canada (PHAC), in 2015, the prevalence of TB and HIV in Saskatchewan was two times the national average, and the Indigenous peoples were over-represented in incidence and prevalence (PHAC, 2016). Therefore, these infections are of significant public health importance for Saskatchewan and require urgent intervention.

The needs assessment employed qualitative research methods by conducting semi-structured interviews with 19 participants who were either administrators or clients in either the TB or HIV programs in Saskatchewan. Participants were interviewed using questions derived from the PRECEDE framework of the PRECEDE-PROCEED model. A combination of both deductive and inductive analytical processes using the PRECEDE model as the framework were utilized to

analyze and interpret the results with apriori themes derived from the PRECEDE model, and emergent themes from the data.

The results show that the PRECEDE model was effective as a needs assessment tool for TB and HIV co-programming. The PRECEDE model allowed development of an effective assessment tool including appropriate range of interview questions and apriori and emergent evaluation codes within the areas of social, epidemiologic, behavioral, environmental, educational, ecological, administrative, and policy. The results enunciated cultural, socio-economic, behavioral and administrative factors that increase the transmission of TB and HIV in Saskatchewan, particularly among the Indigenous peoples. The socioeconomic conditions identified were poverty, adverse effects of residential school system, low level of education, and abuse (physical, sexual and emotional). Behavioral factors of importance included a highly mobile population; living chaotic lifestyles as a result of drug addiction, prostitution, alcoholism; unprotected sex; and needle sharing. Environmental factors that were identified included the large geographical area in Saskatchewan and a large patient population in the rural and remote areas of the province. Educational factors identified were comprised of predisposing, reinforcing and enabling factors. The predisposing factors were related to inadequate knowledge about the mode of transmission of TB and HIV. Stigmatization was a significant reinforcing factor of importance such that patients received minimal support from peers and community members. Enabling factors for consideration included inadequate qualified health personnel and a poor staffing situation made worse by large turnover. Furthermore, recruitment of specialists to work in rural and remote areas of Saskatchewan is very challenging. Therefore, health facilities depend mostly on visiting specialists. The financial resources are inadequate, and this situation is compounded by multijurisdictional funding in off/on reserve communities in northern

Saskatchewan. Appointments to see service providers or specialists are difficult to arrange due to chaotic lifestyle, high mobility, lack of telephone services and homelessness. Diagnosis of administrative and policy factors reveal areas of gaps in the implementation of present programs. Gaps enumerated by participants are lack of coordination between separate TB and HIV programs, especially in data gathering. Other gaps are different locations of TB and HIV laboratories in Saskatchewan, difficulty with transportation in rural and remote areas, and difficulty getting TB and HIV medication.

There is a consensus among the participants about the desirability of establishing at least some form of TB/HIV collaborative program in Saskatchewan, but the ideal model of collaboration is not established. Program officers favored the referral model while patients in the study favored the integrated model (one-stop). No matter the model, the desired goal of all participants was to reduce TB and HIV in Saskatchewan. To achieve this end, the results reveal that it is vital that there is effective coordination between TB and HIV programs to ensure that patients can access the care they need from both services. It is recommended that the various social, epidemiological, educational, behavioral and administrative factors that affect the epidemiology of TB and HIV in Saskatchewan, as identified in the PRECEDE model, be taken into consideration in the design of appropriate intervention and evaluation strategies. Furthermore, the entire planning and implementation of collaborative programming should follow WHO's (2012) guidelines on TB/HIV collaborative services. A Saskatchewan TB/HIV collaborative program that addresses the unique nature of the two diseases in the province, which is well designed, implemented, adequately funded, and purposefully evaluated, would result in a sustainable reduction of TB and HIV diseases in Saskatchewan.

## DEDICATION

This dissertation is dedicated to:

The Almighty God for His abundant favor

To my parents for their immense contribution to my education

To my wife Arinade and Daughters Tomisin and Tomiwa for their unconditional love and support

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## LIST OF ABBREVIATIONS

<b>AIDS</b>	Acquired Immunodeficiency Syndrome
<b>ART/ARV</b>	Antiretroviral Therapy or Treatment
<b>BCG</b>	Bacilli Calmette-Guerin
<b>CDC</b>	Centers for Disease Control and Prevention
<b>CIRNAC</b>	Crown-Indigenous Relations and Northern Affairs Canada
<b>CPT</b>	Co-trimoxazole Preventive Therapy
<b>CXR</b>	Chest X-ray
<b>DOT</b>	Directly Observe Therapy
<b>DOTS</b>	Directly Observe Therapy, Short Course
<b>EFV</b>	Efavirenz
<b>FNIHB</b>	First Nations and Inuit Health branch
<b>HIV</b>	Human Immunodeficiency Virus
<b>ICF</b>	Intensified Case Finding
<b>IDU</b>	Injecting Drug User
<b>IGRA</b>	Interferon Gamma Release Assay
<b>ISC</b>	Indigenous Services Canada
<b>IPT</b>	Isoniazid Preventive Therapy
<b>LTBI</b>	Latent Tuberculosis Infection
<b>MDR-TB</b>	Multidrug-Resistant Tuberculosis
<b>MSM</b>	Men who have Sex with Men
<b>NGO</b>	Non-Governmental Organization
<b>NAAT</b>	Nucleic Acid Amplification Testing
<b>NITHA</b>	Northern Inter-Tribal Health Authority
<b>PHAC</b>	Public Health Agency of Canada
<b>PRECEDE</b>	Predisposing, Reinforcing, Enabling, Construct in Educational/Ecological Diagnosis and Evaluation
<b>PROCEED</b>	Policy, Regulatory, and Organization, Construct in Educational, and Environmental Development
<b>STI</b>	Sexually Transmitted Disease



<b>TB</b>	Tuberculosis
<b>TST</b>	Tuberculosis Skin Test
<b>UNAIDS</b>	Joint United Nations Program on HIV/AIDS
<b>WHO</b>	World Health Organization
<b>XDR-TB</b>	Extensively Drug-Resistant Tuberculosis

# 1 THESIS OVERVIEW

This thesis explores how collaborative activities between TB and HIV control programs in Saskatchewan can be established through evidenced-based needs assessment methods. According to the Public Health Agency of Canada (PHAC, 2016) in 2015, the prevalence of TB and HIV in Saskatchewan was two times the national average. Furthermore, the situation of HIV in on-reserves in Saskatchewan is alarming. Of the 170 new cases of HIV in the province, 79 percent self-identified as Indigenous people. There is geographical diversity in the HIV crisis in Saskatchewan with large urban centers seeing decreases (27-38%) and some rural areas seeing percent change increases as high as 800% over a 9-year period (Saskatchewan Ministry of Health, 2017). The rate of TB in Saskatchewan is 7.5 cases per 100,000 compared to a national rate of 4.7 cases per 100,000, 54% of TB cases occurring in the Indigenous population in Northern Saskatchewan, home to 3.6% of the provincial population (Saskatchewan Ministry of Health, 2017). At present, the province runs separate TB and HIV control programs, an arrangement which to-date has not resulted in a reduction in the infection rates of TB and HIV. The high infection rates of both TB and HIV in Saskatchewan is of great public health importance. The fact that each disease potentiates the prevalence, morbidity and mortality of the other, makes an urgent case to vigorously pursue policy options such as TB and HIV collaborative programming.

## 1.1 Thesis Organisation

This thesis is organised into three distinct papers with appendices. The introduction comprises the objective for embarking on the research, the rationale for the study and the research questions that direct the process and methods of this research.

The decision to embark on this topic for my doctoral thesis emanated from having firsthand knowledge of data on TB and HIV incidence and prevalence from my time as the Medical Health Officer in a First Nations organisation in Prince Albert, Saskatchewan. There was the realization that if nothing is done to improve service delivery to combat the rising incidence of TB and HIV, it may lead to catastrophic consequences in Saskatchewan.

The overall direction for this thesis was based on my clinical and public health experience in which to treat an individual you have to take a history, conduct laboratory investigations, and use the data collected to decide on the management of the disease. In this thesis, the same approach was employed at the population level. In this study, the PRECEDE aspect of the PRECEDE-PROCEED model was analysed as a framework to be used to collect the history of TB and HIV service delivery in Saskatchewan (Paper 1). Data collected was analyzed by describing the participant views by theme or sub-themes, looking for the range of association and defining concepts to describe objectives (Paper 2). Finally, the results were used to develop recommendations for policy guidelines on TB/HIV collaborative services for Saskatchewan (Paper 3).

### 1.1.1 Paper 1: Using the PRECEDE model to develop an assessment tool for TB/HIV co-infection control programming

This paper describes the use and applicability of the PRECEDE aspect of the PRECEDE-PROCEED model as a framework for conducting a needs assessment for TB/HIV collaborative

programming. The PRECEDE model is an acronym for Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation. This model was developed by Green and Kreuter (Green and Kreuter, 2005), and is a widely applied tool for health planning. This model is particularly suited for diseases like TB and HIV that are specifically associated with complex social, behavioural and environmental factors. The model was used as a guide to formulate interview questions for the needs assessment of HIV/TB collaborative programming that would elicit the social, behavioural and environmental factors that affect the TB and HIV diseases in Saskatchewan. The results from this paper were used for data collection and analysis for Papers 2 and 3.

#### 1.1.2 Paper 2: A Needs Assessment of TB/HIV Collaborative Programming in Saskatchewan

A needs assessment for TB and HIV co-programming in Saskatchewan was conducted using the PRECEDE model as described in Paper 1. The needs assessment involved a systematic approach to data gathering and analysis to identify the population health needs and priorities, the situation analysis of TB and HIV in the population, the present state of implementation of intervention programs, and met and unmet needs related to the current TB and HIV programs.

#### 1.1.3 Paper 3: TB/HIV collaborative program: Policy guidelines on implementation in Saskatchewan

This paper is a guide for the implementation of a TB/HIV collaborative program in Saskatchewan through utilization of data collected using the method from Paper 1 and data analysis from Paper 2, as well as the utilization of standard evidence-based best practices as described by the World Health Organization (WHO, 2012).

## 1.2 Rationale

The literature indicates that TB and HIV infections potentiate the incidence, prevalence, morbidity and mortality of each other in a synergistic manner. TB and HIV share a common connection whereby HIV prevention, care and treatment should be a priority for the TB program; likewise, TB care and prevention should be a priority for the HIV program. Furthermore, implementing a collaborative TB/HIV program will lead to shared benefits by reducing mortality of these diseases in the population. According to WHO, an estimated 910,000 lives were saved globally over six years by improving collaboration between TB and HIV services (WHO, 2012). Saskatchewan currently operates its HIV and TB programs as silos with minimal overlap and collaboration.

It has been posited that TB/HIV joint programming will allow for better health outcomes by efficient use of funds and other investments that are available for separate TB and HIV control programs. (Howard et.al, 2010). According to The Global Fund (2010), stronger collaborative services can be achieved through identification of areas of service alignment and support system already in place.

The purpose of this research was to undertake a needs assessment for a TB/HIV collaborative program in Saskatchewan using qualitative research methods to understand the met and unmet needs and gaps for TB and HIV co-programming activities in Saskatchewan

## 1.3 Research Questions

In this project the needs assessment included a systematic review of the health issues facing a population. It assessed the size of the specific problem, current services that address this problem and their effectiveness, and the risks and benefits of a specific intervention (Bani, 2008). The process also identified the unmet health and healthcare needs of a population that

would eventually enable the delivery of cost-effective services that would decrease the burden of TB and HIV in the population. To achieve this, my study is based on the following research questions: In Saskatchewan,

1. What are the present intervention programs provided towards control of HIV and TB, and the various organizations and stakeholders that provide these services?
2. What are the human, material and financial resources available for HIV and TB control programs, the service capacity and capability, and the barriers to accessing the services?
3. What are the gaps (met and unmet needs) in HIV and TB programs?
4. What are the collaborative TB and HIV key interventions that will decrease the burden of infection in the population affected by both diseases?

## 2. LITERATURE REVIEW

### 2.1 The Global Burden of TB and HIV

#### 2.1.1 Tuberculosis

*Mycobacterium tuberculosis* bacteria causes Tuberculosis (TB), this disease is both curable and preventable, but constitutes a significant global public health concern regarding its contribution to significant morbidity and mortality in the world. According to WHO (2017a), the incidence rate of TB reported worldwide was 10 million and the highest percentage occurred in the South-East Asia Region (45%) followed by the African Region (25%) followed by the Western Pacific Region (17%), Mediterranean Region (7%), European Region (3%) and the Americas (3%). This same report also indicated that 1.7 million people died from TB worldwide (approximately 24% of this death is among those co-infected with HIV). Furthermore, greater than 95% of TB deaths are found in low- and middle-income countries namely, India, Indonesia, China, Philippines, Pakistan, Nigeria, and South Africa.

##### 2.1.1.1 TB in Canada and Saskatchewan

The incidence rate of TB in Canada in 2016 was 4.8 per 100,000, with 93% reported as new cases and 5% as retreatment cases. According to Vachon et al., (2018) the majority of TB cases in Canada occur among foreign-born individuals (71%), that is, those that came from countries where the prevalence of TB is high, followed by Canadian born Aboriginal people (17%), and then Canadian born non-Aboriginal (11%) cases. Regarding the geographic distribution of TB in Canada, there are areas with high and low incidence. The incidence rate in Nova Scotia is 0.2/100,000, Manitoba, Alberta, and Newfoundland 4.8%/100,000, and Nunavut at 143/100,000 (Vachon et al., 2018).

The current rate of TB in Saskatchewan is 7.5/100,000. This one of the higher rates of TB among the Canadian provinces when compared to the Canadian national average of 4.7 per 100,000 (Gallant et al, 2017). According to the 2013-2018 Saskatchewan Provincial TB strategy (Saskatchewan Ministry of Health, 2013), 54% of TB cases are in the northern Saskatchewan Indigenous population health districts of Mamawetan, Churchill River, Keewatin Yatthe and Athabasca, in which merely 3.6% of Saskatchewan population resides. In addition, rates of TB on-reserve is twice that of off-reserve rates in Saskatchewan (Long et al., 2013).

NOTE: On December 4, 2017, the Saskatchewan Government transitioned from 12 regional health authorities to a single Saskatchewan Health Authority.

#### 2.1.1.2 Population most at risk

In Saskatchewan, the majority of cases are in First Nations (42.9/100,000), Métis (29.1/100,000) and the northern population rather than foreign-born (14.5/100,000) (Saskatchewan Ministry of Health, 2013, pg.3). According to Long et al. (2013), in Alberta and Saskatchewan, on-reserve rates were more than twice that of off-reserve. The TB rates in the Métis and Registered Indians were similar in Saskatchewan (50.0 and 52.2 per 100,000 person-years, respectively). TB rates are highest in First Nations living on-reserve in the north together with others residing off-reserve in the three northern health authorities of Mamawetan, Churchill River, Keewatin Yatthe, and Athabasca (Long et al., 2013). Most importantly, this area comprises only 3.6% of the population but experiences 54% of the TB cases in Saskatchewan (Saskatchewan Ministry of Health, 2013, p. 3).



### *2.1.1.1 National and Provincial Response to TB*

Two federal healthcare agencies are responsible for implementing the federal framework for TB prevention and control in Canada. First, the Public Health Agency of Canada (PHAC), which provides national leadership related to the public health aspects of TB. Second, Health Canada, through Indigenous Services Canada handles TB on-reserve in First Nations communities.

According to the Pan-Canadian Public Health Network (2012) and the Saskatchewan Provincial Tuberculosis strategy, 2013-2018 (Saskatchewan Ministry of Health, 2013), the national and the provincial goals are to reduce the incidence of reported TB to 3.6 per 100,000. The strategies to achieve this goal are unequivocal and prompt attention to early detection, treatment, and prevention of both active and latent TB in the population. Early detection of TB includes contact tracing and screening of high-risk populations, and aggressive treatment with anti-tuberculosis drugs to prevent treatment failure, drug resistance, and co-infection with HIV. Prevention activities that include health education that is pertinent to the culture of the population.

## **2.1.2 HIV**

### *2.1.2.1 Globally*

According to the UNAIDS (2017), the prevalence of HIV globally is 36.9 million people and 1.8 million people were newly infected. One million people died of HIV-related illnesses worldwide in 2017, while 67% of all persons infected with HIV live in sub-Saharan Africa (World Health Organization, 2016). Globally, there are key populations that are at high risk of acquiring HIV, these are, men who have sex with men (MSM), intravenous drug users, female sex workers and transgender women, in descending order (UNAIDS, 2017).

### *2.1.2.2 HIV in Canada and Saskatchewan*

Canada is classified generally as having a low HIV prevalence, but with a concentrated epidemic among some populations designated as high-risk. In 2016, new cases reported in Canada was 2,344, and the total prevalence of HIV since reporting began in 1985 was 88,409 (Bourgeois et al., 2017a). The same report also indicated variations of HIV incidence and prevalence across the country with Saskatchewan reporting the highest rate of new cases (15.1 per 100,000), which is more than double the entire Canadian rate. In terms of age-sex distribution, Bourgeois et al., (2017b) posited that the highest rate of new cases occurs in ages between 30-39 years, and more men are diagnosed with HIV than women.

### *2.1.2.3 Populations at Risk*

In Canada, the population at risk are MSM, people from countries with high incidence of HIV, Aboriginal populations, and inmates of correctional centres (Bourgeois et al. 2017b). In 2016, the men who have sex with men (MSM) accounted for a significant number of all reported HIV cases in adults (44.1%), followed by heterosexual contact (32.3%), and injection drug use (IDU) constituted the third most reported exposure category (15.1%) (Bourgeois et al., 2017b). In addition, 40.4% of HIV cases are reported in whites, followed by 21.2% in Blacks and 21.2% in Aboriginal people. Among the Indigenous peoples, HIV was reported in 19.0% in First Nations, 1.6% in Métis, 0.4% in Indigenous-unspecified, and 0.3% among Inuits (Bourgeois et al., 2017b).

According to the Saskatchewan Ministry of Health (2017a), the HIV rate in 2016 in Saskatchewan was 14.5/100,000, more than twice the national average. In the same year, 170 people were newly diagnosed with HIV, with a significant increase of cases seen in Regina, Saskatoon and Prince Albert Parkland Health Region. More importantly, there was a notable

shift from urban to rural communities in the number of those infected with HIV. Those who self-identified as Aboriginal people remain the most common group of those newly diagnosed. In addition, eight in ten of newly diagnosed cases in Saskatchewan are females of child-bearing age (15-45 years) (Saskatchewan Ministry of Health, 2017b). Due to the sensitive nature of HIV infection, it is difficult to obtain accurate numbers of those who have the disease.

#### *2.1.2.4 Provincial Response to HIV*

A provincial leadership team was established to implement an HIV strategy for Saskatchewan in response to a 2008 report that showed that Saskatchewan's HIV rate was twice the national rate. According to Saskatchewan Ministry of Health (2017a pg. 10), the HIV rates in Saskatchewan still remains two times the national rates. It was proposed then that the provincial team will implement the Saskatchewan HIV initiatives (Saskatchewan Ministry of Health, 2010, pg. 3) under four main categories and these are;

- a) Community engagement and education. The activities entail community-based programs, for example, education, information events, school-based curriculum development, and social marketing.*
- b) Prevention and harm reduction, this involves, provision of easy access to HIV testing, support for programs that prevent high-risk behaviors and increase harm reduction services.*
- c) Clinical management that supports mentorship and training of health care providers in prevention and harm reduction activities. Also, provide incentives that will encourage essential staff retention especially in rural and remote areas.*
- d) Increase HIV surveillance and case detection.*

Overall, there is an HIV epidemic in Saskatchewan with identified subgroups at greater risk for the disease. Current provincial strategies to address the HIV epidemic have resulted in some success, but the epidemic persists and requires strategic attention.

### 2.1.3 TB and HIV: A Deadly Syndemic

The occurrence of Tuberculosis (TB) and Human Immunodeficiency Virus/Acquired Immunodeficiency Deficiency Syndrome (HIV/AIDS) in a population has always turned out to be a deadly combination, with each disease entity potentiating the prevalence, morbidity and death rate of the other. According to the World Health Organization (2012), this synergistic interaction between the diseases resulted in 33% of people living with HIV/AIDS worldwide to also have TB infection. Consequently, HIV-positive people are nearly 20 times more likely to develop TB when compared with HIV-negative people (World Health Organization, 2012). TB thereby presents as the most common opportunistic infection with an elevated mortality rate.

TB and HIV pose a tremendous public health concern. There is significant uncertainty in the level of co-infection in the country, and this poses considerable challenges in controlling the diseases. It is estimated that the percentage of people with HIV who also have active TB range from 1.6% to 5.8%. The number of those infected with TB who are also HIV positive range from 3.8% to 13.8%. (Harris et al. 2006)

There are various challenges in patients with dual infection with TB and HIV, these are, difficulty in diagnosing TB among HIV patients, drug interaction, overlapping toxicity and tablet burden, all of which may reduce adherence and impact morbidity and mortality (Mendelson, 2007).

### *2.1.3.1 The Syndemic Lens in TB and HIV co-programming*

Syndemic is a term used to describe the aggregation of two or more interrelated disease epidemics that interact to exacerbate the prognosis and burden of the diseases in a population (Kwan and Ernst, 2011). Merrill Singer developed the term in the mid-1990s by describing how infectious diseases intertwine with each other and with social, economic, environmental and political constructs in which the population resides (Singer et al 2017).

Syndemic takes an alternative approach to current prevention and control strategies and includes policies and programs that address the underlying and often structural causes for the diseases. For TB and HIV this includes the social determinants of health, which are similar for the two diseases, and which perpetuate the disease states and outcomes including poverty, urbanization, overcrowding, gender inequality, inequitable access to resources, and weak health service delivery mechanisms, which are often reflective of inadequate funding and political commitment (Karim et al., 2009; Padayatchi et al., 2010). As HIV and TB are Syndemic, any HIV/TB co-programming strategy must address the structural causes of the disease states.

### *2.1.3.2 Current state of TB and HIV programming in Saskatchewan and Canada*

Although the WHO, in 2004, advocated some form of collaboration between TB and HIV control programs, and two national advisory bodies in Canada recommended universal HIV testing of TB patients (Long & Boffa, 2010), each control program at the national and provincial levels still run different programs with distinct human resources and funding. These individual programs may be necessary but are inadequate to manage the complex health challenges, including the syndemic that characterises the occurrence of these diseases (Steiner et al., 2013).

The implication is that the management of TB and HIV or TB/HIV co-infected patients is often fragmented, with little coordination (Seeley et al., 2012).

In Saskatchewan, the TB program is centrally administered by the Ministry of Health's TB Control Program, based in the city of Saskatoon and works in collaboration with provincial, federal, and First Nation partners. The emphasis of the program is on patient-centered care that is community and outpatient based. Implementation is by a multidisciplinary team of healthcare professionals that treat and prevent active disease with a focus on children and high-risk individuals. The goal of the program is to; *"1) eliminate TB within the province through surveillance, detection, treatment, and prevention. 2) Build strong relationship and partnership with relevant stakeholders"* (Saskatchewan Ministry of Health, 2013, pp. 1-2).

The provincial and federal governments share the cost of TB programming in Saskatchewan. First Nations TB programming is more fragmented with the First Nations Inuit Health Branch (Indigenous Services Canada) of Health Canada responsible for First Nations and Inuit persons living on-reserve while the Saskatchewan Ministry of Health is responsible for all persons living off reserve.

#### *2.1.3.3 Co-programming strategies for TB and HIV*

It is expected that planning for TB/HIV joint programming will allow for better health outcomes through the efficient use of funds and other investments that are available for separate TB and HIV control programs as well as identification of areas of service alignment and support system optimization of programs already in place (Howard et. al., 2012),

The desire to implement TB/HIV collaborative programming worldwide prompted the WHO's Stop TB department and the department of HIV/AIDS to establish a global TB/HIV working group (Corbett et al., 2010). This group published three policy documents: These are;

A) Strategic Framework to Decrease the Burden of TB/HIV (Maher et al., 2002). B) Guidelines for Implementing Collaborative TB, and HIV Program Activities (World Health Organization, 2004). C) Interim Policy on Collaborative TB/HIV Activities (World Health Organization, 2004). The final recommended policy for collaborative activities for HIV/TB programming (World Health Organization, 2012, pg. 9) is as follows

***“A. Establish and strengthen the mechanisms for delivering integrated TB and HIV services***

- *Set up coordinating body for collaborative TB/HIV activities, functional at Provincial and community).*
- *Determine HIV prevalence among TB patients and TB prevalence among people living with HIV.*
- *Carry out joint TB/HIV planning to integrate the delivery of TB and HIV services.*
- *Monitor and evaluate collaborative TB/HIV activities*

***B. Reduce the burden of TB in people living with HIV and initiate early antiretroviral therapy (the Three I’s for HIV/TB).***

- *Intensify TB case-finding and ensure high-quality anti-tuberculosis treatment.*
- *Initiate TB prevention with Isoniazid preventive therapy and early antiretroviral therapy.*
- *Ensure control of TB infection in healthcare facilities and congregate settings.*

***C. Reduce the burden of HIV in patients with presumptive and diagnosed TB.***

- *Provide HIV testing and counselling to patients with presumptive and diagnosed TB.*
- *Provide HIV prevention interventions for patients with presumptive and diagnosed TB.*
- *Provide co-trimoxazole preventive therapy for TB patients living with HIV.*
- *Ensure HIV prevention interventions, treatment and care for TB patients living with HIV.”*

The WHO recommended collaborative activities for HIV/TB programming are an important framework that should be considered in the development of effective HIV/TB co-programming activities.

## 2.2 Summary and Gaps

The literature review revealed the enormity of the TB and HIV epidemic globally, in Canada, and particularly in Saskatchewan. HIV causes massive challenges to the control of TB. TB is also the leading cause of morbidity and mortality among people living with HIV/AIDS. In Saskatchewan, despite the individual TB and HIV control and prevention programs, the rate of these diseases continues to rise. Therefore, Saskatchewan has a very significant issue with TB and HIV infection and co-infection, particularly in the rural and northern First Nation populations.



At present, Saskatchewan still operates individual TB and HIV control programs with different management structures. The present strategies have not adequately addressed the burden of these infections in Saskatchewan, and in fact, the burden continues to rise in Saskatchewan. There is the need for a change of policy that could address the burden of TB and HIV in Saskatchewan. Based on the available knowledge, the establishment of a TB/HIV collaborative program could allow for the provision of continuity of quality care at service delivery level for people with or at risk of TB and HIV. Collaboration between TB and HIV programs could ensure adequate access by those infected with TB and HIV to preventive, laboratory, and treatment services. This collaboration has the advantage of minimizing loss through service cracks and follow up.

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### 3. METHODOLOGY

#### 3.1 Philosophical Assumption

This needs assessment for TB/HIV collaborative programming study relies on the interpretivist paradigm. Guba, et. al., (1994) defined paradigm as primary beliefs or worldview that controls research action or an investigation. Furthermore, Guba, et. al., (1994) posited that this research paradigm consists of its ontology (overall nature of a phenomenon), and epistemology (uncovering the knowledge to know the relationship between researcher and reality). Interpretivism therefore, is a form of qualitative methodology that relies on both trained researcher and human subjects to measure certain phenomenon using unstructured interviews or participant observation (Thanh et al., 2015). The ontology of interpretivist paradigm believe that reality is” multiple and relative” (Hudson and Ozanne, 1988; Kivunja, & Kuyini., 2017). Also, the interpretivist approach seeks for a culturally derived and historically situated interpretation of the social world by going into details to look at culture and how they live (Hudson & Ozanne, 1988). The epistemology of the interpretivist approach assumes that we cannot separate ourselves from what we know and believes that researchers and human subjects are interdependent and mutually interactive (Kivunja, & Kuyini., 2017). The interpretivist researcher, therefore, enters the field of study with past understanding of the research background but believes that this is not enough to be used for a rigid research design (Kivunja, & Kuyini., 2017). Furthermore, the researcher remains open to new knowledge throughout the study and this develops into an emergent and collaborative approach that is consistent with human beliefs and realities, and with the goal to interpret the meaning of human behaviour rather than predict cause and effect (Hudson & Ozanne, 1988). This research taps into the real-life experiences of health workers, patients and stakeholders with respect to what they consider an

appropriate approach to TB/HIV collaborative programming. This paradigm also seeks to understand people's perceptions and interpretations of their reality in terms of how they perceive prevailing health issues and what motivates their actions and behaviours (Kivunja, & Kuyini., 2017).

### 3.2 Conceptual Framework

In this research process, the PRECEDE aspect of the PRECEDE-PROCEED model (Green & Kreuter. 2005) was used. This model of health promotion has been widely used and evaluated (Green et al., 1996; Binkley et al., 2014; Phillips et al., 2012).

#### 3.2.1 The rationale for the PRECEDE model

The PRECEDE model was selected for the following reasons: (1) it is a framework that offers a procedural structure for constructing an intervention and framework for critical analysis. It allows for an orderly structure that addresses the main issues in my study with the goal of improving the quality of life of patients with TB/HIV and the community, (2) several health behavior theories are embedded into the structure of the framework namely, a) the health belief model, which is a psychological health behavior that attempt to explain and predict health-related behaviors as it affect the uptake of health services. b) Health promotion model, which focuses on helping people achieve higher levels of well-being through not only helping patients prevent illness through their behavior, but in addition looking at ways in which a person can pursue better health or ideal health. c) Social learning theory, a theory of learning and social behavior which adduces that people learn from one another, via observation, imitation, and modeling. (Green & Kreuter, 2005). Hence, this model was seen as appropriate for evaluation of TB/HIV collaborative programming, which has complex multidimensional behavioral factors that affects its epidemiology.

PRECEDE is an acronym for Predisposing, Reinforcing and Enabling Constructs in Educational/Ecological Diagnosis and Evaluation and consists of five phases (Green & Kreuter, 2005. p. 9-17)

*Phase 1: Social Assessment*

*Phase 2: Epidemiological Assessment*

*Phase 3: Behavioral and Environmental Assessment*

*Phase 4: Educational and Ecological Assessment*

*Phase 5: Administrative and Policy Assessment*

The key to the PRECEDE model is that it requires logical thinking about the desired end goal and then works backwards to achieve this goal. In this study, the goal is to reduce the incidence and prevalence of TB and HIV in Saskatchewan through collaborative programming.

### 3.3 Data Collection and Data Analysis Process

The process utilized for data collection, analysis and interpretation in this study is akin to the clinical reasoning approach in medicine. Data collection using the PRECEDE framework (Paper 1) is like taking the history of a patient. Interpretation of the data (Paper 2) is akin to the diagnosis of the condition and developing a policy for TB/HIV collaborative programming in Saskatchewan is similar to treatment for the situation (Paper 3).

#### 3.3.1 Data Collection

The Phases of the PRECEDE model were utilized to develop relevant open-ended questions for the interviews (Table 3.1). The PRECEDE model was used to create questions that would elicit components of social, behavioral, environmental, educational, ecological, administrative, and policy factors that affect TB and HIV in Saskatchewan and would be important in an effective program model.

Table 3.1: Interview Questions and Goals for Data Collection Using PRECEDE Model

PRECEDE phases	Interview Questions
Phase 1 and 2: Social and Epidemiological assessment	<p>1) Tell me about your role in the organization? Probe: defined responsibility</p> <p>2) What is your comment on the situation of TB and HIV in the community? Probe: Explore awareness/attitudes/perception</p> <p>The goal is to explore the situation analysis of TB and HIV in Saskatchewan and determine how control programs are implemented</p>
Phase 3: Behavioral and Environmental assessment	<p>3) Tell me about the services rendered towards TB and HIV control and method of implementation. Probe: type of services, resources and coordinating capacity.</p> <p>4) What factors affect access to the services?</p> <p>5) How adequate are the human, material and financial resources towards the implementation of services?</p> <p>The goal is to examine the reason for the epidemiology of TB and HIV infections in the context of socioeconomic, behavioral and environmental factors</p>
Phase 4: Educational and Ecological assessment	<p>6) What is your view about TB/HIV collaborative service? Probe: Barriers to existing program</p> <p>7) How do you think collaborative services will be received by healthcare personnel and patients? Probe: Specific ways of promoting TB/HIV care, inquire about service uptake</p> <p>The goal is to appraise the effectiveness the present TB and HIV control program. Identify gaps and the need for co-infection programming. Also identify pros and cons to collaborative program</p>
Phase 5: Administrative and policy assessment	<p>8) What collaborative model for TB/HIV collaborative program would you advocate?</p> <p>9) Do have any comment that you think would improve TB/HIV co- infection program?</p> <p>The goal is to identify policy plans and action for collaborative services between TB and HIV programs that will enhance efficiency, accessibility, sustainability and improved quality of life.</p>

### 3.3.2 Deductive and Inductive Analytical Processes and Coding

This research utilized the combination of both deductive and inductive analytical processes. The deductive approach (Elo & Kyngash, 2008), by tests categories, concepts, hypothesis or models (Marshall & Rossman, 2014). In this research the PRECEDE model, a predetermined framework, was used to analyze data, which started with using an organizing framework via codes (Huberman & Miles, 2002). These pre-determined codes helped to integrate concepts already well-known in the literature. The PRECEDE model was utilized for generating a priori codes/themes (Table 3.2) from the data collection. Inductive approach begins with an in-depth familiarity with the data, seeking patterns, then theorizing about these patterns. Emergent codes evolved through inductive reasoning and surfaced through analysis of the participants' responses from the interviews. These emergent codes were similar thoughts/insights that surfaced during the review of the interview data and were coded as important themes. The advantage of using this combination is that it enables a more comprehensive account of the data and overcomes the boundaries of only using the predetermined themes. (Tramm et al., 2012). As a result, new information that is relevant to the study analysis and might reveal important insights for the findings was not ignored because it did not fit into the pre-determined codes



Table 3.2: A priori Codes/Themes using PRECEDE

<b>Codes/Theme</b>	<b>child /sub node</b>
<b>Phase 1 &amp; 2</b> Community	<ul style="list-style-type: none"> <li>- Urban/Rural/Remote</li> <li>- Type of service in community</li> <li>- Disease situation in community</li> </ul>
<b>Phase 3</b> Behavior linked with TB or HIV	<ul style="list-style-type: none"> <li>- Risk factors</li> <li>- Help seeking behaviour</li> </ul>
<b>Phase 4</b> Predisposing factors	<ul style="list-style-type: none"> <li>- Values</li> <li>- Perception</li> <li>- Knowledge</li> <li>- Attitudes</li> </ul>
Enabling Factors	<ul style="list-style-type: none"> <li>- Referrals</li> <li>- Manpower availability and skill</li> <li>- Availability of resources</li> <li>- Accessibility</li> </ul>
Reinforcing factors	<ul style="list-style-type: none"> <li>- Social determinants</li> <li>- Peers</li> <li>- Attitudes and behavior of health personnel</li> </ul>
Environmental assessment Physical environment	<ul style="list-style-type: none"> <li>- Define problems of individual or community</li> </ul>
<b>Phase 5</b> Medication for TB and HIV Effectiveness of programs	<ul style="list-style-type: none"> <li>- Side effects</li> <li>- Adherence</li> <li>- Utilization</li> <li>- Stigmatization</li> <li>- Screening methods</li> <li>- Data management</li> <li>- Barrier</li> </ul>
Gaps in services	<ul style="list-style-type: none"> <li>- Unmet needs</li> <li>- Met needs</li> </ul>

### 3.3.3 Framework Approach for Data Analysis

Framework analysis is *"an emerging method of qualitative thematic data analysis that is increasingly popular in healthcare study"* (Ward et al., 2013. p. 2424). Developed by policy researchers in the UK (Ritchie & Spencer, 1994; Ritchie et al., 2002), it is a practical approach to real-world investigation. The Framework Approach to data analysis was chosen for the following reasons. First, there is the need to capture different phenomena of what participants expressed,

and the Framework approach is particularly suited for this (Ritchie et. al., 2003). Second, interpretation of what participants expressed is transparent and straightforward and offers a conclusion that can be linked back to the original data (Gale et al., 2013). Third, charting in Framework analysis allows for transparency (Dixon-Woods, 2011). Fourth, the movement from data management to developing rational analysis and interpretation to sufficiently answer research questions can be a challenge, especially to a new researcher. Therefore, the interconnected stages in Framework analysis help the researcher to approach data analysis in a systematic and explicit manner (Smith & Firth, 2011).

The Framework approach consists of five stages:

1. Familiarisation; the researcher is the sole person who interviewed the participants. The audio recordings were sent to a transcriptionist for verbatim transcription. The transcribed texts were then loaded into NVivo for analysis. For adequate familiarization with the substance of the interviews, transcripts were read and reviewed several times. Field notes were also taken by the researcher to know in which context some comments were made. Field notes were useful when developing the codes and indexing.

2. Coding: The initial themes and nodes /child nodes were predetermined from the PRECEDE model (Table 3.2), and other nodes added were emergent issues raised by participants. This stage was done using NVivo software, where statements of each participant were “cut and pasted” into relevant Nodes /child nodes. Nodes were constantly reviewed throughout data analysis whenever new insights emerged.

3. Indexing: From the draft framework developed from the coding, key phrases or paragraphs were summarised in each node by the researcher without changing the context in which participants made statements. Indexing allowed further immersion in the data so that

nodes and child nodes could be refined (Ritchie & Spencer 2002). The product of this stage is a refined framework in which data fit in only one theme and is not repeated in others.

4. Charting: This involves building a picture of the data as a whole (Huberman, & Miles, 2002). Framework matrix (spreadsheet) produced by NVivo aided the researcher to view participants' comments in an orderly form to establish patterns for analysis. Charting required that data from the participants are summarised by categories or themes. A good charting depends upon the skill to strike a balance between condensing the data on the one hand and keeping the original meanings expressed by participants in the interview (Gale et al., 2013).

5. Mapping and interpretation: The Framework matrix was used to describe the participant views in each theme/nodes or sub nodes/sub-themes and were used to look for a dimension of association, nature of phenomena, developing strategies, and defining concepts. This step was guided by the research questions, linking to the original response of participants, and the knowledge from the literature review (Huberman & Miles 2002).

In this study, the combination of PRECEDE model and Framework analysis guided the needs assessment for collaborative program, and the development of a logic model. The logic model set the stage for policy design and program implementation for TB/HIV collaborative programming and evaluation. The final goal was to use the results from the study to help design in detail, TB/HIV collaborative programming options for Saskatchewan.

Table 3.3: Example of a Framework matrix

<b>Node/Theme</b>	<b>Participant 01</b>	<b>Participant 02</b>	<b>Participant 03</b>	<b>Participant 04</b>
Community				
Behavior linked with TB or HIV				
Effectiveness of programs				
Physical environment				
Predisposing factors				
Enabling factors				
Reinforcing factors				
Environmental assessment				
Treatment Schedule for TB and HIV				
Medication for TB /HIV				
Gaps in Services				

### 3.4 Setting and Participants

Participants in the study were chosen from the following Saskatchewan health regions: Prince Albert, Mamawetan Churchill River, Keewatin Yatthé, Saskatoon, Regina Qu'Appelle, and the Northern Inter-Tribal Health Authority (NITHA), which is solely responsible for the "off-reserve" First Nations population, located mostly in northern Saskatchewan. (Please note that in 2018 Saskatchewan formed a single Health Region, called Saskatchewan Health Authority).

Participants were recruited from the following categories: medical health officers, family physicians, social workers, TB and HIV program managers, epidemiologists, provincial laboratory workers, pharmacists, patients, and stakeholders involved with TB and HIV.

The selection criteria for participants in this study included involvement with HIV and TB activities in the province of Saskatchewan. Recruitment to this study was by purposeful

sampling and snowballing procedure. Participants were contacted initially via e-mail (Appendix 1 and 2) and appointments confirmed by telephone. This helped to accomplish the goal of selecting information-rich individuals, groups, and organizations that provided the most significant insight into the research questions (Fossey et al., 2002). Demographics such as age, education, economic status etc. are not variables that were collected in this study, because this is a qualitative descriptive research that focuses on determining the desirability of establishing, designing, and implementing TB/HIV collaborative programming in Saskatchewan through the perspective of participants involved with TB and HIV programs.

Participants were interviewed until saturation occurred, which according to Morse and Richards (2007) is ‘when no new or relevant data emerges from interviews with various participants on the topic under study’. Data were collected from 19 participants through a semi-structured interview (Appendix C) in their place of choice. The interview process for each participant lasted between 30 minutes and one hour and was audio recorded. All participants were given an invitation to participate in the study information sheet (Appendix A) and asked to sign a consent form (Appendix B) before the start of the interview. This document explained the purpose of the study, as well as the benefits, risks and procedures involved. The identity of the participants was shielded by giving them unique study identification numbers to maintain confidentiality. Participants were also informed that they could withdraw from the study at any point in time with no repercussions.

Audio recordings of the interviews were sent to a professional transcriptionist for verbatim transcription. These data were loaded into NVivo (NVivo qualitative data analysis Software; QSR International Pty Ltd. Version 10, 2012.), a software program which supports

qualitative research methods and allows the data generated from the interviews to be organized and analyzed.

### **Validity: Trustworthiness**

Qualitative researchers are always faced with the issue of trustworthiness of their studies regardless of the approach to data collection. Assessing the trustworthiness of study findings requires a transparent research process, sound in relation to the application and appropriateness of methods undertaken, and the integrity of the final conclusion (Noble & Smith, 2014). Guba (1981), indicated four general criteria to assess trustworthiness in qualitative research, and these are;

**A) Transferability:** Is the extent to which research study's findings could be applicable to other contexts, situations, times, and populations. The strategies used to enhance transferability in this study included; 1) detailed description of the overall research context. 2) The use of PRECEDE-PROCEED model which is a multi-theoretical based framework developed by Green and Kreuter (2005). This model has been utilized in public health for over 40 years and holds potential for use in a needs assessment for TB/HIV collaborative programming. This model embodies two key aspects of intervention: a) planning and b) evaluation. The use of this model is similar to what obtains in clinical diagnosis, that is, just as a medical diagnosis precedes treatment, so should evidence-based educational diagnosis precede an intervention plan that would improve quality of life. In addition, the use of this well-tested model eliminates personal bias that may influence findings. 3) The participants purposively chosen were diverse in terms of their role in TB and HIV programs and geographical locations. This ensured representativeness of findings in relation to TB and HIV programming. Also, these participants were willing to share their experiences in-depth.

**B) Dependability:** This is important to trustworthiness because it establishes the research study's findings as consistent and repeatable. That is, different researchers will obtain similar results

using the same context with same methods and the same participants. Marshall and Rossman (2014) noted that ensuring dependability in qualitative research can be problematic, because reality is socially built and constantly changing, that is, no two situations or reality are ever identical. According to Shenton (2004), issues concerning dependability can be addressed by giving a detailed report on the processes used in the study. This include the exact methods of data gathering, analysis, and interpretation, thereby enabling a future researcher to repeat the work and probably obtain the same results. The strategies used in this study are: 1) Interviews were audio recorded and transcribed verbatim. Data collected was stored into NVivo software later to be retrieved for the process of data analysis. This was done to confirm the accuracy of findings and ensure that findings are supported by the data collected. Themes emerging from data collected can be repeatedly revisited to ensure they aligned with participants' accounts. 2) Use of verbatim extracts from interview participants assists readers to make judgement about whether themes fit with participants' accounts.

**C) Confirmability:** This has to do with the level of confidence that the research study findings are based on the participants' account and response to interview questions rather than researcher biases. The steps taken in this research to establish the confirmability of the research findings are: 1) Audit trail. This is a process in which data collection, data analysis, and data interpretation were recorded in detail. The information required in audit trail are: audio recordings and verbatim transcription, data reduction and analysis using the Framework analysis, data reconstruction leading to the construction of a "framework matrix", and logic model design for program planning and implementation (Morrow, 2005). 2) Reflexivity. This is the approach that a qualitative researcher maintains when collecting and analyzing the data. The researcher should acknowledge his or her own background and position to see if not at conflict with the research process that is,

selecting the topic, choosing the methodology, analyzing the data, interpreting the results, and presenting the conclusions (Ruby, 1980). In this study, the researcher indicated that he is a medical doctor and public health practitioner. He got the inspiration to embark on this study when he worked as Medical Officer of Health in a First Nation organization in Prince Albert Saskatchewan, Canada. In this capacity, he had a firsthand knowledge about the statistics of TB and HIV in First Nation communities. There was the realization that if nothing is done to improve service delivery to combat the rising incidence of TB and HIV it may lead to catastrophic consequences in Saskatchewan. The overall direction for this thesis was based on my clinical and public health experience in which in order to treat an individual you must take a history, conduct laboratory investigation and use the data collected to decide on management of the disease. In this thesis, the same approach was used at the population level.

**D) Credibility:** Credibility essentially asks the researcher to clearly link the research study findings with reality to demonstrate the truth of the research study's findings. In other words, credibility deals with the question, how consistent are the findings with reality? (Patton, 1999). Therefore, to promote confidence in the study this researcher used research methods and frameworks that are well established and tested. For example, this study used PRECEDE aspect of the PRECEDE-PROCEED model to develop research questions, Framework analysis and categorization for data analysis and interpretation.

### 3.5 Ethical Approval

This research proposal was approved by the University of Saskatchewan Behavioral Research Ethics Board under the category of minimal risk study (BEH-13-275.). The following health regions also provided operational approval Regina Qu'Appelle, Prince Albert, Mamawetan Churchill River, Keewatin Yatthé, Saskatoon Health region, and the Northern Inter-



Tribal Health Authority (NITHA). Hard copies of transcribed data and consent forms will be kept securely at the University of Saskatchewan and stored for five years after the end of study as suggested by the University of Saskatchewan Behavioral Research Ethics Board.

Footnote: On December 4, 2017, the Saskatchewan government transitioned from 12 Regional Health Authorities to the single Saskatchewan Health Authority. NITHA is not a health region but an “off-reserve” First Nations' partnership organization which comprised of Meadow Lake Tribal Council, Lac La Ronge Indian Band, Prince Albert Grand Council and Peter Ballantyne Cree Nation.

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#### 4. PAPER 1: THE PRECEDE MODEL AS AN ASSESSMENT AND DATA COLLECTION TOOL FOR A NEEDS ASSESSMENT OF TB/HIV COLLABORATIVE PROGRAMMING IN SASKATCHEWAN

##### 4.1 Contribution of paper 1 to the overall thesis

The PRECEDE aspect of the PRECEDE-PROCEED model was used to design a questionnaire for participants in which the result of their responses would serve as a guide for the design of TB/HIV collaborative programming activities in Saskatchewan. The PRECEDE model considers multiple factors that contribute to the epidemiology of TB and HIV in the community. The PRECEDE components involve assessing social, epidemiological, behavioral, environmental, educational, and administrative factors that affect the epidemiology of diseases in the population. The paper describes how the PRECEDE model was adapted as a method for needs assessment and describes the applicability and effectiveness of the model in assessing HIV and TB control strategies in Saskatchewan.

##### 4.2 Abstract

The PRECEDE model is an acronym for Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation. This model was developed by Green and Kreuter and is a widely applied tool for health planning (Green and Kreuter, 2005). This model is particularly suited for diseases like TB and HIV that are specifically associated with complex social, behavioral and environmental factors. The goal of this paper is to describe the use and applicability of the PRECEDE aspect of the PRECEDE-PROCEED model as a framework in conducting a needs assessment for TB/HIV collaborative programming in Saskatchewan.

This study used the PRECEDE aspect of the PRECEDE-PROCEED model as a framework that provided a "road map" for gathering the relevant data needed to evaluate the current TB and HIV programs in Saskatchewan. The purpose of undertaking a needs assessment for a TB and HIV collaborative program in Saskatchewan is to systematically identify areas of met and unmet needs in order to determine the necessity and requirements to establish the components of an effective collaborative program. The PRECEDE model was used to develop questions that would elicit components of social, behavioral, environmental, educational, ecological, administrative, and policy factors that affect TB and HIV in Saskatchewan and would be important in an effective program model. The PRECEDE model was beneficial in identifying which factors are to be a priority, which factors are most amenable to intervention, and which factors are necessary to address to improve the health of those infected with TB and HIV in Saskatchewan. Furthermore, emergent factors, outside the anticipated apriori themes, identified relevant factors important to understanding the met and unmet needs of the current programs. In conclusion, this framework achieved the purpose of a useful tool to conduct needs assessment for TB/HIV collaborative programming.

## 4.2 Introduction

Globally, the occurrence of Tuberculosis (TB) and Human Immunodeficiency Virus/Acquired Immunodeficiency Deficiency Syndrome (HIV/AIDS) is a deadly combination, with each disease entity potentiating the prevalence, morbidity and mortality of the other. According to the World Health Organization (2012), this synergistic interaction between the diseases resulted in one-third of people living with HIV/AIDS worldwide also being infected with TB. HIV-positive people are nearly 20 times more likely to develop TB when compared with HIV-negative people (WHO, 2012). TB thereby presents as the most common opportunistic infection in persons with HIV, with an elevated mortality rate.

The prevalence of HIV among TB patients in Canada is estimated at between 9% and 19% (WHO, 2004; Corbett et al., 2007). It can be assumed that co-infection is a public health issue needing urgent intervention, despite the lack of available data. This is particularly true when considering the argument against the background of unfavourable socio-economic and behavioural determinants that seem to enhance the transmission of TB and HIV in Saskatchewan and Canada. According to Public Health Agency of Canada PHAC (2015) reports show a steady rise in those who test positive for HIV infection among the Indigenous population, and this has the potential to exacerbate the poor state of TB control within this same population. The Indigenous (Aboriginal) population is described by Statistics Canada (2017),

*"Aboriginal identity population is attributed to people who identify with one Aboriginal group, that is, First Nations, Métis or Inuit, and/or those who reported being a Treaty Indian or a Registered Indian as defined by the Indian Act of Canada, and/or those who reported they were members of an Indian band or First Nation"*



Furthermore, 11% of the Indigenous population in Canada lived in Saskatchewan and they made up 16% of the total population of the province with a significant portion residing in the urban centres 15% residing in Saskatoon, 13% in Regina, 10% in Prince Albert, but a large majority residing on-reserve and in northern Saskatchewan (Government of Saskatchewan, 2016).

The high rates of TB and HIV in Saskatchewan suggest that a review of current programming strategies needs to be undertaken. Currently, in Saskatchewan, the HIV and TB control programs are run separately, with separate human resources and funding. The WHO in 2004 advocated some form of collaboration or integration between TB and HIV control programs, and this is supported by national advisory bodies (Long & Boffa, 2010). A needs assessment of the current Saskatchewan programs and potential for a collaborative approach to programming is an essential element in response to the high disease rates. The PRECEDE model was adapted as the tool to undertake a needs assessment of TB and HIV programming in Saskatchewan.

The PRECEDE-PROCEED model has been utilised in public health over a long period of time and holds potential for use in planning for TB/HIV collaborative programming. It is a framework developed by Green and Kreuter (2005) for comprehensive assessment and health program planning. PRECEDE is an acronym that stands for Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation. The use of this model is similar to clinical diagnosis; that is, just as medical diagnosis precedes treatment, so should evidence-based program diagnosis precede an intervention plan intended to improve quality of life for TB and HIV patients. Health behaviours are complex and multidimensional, and particularly so in TB

and HIV. These behaviours are influenced by socio-economic, epidemiological, cultural and psychological factors, all of which are dynamics assessed by the PRECEDE model.

The key to the PRECEDE model is that it requires logical thinking about the desired end goal and then works backwards to accomplish this goal (Green and Kreuter, 2005). In this study, the goal is to reduce the incidence and prevalence of TB and HIV in Saskatchewan through collaborative programming and then design a layout to achieve this goal.

#### 4.3 Phases of the PRECEDE model

As shown in Figure 4.1, the PRECEDE model utilizes five phases to assess health programs: (1) social assessment, (2) epidemiological assessment, (3) behavioral and environmental assessment, (4) educational and ecological assessment, and (5) administrative and policy assessment (Green and Kreuter, 2005).

##### 4.3.1 Phase 1: Social Assessment

The goal of Phase 1 is to assess the quality of life of patients affected by TB, HIV or both diseases. TB and HIV are diseases of public health importance in Saskatchewan. They substantially impinge on the quality of life of the community because both diseases have a high level of stigmatisation and discrimination by people in the community. Key investigation questions in making a thorough social diagnosis were the situation of TB and HIV in the community; the type of health services in the community; and the barriers to the utilization of services at the individual, community or geographical levels. Other sources of information and insight included living conditions, support systems within the community and cultural practices.

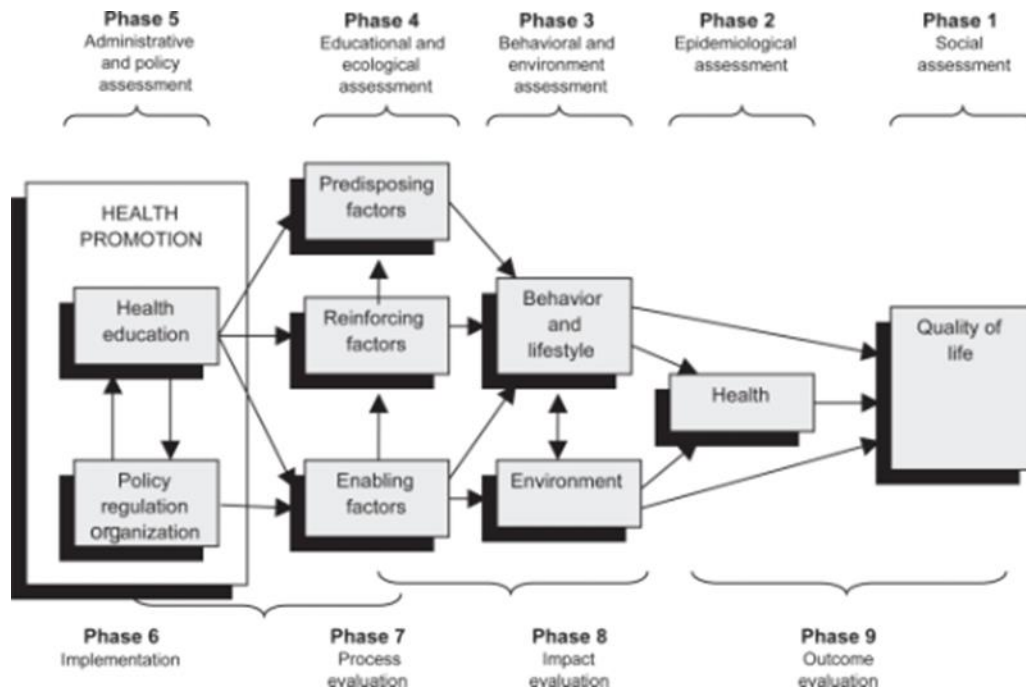


Figure 4.1: The PRECEDE-PROCEED Model

Taken from *Health Program Planning: An Educational and Ecological Approach* (p. 10), by L.W. Green and M.W. Kreuter, 2005, McGraw-Hill, Higher Education Company. Copyright 2005. Taken with permission.

#### 4.3.2 Phase 2: Epidemiological Assessment

The essence of this step is to establish achievable health-related objectives by which the success of the program can be measured (Green and Kreuter, 2005). For these objectives to be realistic, the study requires existing baseline data for TB and HIV infection in the population including national, provincial and health regions' statistical data, and socioeconomic data. The baseline data on co-infection is currently unavailable in Saskatchewan and would be a key outcome if collaborative programming was implemented in the province. How to access this level of information could be ascertained in the study.

#### 4.3.3 Phase 3: Behavioural and Environmental Assessment

The purpose of Phase 3 is to ask questions to establish the pattern of distribution of TB, HIV and co-infection, and to discover why a peculiarity of distribution occurs within the population. The questionnaire was designed to determine the behavioural and environmental factors that promote the propagation of TB and HIV infection in the community and affect the quality of life of those affected by the diseases. The information obtained assists in identifying those factors that can be changed to reduce the incidence and prevalence of TB, HIV and co-infection.

The behavioural determinants consist of three levels. The first level is proximal, which are behaviours or lifestyle that contribute to the severity of TB and HIV infections (e.g., needle sharing, stigma, poverty, poor access to facilities). The second level is the behaviour of others that directly affect those individuals at risk of TB and HIV. The third level is the action of decision makers whose decisions affect the social or physical environment of the individual at risk (e.g. community empowerment advocacy, communication and mobilisation; staffing, turnover, staff training).

#### 4.3.4 Phase 4: Educational and Ecological Assessment

This phase involves understanding if a unique plan for TB/HIV collaborative programming is likely to increase or decrease the likelihood that behavioural and environmental changes (Phase 3) will occur. This understanding is gained through the identification of predisposing, reinforcing and enabling factors (Green and Kreuter, 2005). Predisposing factors include an individual or group's increased or decreased likelihood to be infected with TB and HIV based on their knowledge, attitudes, perceptions and beliefs. Reinforcing factors are factors that propagate or decrease TB and HIV infections in the community. Enabling factors represent

the necessary conditions that must be present for a successful implementation of TB/HIV co-infection programming. These factors include the availability and accessibility of financial and human resources.

It is also essential to know what is currently being done about TB/HIV collaborative programming at the community and provincial levels and the plans and resources that might already exist in support of collaborative programming.

#### 4.3.5 Phase 5: Administrative and Policy Assessment

This phase aims to identify the policies, resources and organisation models that exist and are seen as required for the implementation and sustainability of TB/HIV collaborative programming. This phase assesses the gaps (met and unmet needs) in the way existing programs are implemented.

The phases of the PRECEDE model were utilised in generating apriori themes that were then developed into open-ended questions. Table 4.1 shows how the PRECEDE model was used as a “road map” to develop interview questions for the semi-structured interviews.

Table 4.1: The PRECEDE model as a tool to develop interview questions and categories of data analysis

Category Of Analysis	PRECEDE Phase	apriori themes	Interview Questions
<p><b>Contextual:</b> The goal is to explore the situation analysis of TB and HIV in Saskatchewan and determine how control programs are implemented</p>	<p><b>Phase 1 and 2:</b> Social Assessment</p>	<ul style="list-style-type: none"> <li>- Nature of population needs.</li> <li>- Type of service in the community.</li> <li>- Urban, rural and remote community Epidemiological Factors</li> <li>- existing baseline data for TB and HIV infection in the population</li> </ul>	<p>1) Tell me about your role in the organization? <b>Probe:</b> defined responsibility</p> <p>2) What is your comment on the situation of TB and HIV in the community? <b>Probe:</b> Explore awareness/attitudes/perception</p>
<p><b>Diagnostic:</b> The goal is to examine the reason for the epidemiology of TB and HIV infections in the context of socioeconomic, behavioral and environmental factors.</p>	<p><b>Phase 3:</b> Behavioral and Environmental assessment</p>	<ul style="list-style-type: none"> <li>-Behavior linked to TB and HIV co-infection.</li> <li>-Predisposing factors.</li> <li>-Enabling factors.</li> <li>-Reinforcing factors.</li> <li>-Data management</li> </ul>	<p>3) Tell me about the services rendered towards TB and HIV control and method of implementation. <b>Probe:</b> type of services, resources and coordinating capacity.</p> <p>4) What factors affect access to the services? In terms of behaviour and environment</p> <p>5) How adequate are the human, material and financial resources towards the implementation of services?</p>
<p><b>Evaluative:</b> The goal is to appraise the effectiveness the present TB and HIV control program. Identify gaps and the need for collaborative programming. Also</p>	<p><b>Phase 4:</b> Educational and Ecological assessment</p>	<ul style="list-style-type: none"> <li>-Effectiveness of program.</li> <li>-Gaps (met and unmet needs)</li> <li>A) Predisposing factors</li> <li>B) Reinforcing factors</li> </ul>	<p>6) What is your view about TB, HIV and TB/HIV collaborative service? <b>Probe:</b> Barriers to existing program, predisposing, enabling, and reinforcing factors.</p> <p>7) How do you think collaborative services</p>

identify pros and cons to collaborative program		C) Enabling factors	will be received by healthcare personnel and patients? <b>Probe:</b> Specific ways of promoting TB/HIV care, inquire about service uptake
<b>Strategic:</b> The goal is to identify policy plans and action for collaborative services between TB and HIV programs that will enhance efficiency, accessibility, sustainability and improved quality of life.	<b>Phase 5:</b> Administrative and policy assessment	Administrative and Policy Factors	8) What collaborative model for TB/HIV co-infection program would you advocate? 9) Do have any comment that you think would improve TB/HIV co-infection program?

#### 4.3.6 Emergent themes

The raw data collected from semi-structured interviews of participants are usually unstructured. Therefore, the researcher must provide coherence and structure through thematic analysis and at the same time retain the link to the original account and observation. Subsequently, rigorous analysis of data collected is crucial to the generation of good evidence that serves as the basis for change in policy and practice. In this research, the process derived from apriori themes from within the PRECEDE model as well as describing other themes that emerged.

The themes in Table 4.2 emerged during the data collection process and coding. These emergent themes were identified as necessary for answering my research questions, identifying essential characteristics to understanding the state of TB and HIV, and drawing the big picture that would help design intervention strategies. In this research, emergent themes arose out of the

ultimate objective to identify gaps in the present implementation of TB and HIV control and then use the information collected to design a TB/HIV collaborative program. The emergent themes emerged from an iterative reading of interview transcripts, field notes, and the process of abstraction that is, creating categories from the complexity of the data collected. Therefore, the emergent theme is grounded empirically in the data obtained using the PRECEDE model.



Table 4.2: Emergent Themes

Phase in PRECEDE model	Emergent themes	New Probes /Interview Questions
Phase 1 and 2 Social Assessment	-Disease situation in community -Discrimination and gender -Physical environment (overcrowding)	Tell me the categories of individuals in the population that are mainly affected by TB and HIV and what factors lead to increase disease prevalence?
Phase 3 Behavioral and Environmental assessment	-Risk takers and chaotic life style -Drug addiction and needle sharing -Highly mobile population	As above probe questions
Phase 4 Educational and Ecological assessment	-Support from community, peers and health staff -Stigmatization -Financial and human resources - Screening methods - Utilization and access to health services (including barriers)	-What type of support is available for those affected by TB and HIV in the communities? -How important is stigmatization to those affected by TB and HIV? -Is funding an important factor -What are factors that affect utilization of services?
Phase 5 Administrative and policy assessment	-TB/HIV collaborative services -Data management -Met and unmet needs	-What model of collaboration between TB and HIV services do you think should be adopted?

#### 4.4 Discussion

The planning cycle of health programming usually begins with a needs assessment. Health needs assessment is defined as a systematic method of reviewing the health issues facing a population, leading to agreed-upon priorities and resource allocations that improve health and reduce inequities (Wright et al., 1998). The design of an effective and sustainable health program depends on the data gathered being of high quality. The PRECEDE aspect of the PRECEDE-PROCEED model is a useful framework and provided a useful "road map" for interview questions that would fully assess the current situation of TB and HIV in the province and

therefore collect the relevant data needed to assess and evaluate the need for a TB/HIV collaborative program.

The PRECEDE model has enhanced the design for collection of quality data from participants about needs assessment for a TB/HIV collaborative program. The model integrates relevant theory and models in its phased component in order to give information about factors that affect the propagation of TB and HIV in the population. These theories are the health belief model, health promotion model and social learning theory (Gielen et al., 2008). Furthermore, the model allows for the identification of met and unmet needs, which is a critical component of needs assessment, and for the determination of areas of collaboration or integration of services between TB and HIV programs that would not only allow for easy accessibility and acceptability, but also prevent unnecessary and wasteful spending of scarce resources.

The concepts and questions were developed according to the principles for program collaboration and service integration outlined by Friedland et al. (2007) and the Center for Disease Control (2009, p.9) and fit well into a needs assessment for collaborative programming for HIV/TB. Regarding **comprehensiveness**, it is expected that program collaboration between TB/HIV services will promote joint planning and coordination of resources that facilitate comprehensive prevention, treatment and risk-reduction services. Regarding **Continuity of care**, the process evaluates political will to ensure sufficient support at all governmental levels for TB/HIV co-infection programming and stakeholders including staff training and capacity development. **In terms of Competence**, the process evaluates intervention strategies that should have a favorable outcome. That is, they should ensure treatment success, cure or completion of therapy; reduced HIV and TB disease progression and mortality; and decreased transmission of both diseases. The strategies should facilitate unhindered access to medication and promote

coherence of communication between TB and HIV services. The process integrates **Compassion** by evaluating reduction or elimination of stigmatisation and discrimination. It also involves taking care of the prevailing socio-economic problems of patients and community members. The process also evaluates **Cost-effectiveness** in terms of the design of any intervention and taking into cognisance the prevalence of limited financial and human resources. Investment in TB/HIV co-infection programming should produce the desired outcome of effectively reducing morbidity and mortality and if this can be accomplished through combining operational resources and the use of shared infrastructure to reduce overhead costs (Dobrow et al., 2004).

The information provided from the PRECEDE can be used to form the basis of a logic model for implementation and evaluation of a TB/HIV collaborative program. This is important, as an intervention plan should have an evaluation component. Evaluation gives insight into the challenges and successes of a program, and this information can be used to make changes as needed in order to enhance the accessibility and effectiveness of a program. If a TB/HIV collaborative program is implemented in Saskatchewan, the PROCEED portion of the PRECEDE-PROCEED model could be utilised for evaluation.

#### 4.5 Conclusion

Using the PRECEDE model as a needs assessment tool for TB and HIV collaborative programming is applicable and useful for developing a data collection tool. The strength of the model include the integration of relevant theory and models in its phased components (phases 1-5 of PRECEDE) and provided valuable information on the incidence, prevalence and social determinants of TB and HIV in Saskatchewan. In addition, the model allows for the identification of met and unmet needs and the determination of potential areas of collaboration or

integration of services which are critical components of a needs assessment. Furthermore, the model has the potential to work in other groups and settings. Also, the PRECEDE model forms the basis from which, if implemented, a collaborative program can be evaluated using the PROCEED phase of the PRECEDE-PROCEED model. Due to the complex nature of the infections in Saskatchewan, specific themes emerged that were not originally construed using the PRECEDE model. These emergent themes could be important considerations when using the PRECEDE model as a needs assessment for these specific diseases

The PRECEDE-PROCEED model has its limitations, the phases of emphases are restrictive to be used for needs assessment for TB and HIV collaborative program. These are diseases that also has complex interaction with history, cultural and local environmental in which they exist. Therefore, I would suggest including historical, cultural, politics, ideology and community values assessment to the process of PRECEDE framework to adequately capture any planned community-based health promotion activities that is designed to benefit Indigenous peoples. In addition, the PRECEDE-PROCEED framework should incorporate Community-based participatory research conceptual model, that is, collaborative approach to research that equitably involves all partners (e.g. community members, organizational representatives), all contributing their expertise to the research process, and sharing in policy decision making and ownership. (Israel et al., 1998). Inclusion of Health Quality Improvement phase in the framework is also important.

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## 5. PAPER 2: A NEEDS ASSESSMENT OF TB/HIV COLLABORATIVE PROGRAMMING IN SASKATCHEWAN

### 5.1 Contribution of paper 2

Paper 2 provides the results from the needs assessment for TB and HIV co-programming in Saskatchewan conducted using the PRECEDE model as described in Paper 1. Using the approach described in Paper 1 resulted in a systemic approach to data gathering and analysis that identified the population health needs and priorities, the situation analysis of TB and HIV in Saskatchewan, the present state of implementation of TB and HIV intervention programs and met and unmet needs related to the current TB and HIV programs.

### 5.2 Abstract

A needs assessment for TB/HIV co-programming in Saskatchewan was conducted using the PRECEDE framework (Paper 1). Currently in Saskatchewan patients with TB/HIV must navigate two separate health care programs to receive appropriate treatment. This systematic need assessment evaluated the present state of the current TB and HIV control programs and met and unmet needs for TB and HIV programs in Saskatchewan.

**Methods:** Qualitative semi-structured interviews were conducted with 19 participants who were purposively selected among health workers, administrators of TB and HIV programs, patients and stakeholders in Saskatchewan, Canada. The PRECEDE part of the PRECEDE-PROCEED model, as previously described (Paper 1) was used to guide the qualitative data collection.

**Results:** The PRECEDE model helped to identify/diagnose the social, behavioral, environmental, educational and administrative factors in the current TB and HIV programs in



Saskatchewan, and the needs that could be met through collaborative programming options. The socioeconomic conditions identified were poverty, adverse effects of residential school system, low level of education, and abuse (physical, sexual and emotional). Behavioral factors of importance included a highly mobile population; living chaotic lifestyles as a result of drug addiction, prostitution, alcoholism; unprotected sex; and needle sharing. Environmental factors that were identified included the large geographical area in Saskatchewan and a large patient population in the rural and remote areas of the province. Educational factors identified were comprised of predisposing, reinforcing and enabling factors. The predisposing factors were related to inadequate knowledge about the mode of transmission of TB and HIV. Stigmatization was a significant reinforcing factor of importance such that patients received minimal support from peers and community members. Enabling factors for consideration included inadequate qualified health personnel and a poor staffing situation made worse by large turnover. Furthermore, recruitment of specialists to work in rural and remote areas of Saskatchewan is very challenging. Therefore, health facilities depend mostly on visiting specialists. The financial resources are inadequate, and this situation is compounded by multijurisdictional funding in off/on reserve communities in northern Saskatchewan. Appointments to see service providers or specialists are difficult to arrange due to chaotic lifestyle, high mobility, lack of telephone services and homelessness. Diagnosis of administrative and policy factors reveal areas of gaps in the implementation of present programs. Gaps enumerated by participants are lack of coordination between separate TB and HIV programs, especially in data gathering. Other gaps are different locations of TB and HIV laboratories in Saskatchewan, difficulty with transportation in rural and remote areas, and difficulty getting TB and HIV medication.

**Conclusion:** There is a consensus among the participants about the desirability of establishing at least some form of TB/HIV collaborative program in Saskatchewan, but the ideal model of collaboration is not established. Program officers favored the referral model while patients in the study favored the integrated model (one-stop). No matter the model, the desired goal is to reduce the incidence of TB and HIV in Saskatchewan population. To achieve this end, it is vital that there is effective coordination between TB and HIV programs to ensure that patients can access the care they need from both services. It is recommended that the various social, epidemiological, educational, behavioral and administrative factors that affect the epidemiology of TB and HIV in Saskatchewan as identified in the PRECEDE model be taken into consideration in the design of appropriate intervention and evaluation strategies. Furthermore, the entire planning and implementation of collaborative programming should follow WHO's (2004) guidelines on TB/HIV collaborative services.

### 5.3 Introduction

Globally, the occurrence of Tuberculosis (TB) and Human Immunodeficiency Virus/Acquired Immunodeficiency Deficiency Syndrome (HIV/AIDS) in a population has always turned out to be a deadly combination with each disease entity potentiating the prevalence, morbidity and death rate of the other. According to the World Health Organization (WHO, 2012), this synergistic interaction between both diseases resulted in a 67% of people living with HIV/AIDS worldwide being infected with TB. HIV-positive people are nearly 20 times more probable to develop TB when compared with HIV negative people (WHO 2012). In Canada two National advisory bodies recommended universal HIV testing of TB patients (Long & Boffa 2010).

The province of Saskatchewan runs separate TB and HIV control programs with distinct personnel and funding. According to Public Health Agency of Canada (PHAC) in 2015, the prevalence of TB and HIV in Saskatchewan was two times the national average. There are no reliable data in Canada and Saskatchewan on TB/HIV co-infection, which is attributed to lack of concurrent surveillance for the two diseases (Long & Boffa, 2010). TB, HIV, and TB/HIV co-infection are likely to become a public health issue that requires urgent intervention. To address the dual burden of TB and HIV, WHO in 2004 advocated some form of collaboration/integration between TB, and HIV control programs (WHO, 2004).

Needs assessment is a complex, multidimensional approach to health service planning that ensures quality evidence-based management to improve the health of a community with the goal of applying available resources efficiently. Through needs assessment, health issues are prioritized, and inequalities in health and access are identified. TB and HIV infections have substantial social, cultural, behavioral, educational and administrative components that are important in their epidemiology and these factors are important when designing intervention strategies. It is essential to incorporate an evaluation formula to health intervention or promotion strategies, and this can be addressed by the PRECEDE-PROCEED Model (Phillips et al., 2012).

Whilst the importance of collaboration/integration has been widely advocated (WHO, 2004), there is no acceptable service model for TB/HIV collaborative programming. This paper therefore intends to look at the current TB and HIV programs implementation, the gaps, the met and unmet needs, and areas of synergy that would contribute to development of co-programming options for Saskatchewan.

## 5.4 Methods

### 5.4.1 Setting

In this study, selection of participants were from six health regions in Saskatchewan, geographically described as Northern (Prince Albert, Mamawetan Churchill River, Keewatin Yatthe and the Northern Inter-tribal Health Authority (NITHA) which is solely responsible for the “Off-reserve” First Nation population of Northern Saskatchewan) , Central (Saskatoon health region), and Regina Qu’Appelle . This was deliberate to cover a range of ideas, cultural and geographical diversity that exists in the province that may significantly influence program design and activities.

The selection criteria for participants in this study were: individuals knowledgeable in HIV and TB prevention and treatment in the province of Saskatchewan, engaged as program management, or involved with decision-making processes (Cresswel & Clark, 2011). Participant categories were: TB and HIV administrators and program managers, clinicians, social workers, stakeholders, provincial laboratory workers, epidemiologists, pharmacists, Medical Health Officers, and patients.

The research proposal was approved by University of Saskatchewan Behavioral Research Ethics Board. Operational approval was provided by health regions (Prince Albert, Mamawetan Churchill River, Keewatin Yatthe, Saskatoon, Regina Qu’Apelle and NITHA).

### 5.4.2 Data sources and Participants

Epidemiological data were obtained from the Public Health Agency Canada (PHAC) and Statistics Canada (2016) websites which provided baseline data for TB and HIV infections in the population. Recruitment to the study was by purposeful and snowballing sampling. This helped

to accomplish the goal of selecting information-rich individuals, groups, and organisations that provided the most significant insight into the research questions (Fossey et al., 2002).

Semi-structured open-ended interviews drawn from the PRECEDE model were used to guide the structure and direction of interviews. An invitation to participate in the study and information sheets were sent to each participant by e-mail. Confidentiality was maintained by giving participants unique identifying numbers. Informed consent was obtained from all participants before the start of the interview. Interviews were conducted in participants' place of choice with the process lasting from 30 minutes to 1 hour. Audio recordings of interviews were sent to a professional transcriptionist for verbatim transcription.

Interviews took place until saturation was achieved, which according to (Fossey et al., 2002) is 'when no new or relevant data emerges from interviews with various participants on the topic under study'. The final sample was 19 participants, and the categories of those interviewed are TB and HIV frontline workers, administrators and patients.

#### 5.4.3 Data analysis

The interview transcripts were loaded electronically into NVivo 10 software. Data analysis started as soon as each transcript was received.

The "framework" analysis, which is a form of thematic analysis, was used as the data management process to classify and organise data according to key themes, concepts and emergent categories (Ritchie, et. al., 2013, Srivastava & Thomson, 2009).

The first step in the management of collected data was to become familiar with transcribed data by reading and reviewing the transcript several times. This allowed the researcher to gain enough understanding of what participants were saying about the concept of TB and HIV and recognising key themes and emerging themes in the data. In the second step,

the data were coded using NVivo software into two broad areas, pre-set themes (also referred to as "apriori themes") derived from the PRECEDE model. The other set of themes called the "emergent themes" evolved and were refined (as an iterative process) through reading and familiarisation with raw data and making sure that the original research questions were adequately addressed. After that, summarised statements from participants were manually extracted from the transcripts and assigned to relevant themes to form a matrix. This allowed the researcher to view comments in a better-organised form to establish patterns for analyses (Appendix 4).

The final step was mapping and interpretation of data using participant views as the guide in each theme or sub-theme, looking for the range of association, nature of phenomena, developing strategies, and defining concepts.

## 5.5 Results

Table 6 and Figure 2 summarize the results by PRECEDE phase and apriori and emergent themes to diagnose the social, environmental, behavioral, educational, and administrative policy factors responsible for TB and HIV epidemiology in Saskatchewan

Table 5.1: A priori and emergent themes

<b>Phase in PRECEDE model</b>	<b>apriori themes</b>	<b>Emergent themes</b>
<b>Phase 1 and 2</b>	<p><b><i>Social Factors</i></b></p> <ul style="list-style-type: none"> <li>- Nature of population needs.</li> <li>- Type of service in the community.</li> <li>- Urban, rural and remote community</li> </ul> <p>Epidemiological Factors</p> <ul style="list-style-type: none"> <li>- existing baseline data for TB and HIV infection in the population</li> </ul>	<ul style="list-style-type: none"> <li>- Disease situation in community</li> <li>-Discrimination and gender</li> <li>-Physical environment (overcrowding)</li> </ul>
<b>Phase 3</b>	<p><b><i>Behavioral Factors</i></b></p> <ul style="list-style-type: none"> <li>-Behavior linked to TB and HIV co-infection.</li> <li>-Predisposing factors.</li> <li>-Enabling factors.</li> <li>-Reinforcing factors.</li> <li>-Data management</li> </ul>	<ul style="list-style-type: none"> <li>-Risk takers and Chaotic life style.</li> <li>-Drug addiction and needle sharing.</li> <li>-Highly mobile population</li> </ul>
<b>Phase 4</b>	<p><b><i>Educational and Ecological Factors</i></b></p> <ul style="list-style-type: none"> <li>-Effectiveness of program.</li> <li>-Gaps (met and unmet needs)</li> <li>A) Predisposing factors</li> <li>B) Reinforcing factors</li> <li>C) Enabling factors</li> </ul>	<ul style="list-style-type: none"> <li>-Knowledge, attitude and belief about TB and HIV.</li> <li>-Support from community, peers and health staff.</li> <li>-Stigmatization</li> <li>-Financial and Human resources.</li> </ul> <p>Screening methods</p> <ul style="list-style-type: none"> <li>- Utilization and access to health service (including barriers)</li> </ul>
<b>Phase 5</b>	Administrative and Policy Factors	<ul style="list-style-type: none"> <li>-TB/HIV collaborative services</li> <li>-Data management</li> <li>-Met and unmet needs</li> </ul>

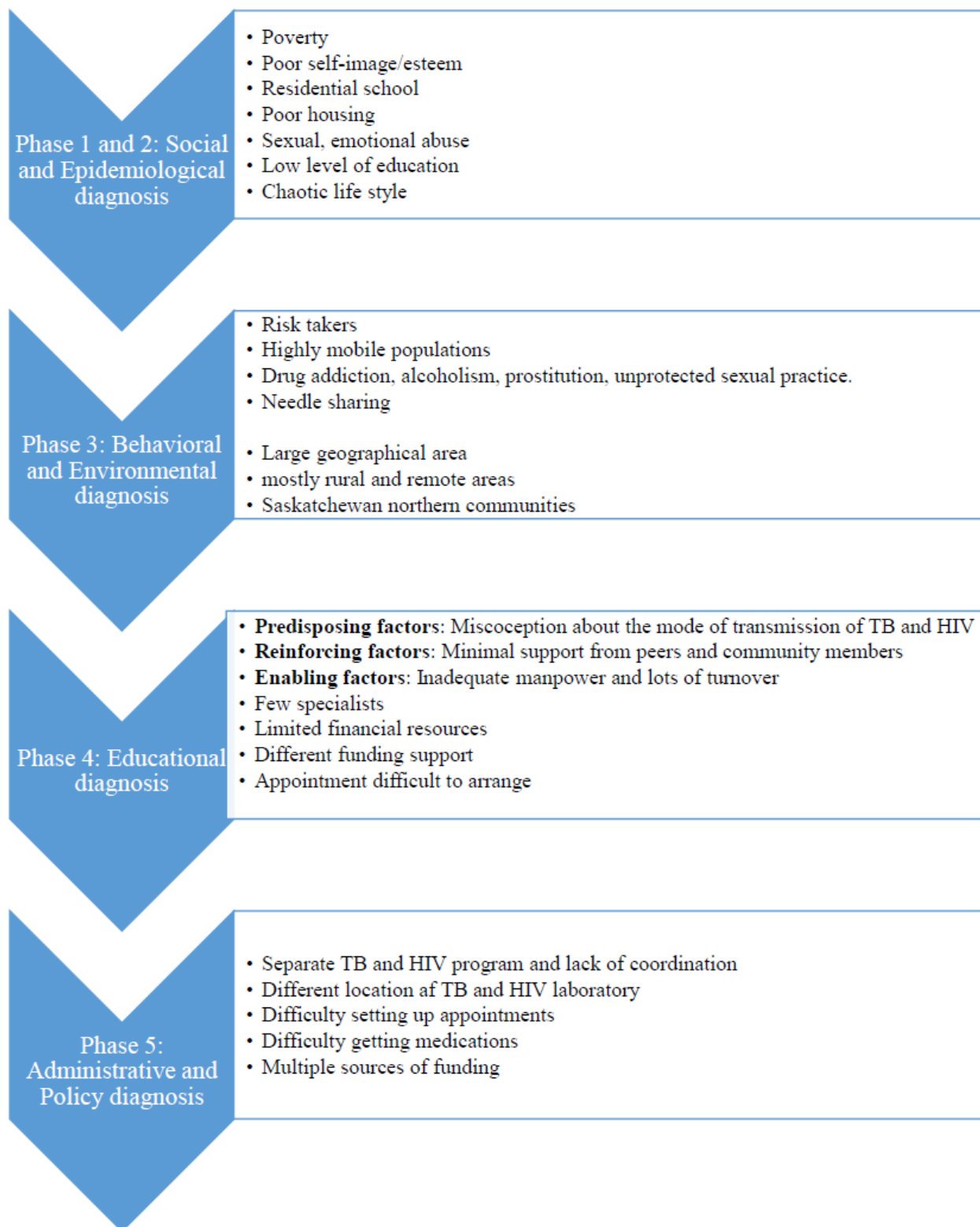


Figure 5.1: Summary of results categorized by PRECEDE model phases.



### 5.5.1 Phase 1 and 2: Social and Epidemiological diagnosis

From the social diagnosis, the major factors that impact TB and HIV and quality of life of for those infected by the diseases as identified by participants are: poverty, poor self-esteem mostly as a result of history of residential schools, chaotic life style, poor housing, sexual/emotional abuse and low level of education.

Table 5.2: Quotes of participants on Social Diagnosis.

Factors from Social Diagnosis	Quotes from participants
History of residential school	<i>Poverty, residential school survivors so lots of sort of co-existing factors that created a scenario where people were either had such poor self-image or self-esteem that they didn't feel it was worth protecting themselves. (07/2).</i>
Chaotic lifestyle	<p><i>Many of the people that I see that have drug addiction, have a history of trauma: abuse, neglect, sexual abuse, physical abuse, emotional abuse and neglect, so long history of problems related to that and simply being able to navigate complex systems is challenging and may be heavily street involved, marginalized, maybe not have a high level of formal education (01/2).</i></p> <p><i>We do a lot of drugs and alcohol and we have difficulty getting out the habit.(04/01)</i></p> <p><i>HIV is a big problem in community (04/2)</i></p> <p><i>Lots of my friends have HIV and Hep C.(04/3)</i></p>
Sexual/emotional abuse	<i>There are some people that I've had as patients that have told me, why should I be treated for my HIV? I don't care. I don't care. It just makes me live longer. Why would I want to live longer? The best day of my life was the day that I beat my father up before he could rape my sister. That was his single greatest accomplishment in life. So when you think about the trauma and the violence and so on in that kind of a setting, here's a</i>

	<i>person who really hadn't seen anything in life that was of great value to him. (01/2).</i>
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### 5.5.2 Phase 3: Behavioral and Environment Diagnosis

According to the participants there is a constellation of behavioral factors that are attributed to acquiring TB and HIV in the population (Tables 5.3, 5.4, 5.5)

The first level of behavioral diagnosis the proximal, which are behaviors or lifestyle that contributes to the severity of TB and HIV infections. These are unhealthy behaviors characterized by needle sharing by Injection Drug Users (IDU) that encourages HIV transmission, and inappropriate health seeking behavior caused by patients' reluctance to undergo testing because of stigma.

Table 5.3: Quotes of participants on behavioral and environmental diagnosis.

Factors	Quotes from participants
Intravenous drug users (IDU)	<p><i>-They live in close community, close homes and a lot of IV drug use. First Nations community has high rates of IV drug use and limited access to needle exchange program so they end up sharing needles. (02/2)</i></p> <p><i>- 70%-80% of HIV in Saskatchewan caused by IDU (1/02)</i></p>
Inappropriate health seeking behaviours	<p><i>-They know doing drugs is illegal, this push them underground. They are not ready to talk about this. (8/01) – seems like the people do not want to disclose and the community do not want to admit that there might be somebody there that have HIV and they just don't want to discuss it. (2/01)</i></p>
Stigmatization	<p><i>-Lots of stigmatization because people are not educated enough (4/03)</i></p>

	<p><i>- In Rural and remote areas, stigmatization is a challenge because of familiarity of patient with service provider. Confidentiality may not be assured (3/01)</i></p> <p><i>- Rude and judgmental health workers. Some wear gloves even when taking the pulse. Some people behave badly to you. (4/03)</i></p> <p><i>-Double stigmatization with TB/HIV co-infection, especially in northern community. Patient may shut down (7/01)</i></p>
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The second level of behavioral diagnosis is the behavior of others that directly affect those individuals at risk of TB and HIV. These are alcoholism, prostitution, overcrowding, active TB in the community, and unknown HIV carrier status.

Table 5.4: Quotes of participants on behavioral factors

Factors	Quotes from participants
Alcoholism, Prostitution, overcrowding	<p><i>-Drugs, Alcohol and difficulty getting out of the habit (4/01)</i></p> <p><i>- TB is caused by deprivation, poor housing, and poverty (1/02)</i></p>
Unknown HIV carrier status	<p><i>- Scared to tell about HIV (4/01)</i></p> <p><i>- Fear to disclose HIV so that they are not labelled (7/02)</i></p>

The third level of behavioral diagnosis is the action of decision makers whose decisions affect the social or physical environment of the individual at risk. Examples are, community empowerment at grass root level using effective advocacy.

Table 5.5: Quotes of participants on behavioral factors.

Factors	Quotes from participants
Community	<p data-bbox="500 331 1292 369"><i>- In some reserves HIV is criminalized and vilified {sic}(1/01)</i></p> <p data-bbox="500 407 1382 516"><i>-Smooth delivery of treatment in reserves depends on leadership and health care staff who are non-judgmental (1/01)</i></p>

### 5.5.3 Environmental diagnosis: Physical Environment

Environmental factors are those social and physical factors external to the individual, often beyond the personal control of those at risk of TB and HIV infections. These factors as enumerated by participants are: large geographical area of Saskatchewan in which a substantial area is rural and remote, and the communities are spread over this vast land.

*Northern Saskatchewan poses geographical challenge in terms of communities spread out over a very vast area. (08/1)*

### 5.5.4 Phase 4: Educational Diagnosis

Educational diagnosis includes the predisposing, reinforcing and enabling factors. In this phase health program planners take into consideration the antecedents to behavior that provide the rational or motivation for the behavioral change that the health intervention wants to achieve. This phase involves developing a unique plan for TB and HIV collaboration program that increases the likelihood that behavioral and environmental changes will occur through identification of predisposing, reinforcing, and enabling factors.

**1) Predisposing Factors** (Table 5.7) are antecedent to behavior that provide motivation for actions. They include knowledge, attitudes, and beliefs about TB and HIV infections.

The views expressed by participants about knowledge of TB and HIV are a misconception about the mode of transmission and those at risk of getting the infections.

Table 5.6: Quotes from participants on predisposing factors

Predisposing factors	Quotes from participants
Knowledge	<ul style="list-style-type: none"> <li>- <i>Knowledge about HIV is increasing but some people still call it dirty disease. (08/1)</i></li> <li>- <i>A big concern in the general population, HIV education has come a long way. (02/1)</i></li> <li>- <i>Lot of misconception about how it is transmitted. Some people feel it is a gay disease. People have the opinion it is a death sentence. A lot of people do not think it is a problem. Because it affect mainly the IDU (the forgotten people). (07/1)</i></li> </ul>
Attitudes and Beliefs	<ul style="list-style-type: none"> <li>- <i>We made bad choices in life and we go through daily life struggles. (04/1)</i></li> <li>- <i>They know doing IDU is illegal, this pushes them underground. They are not ready to talk about this. (07/1)</i></li> </ul>

Attitudes and beliefs influence the perception of individuals to accept the disease entity as a threat, which on the long run affect how preventive measures and treatments are sought. Some of the participants, especially the patients, admitted they made bad choices in life. Others alluded to having series of challenges in life.

**2) Enabling Factors** (Table 5.7) represent the necessary conditions that must be present for a successful implementation of TB/HIV co-infection program. These factors include availability of health resources, which can be described in terms of human and material resources, and accessibility of services and community/government laws policies and priorities.

The participants highlighted the challenges as a lack of coordination between TB and HIV, inadequate personnel and substantial staff turnover especially in rural and remote areas,

few infectious disease specialists, limited and multiple sources of funding, and difficulty in appointment arrangement for patients.

Table 5.7: Quotes from participant on enabling factors

Factor	Quotes from participants
Enabling	<p><i>-Always short of staff. Rotate available staff to work with ID physician, Lab, and skin testing. (2/02)</i></p> <p><i>-Need for staff training and additional funds for TB/HIV co-infection. Struggling to recruit Infectious disease doctors. There is long waiting list of newly diagnosed cases. Sometimes wait for 1 year. (2/03)</i></p>

**3) Reinforcing factors** (Table 5.8): these are attitudes of the people in the community that help to support or make difficult healthy behaviour necessary to reduce impact of TB and HIV diseases.

The responses from participants that are identified as reinforcing factors are: stigmatization and confidentiality. Also, negative attitude of peers, community, and health staff towards those infected by TB and HIV.

Table 5.8: Quotes from participants on reinforcing factor

Factor	Quotes from participants
Reinforcing factor	<p><i>-There is worry about confidentiality and anonymity in the reserves, although this varies from place to place. In some reserves HIV is criminalized and vilified. (01/1)</i></p> <p><i>-Rude and judgmental health workers. Some wear gloves even when taking the pulse. Some people behave badly to you. (04/3)</i></p>

### 5.5.5 Administrative and Policy assessment

This aims at identifying the gaps in present policies, resources, and organizational model. Aboriginal health policy in Canada is complicated. It is made up of complex policies, legislation

and agreements that delegate responsibility between federal, provincial, municipal, and Aboriginal governments. This complicates policy and leads to jurisdictional confusion in health funding and barriers to equitable access to health care and services.

The participants identified separate TB and HIV programs, conflicting model of funding, lack of coordination of referrals, difficulty in setting up appointments, difficulty in getting TB and HIV medications, adherence to medication, difficulty with transportation, shortage of human resources and different location of TB and HIV testing laboratory as factors inherent in the present implementation of TB and HIV programs.

Table 5.9: Quotes of participants on policy and administrative factors.

<b>Gaps</b>	<b>Quotes from participants</b>
Conflicting model for funding	<p><i>-Multiple sources of funding; Ministry of health and Saskatoon health region fund TB program. There is funding to recruit physicians. PLP has its own funding from provincial health. HIV strategy funds have first time funds for 3 years. Lots of Funding for HIV, but is mainly temporary. Need for staff training and additional funds for TB/HIV co-infection. (2/03)</i></p> <p><i>-TB funding is different from HIV funding for northern support. (2/02)</i></p> <p><i>-2/3 of funding from Public health agency of Canada (Federal government). Rest from provincial funding and donations and fundraising. Rely mostly on volunteers and are used mainly for fundraising (8/01)</i></p>
Lack of coordination of referrals and difficulty setting up appointments	<p><i>-Very mobile population (2/01)</i></p> <p><i>- Difficult to contact patients by phone. Numbers may have changed or no reception in the area (2/02)</i></p> <p><i>-Patients move back and forth through the province and the correctional centers (provincial or federal). No continuity on release from prison (9/01)</i></p> <p><i>-Appointments are difficult arranged with patients. This may be due to patient's disruptive life. May be structural when patients are expected to come back after 3 days for reading (2/03)</i></p>

	<p><i>-Referral cannot be tracked to know if appointments were honored (2/02)</i></p> <p><i>- Schedule appointment don't work. Except drop in. RUH location is difficult to access and therefore difficult to manage appointment (2/03)</i></p>
Difficulty getting medication	<p><i>-Getting medication is a challenge it depends on where they live. TB drugs are dispensed to TB crew. HIV drugs are access through regular pharmacy (9/01)</i></p> <p><i>- Stocking of drugs is a challenge, especially in rural areas (9/01)</i></p> <p><i>- Access to medication is central in Saskatoon. This is restrictive. Patients have to travel to get medication. 2 pharmacists. Saskatoon takes care of Northern SK. Regina the South (9/01)</i></p>
Difficulty with transportation	<p><i>-Transportation is a problem (4/02)</i></p> <p><i>-Transportation in small communities is the biggest problem. (10/01)</i></p> <p><i>-Expansion of services depends heavily on the specialists. Transportation to Northern Saskatchewan needs to be addressed (3/01)</i></p>
Adherence to medication	<p><i>-Adherence is poor. Completion of treatment is affected by lack of knowledge. They stop medication when they get better. Start medication when they experience a flare up (8/01)</i></p> <p><i>- The pharmacists are important to improve adherence. Most patients have a good relationship with them (8/01)</i></p> <p><i>- Challenges with DOT providers at provincial level. Unique structure in the reserves versus RHA (2/01)</i></p> <p><i>-Determinants of adherence to medications are; housing, addiction issues, chaotic lifestyle affecting medical appointment, and medication fatigue (2/03)</i></p> <p><i>- A lot of success with DOT when it comes to methadone. But not everybody is on methadone (2/03)</i></p>
Shortage of human resources	<p><i>-Always short of staff. Rotate available staff to work with ID physician, Lab, and skin testing (2/02)</i></p> <p><i>-HIV/TB collaborative program will need rework of staff training and funds (2/03)</i></p>



<p>Policy on TB/HIV collaborative programming</p>	<ul style="list-style-type: none"> <li>- <i>Administratively, data collection, policy, and budget, TB and HIV programs work in silos.</i></li> <li>- <i>Data for TB and HIV co-infection cannot be easily verified. TB does not have access to HIV data (6/01)</i></li> <li>- <i>No provincial TB/HIV co-infection or collaborative program (1/01)</i></li> </ul>
<p>Accessibility</p>	<ul style="list-style-type: none"> <li>- <i>Due to the mobility of the first nation's people, some services can be accessed in the city. Access is better in rural where service is culturally sensitive (1/02)</i></li> <li>- <i>Access difficult for those living outside these communities, they may need to travel to the big centers in Saskatoon or Prince Albert (3/01)</i></li> <li>- <i>Access to HIV service hindered due to other social concerns, for example; no housing, no food for some days, some have warrant for arrest. (8/01)</i></li> <li>- <i>People do not want to access services close to their homes. They may be familiar with the service providers. (3/01)</i></li> </ul>
<p>Laboratory services</p>	<ul style="list-style-type: none"> <li>- <i>Lots of problems getting the patient to come back to read Mantoux test (2/03)</i></li> <li>- <i>Communicable disease control laboratory is in Regina. Completely separated from TB control laboratory which is based in Saskatoon (10/01)</i></li> <li>- <i>There are issues about tracking down people who need testing and collecting samples. There is need for a mobile lab. If you have mobile clinic why not mobile lab. There is point- of -care diagnostics in Saskatchewan but verification should be done in Regina. (10/01)</i></li> </ul>

5.6 Discussion

**Demographic information of participants:** The participants were 19 adults comprising 11 females and 8 males. This purposively collected sample were in two groups: Group A are Clinicians, TB and HIV program officers, administrators, social workers, and stakeholders. The length of service in their present position ranged from 5-20 years. Group B were mainly patients with HIV. Their ages ranged from 15-30 years, and education level below grade 12.

The initial step in needs assessment involves conducting a situation analysis. This involved gathering information about the health problem, its causes and severity. It is also essential to identify those people that are mostly affected, the broad context in which the health problem exist and the factors that inhibit or facilitate behavioral change. According to WHO (2017), situation analysis entails the appraisal assessment of the current health situation and is crucial to designing and updating national policies, strategies and plans. Furthermore, WHO posited that situation analysis should not only describe the epidemiology, demography and health status of the population, instead should be comprehensive, with the inclusion of the full range of current and potential future of health issues and their determinants.

This paper illustrates the findings in the study of a needs assessment for TB/HIV collaborative programming in Saskatchewan through the framework of PRECEDE aspect of PRECEDE-PROCEED model.

#### 5.6.1 Historical and Cultural perspective

Saskatchewan has one of the highest rates of TB and HIV among Canadian provinces. The epidemiology of TB in Saskatchewan is different from other provinces in that most cases are among the Aboriginal people and northern populations rather than foreign-born.

**The Indigenous population in Canada:** According to Statistics Canada (2017), in 2016 there were 1,673,785 Indigenous people in Canada, accounting for 4.9% of the total population.

**Indigenous population in Saskatchewan:** The overall population of Saskatchewan is 1,168,058 (Saskatchewan Bureau of statistics, 2017). Data from 2016 Census, shows Saskatchewan population of self-identified Indigenous people was 175,020 or 16.3% of the total population. The largest population of this group is the First Nations people who are 114,570 (10.7% of the population), followed by Métis 57,875 (5.4%) and Inuit 360 (0.18%). Among the First Nations

living in Saskatchewan in 2016, 54,460 (47.5%) lived on the reserve. 15,775 (5.5%) lived in city of Saskatoon, Regina 13,150 (5.7%) and Prince Albert 9,045 (21.3%). Among the Métis, those who lived in Saskatoon are 14,900 (5.2%). In Regina 7,975 (3.7%) and Prince Albert 7,570 (17.9%).

Constitution Act, 1982 Section 35 (The Canadian Encyclopedia, 2006) is part of the Constitution Act that provides a constitutional safeguard that protects the rights and treaty of Indigenous peoples in Canada. This act also defines the Aboriginal peoples to include the Indian, Inuit and Métis peoples of Canada, as well as, right to land claim agreements

The coming of European settlers in Canada had an adverse repercussion on the Indigenous people. These impacts are in the form of devaluation of culture, language and traditions through the establishment of residential schools. A scoping review by Wilk et al. (2017) on residential school and the effect on Aboriginal health and well-being indicated that residential school had a long-lasting and intergenerational effect on the physical and mental wellbeing of Aboriginal people of Canada. In the same note, Milloy, (2006) describe the impact of residential school as the most damaging of the many elements of Canada's colonisation, and their consequences still affect the lives of Aboriginal people up to this day. Many health issues including addictions, poverty and mental health issues can be traced back to the residential school legacy. This influence was well articulated by a participant who indicated that poverty and residential schools constitute important co-existing factors that created a scenario where people either had a poor self-image or low self-esteem that they did not feel it was worth protecting themselves.

TB remains a significant public health problem for Indigenous people living on reserves and those residing in the inner city (Young and Casson, 1988). Historically, death rates from TB

infection in the 1930s and 1940s among the First Nation peoples resulted in the death of 700/100,000. This is described as the highest ever reported in a human population. The cause of high mortality was attributed to malnutrition, overcrowding in reserves and lack of immunity among the First Nation peoples. (Grzybowski & Dorken., 1983)

In the past, the overall prevalence of HIV/AIDS in Canada was relatively low (Joint United Nations Programme on AIDS, 2016). However, since 2000, the number of newly reported HIV infections has increased. Officials suggest that this increase may be partly due to improved surveillance and reporting which, in most provinces and territories, also includes immigrants who now require mandatory testing. Another comment on this worrisome trend of HIV in Saskatchewan indicated that Aboriginal communities in rural Saskatchewan are experiencing HIV rates that are among the highest in the world which is comparable to countries in the developing world (Soloducha, 2017). The participants express a high incidence of HIV among the Aboriginal communities in Saskatchewan.

#### 5.6.2 Socio-economic and environmental Determinants

The World Health Organization (WHO) defines social determinants of health as the conditions in which people are born, grow, live, work and age (Commission on Social Determinants of Health, 2008). The main group of social determinants of health as described by WHO are; a) Physical environment (Including shelter, building, climate and peace). b) Social environment (education, income, social justice, access to health, social support network, and working conditions). c) Biological and behavioural determinants (genetic factors, personal health practices and coping skills, gender, ethnicity and lifestyles). Therefore, to reduce the impact of HIV and TB on communities that are unequally affected, the social determinants must be confronted (Centers for Disease Control and Prevention, CDC 2011). Accounts from this study

indicated that Indigenous peoples are overrepresented in the incidence and prevalence of TB and HIV infections in Saskatchewan, similar to what obtains in the rest of Canada. The factors that are responsible for these inequalities are complex and multifaceted (Dean and Fenton, 2010).

The physical environment is vital in determining the health of Indigenous people, especially in the area of housing shortages and poor quality of existing homes (Bryant et al., 2004). About 50% of the Indigenous population in Canada lives in rural and hard-to-reach communities, where life expectancy is shorter than in most of Canada (Reading & Wein, 2009). From the current study, the remoteness of these communities usually led to decreased access to health and social services. Of great concern are lack of health professionals, counselling services, confidentiality, and difficulty with transportation. Furthermore, unemployment rates for all Indigenous groups continue to be at least double the rate of the non- Indigenous population and Registered Indians have the highest unemployment rate of any Indigenous group (Reading & Wein, 2009).

### 5.6.3 Unhealthy behaviour and lifestyle

Unhealthy behaviour and lifestyle increase the risk or vulnerability of an individual to TB and HIV infections. In this study, the behavioural factors that increase the likelihood of being infected by TB and HIV generally described these individuals as living a risky lifestyle that participants attributed to a history of residential schools. As a result, the individuals who experienced these stressful conditions are involved with alcoholism, injection drug use, and prostitution. Participants in the study described TB as a disease of deprivation, inadequate housing and poverty. There is a strong connection between HIV and drug addiction in which 70%-80% of HIV in Saskatchewan is seen among intravenous drug users (Yang et al., 2010. PHAC, 2016). Also, many of these drug addicts have a history of trauma, neglect, and physical,

emotional, and sexual abuse. The chaos in daily lives includes lack of housing leading to homelessness and high mobility within and outside the province, low-income support, and involvement with criminal activities or sex trade. TB and HIV weaken the patient's physical, social, economic, and mental functioning. Deribew et al. (2009) study included HIV positive individuals with and without TB. They found lower mean scores on all domains for people co-infected with HIV and TB compared to people living with HIV without TB. These patients experienced depression, poor physical health and self-stigmatization as a result of being infected with TB and HIV. In Saskatchewan, the population affected by TB and HIV already experience a lower quality of life, because the majority of those affected are found amongst Intravenous Drug Users (IDU), homeless people, those with a history of child abuse and family violence (Government of Saskatchewan, 2017). It is therefore imperative that measures to alleviate these life stressors should be embedded in the design of intervention programs for TB and HIV. Accounts from a participant in this study noted that there is a need to stabilize the individual first before medication. This notion is supported in the literature by Coates et al. (2008) in which they indicated that a combination of behavioural, biomedical and structural interventions provides the most effective approach to HIV prevention and treatment, and this should be in concomitant to addressing social, economic and cultural barriers that affect community members.

#### 5.6.4 Stigma

The most important interpersonal factor that affects the spread of diseases and utilization of TB and HIV services is stigmatization. Infected individuals are at risk of stigma-related social and economic consequences. It is a widely accepted fact that TB and HIV stigma contributed to a delay in diagnosis and negatively affects treatment compliance (Courtwright & Turner, 2010). The structure of a community's beliefs and norms about a disease and the resulting stigma can

substantially impact health. According to Nyblade et al. (2009), the effect of HIV related stigma on health-seeking behaviour may result in individuals afraid of getting tested. For people living with HIV/AIDS, being stigmatised may result in a delay to seek treatment, and lack of adherence to treatment regimen. In this study patients indicated that they experienced lots of stigmatisation in their communities and this had affected the following; a) Illness disclosure whereby infected patients would not disclose TB or HIV status or only tell those they are associated with. Fear of disclosure, mistrust in healthcare staff and concerns regarding patient confidentiality were frequently cited concerns of people living with HIV/AIDS. b) Utilization of services, because of familiarity with health providers in their communities and confidentiality cannot be assured. c) Adherence to medication, whereby stigma prompted patients to skip medication doses. Similar reasons for nonadherence were documented with TB/HIV co-infection (Gebremariam et al., 2010; Naidoo et al., 2009), particularly when patients lack concurrent social support (Shin et al., 2008).

#### 5.6.5 Addressing Predisposing, Enabling and Reinforcing factors for TB and HIV

Predisposing factors are knowledge, attitude, and beliefs of participants towards TB and HIV infections. Knowledge about and beliefs regarding these infections could impact user acceptability of TB/HIV collaborative program. If knowledge is high and users believe that TB and HIV infection pose a severe threat to health, they are more likely to have a stronger commitment to a TB/HIV infection program. In this study participants expressed that knowledge about TB and HIV infections is improving in the population, but some people call HIV a “dirty disease” or “Gay disease”. Some attributed it to be mainly among the “forgotten people”, that is, Intravenous Drug Users (IDU). Furthermore, there are many misconceptions about the mode of transmission of TB and HIV, and the general opinion is that HIV is a death sentence. Knowledge

about these diseases is believed to be linked with determinants of health-seeking behaviour as well as adherence to preventive measures and treatment (Goudge et al., 2009). Achieving a high level of TB and HIV awareness is essential for the success of prevention and treatment efforts, especially in high-risk groups. Knowledge about TB and HIV could impact user acceptance of a TB/HIV collaborative program and compliance with medical regimens (Deye et al., 2016). Also, to implement HIV prevention strategies among TB patients, it is essential to know the level of knowledge about HIV in a population. Disease-related stigma and knowledge are believed to be associated with patients' willingness to seek treatment and adherence to treatment (Jittimanee et al., 2009). A study in Peru found inadequate levels of knowledge about HIV transmission and prevention among newly diagnosed TB patients (Millard et. al., 2015).

Another predisposing factor is health beliefs about TB and HIV, which is how an individual perceives the risks of having the diseases and the severity of the diseases, and if there is a belief that taking recommended action will lead to a positive outcome (Godfrey-Fausset & Ayles, 2003). The Health Belief Model (HBM) is a psychological model that attempts to explain and predict health behaviour by concentrating on the attitudes and belief of individuals (Glanz & Bishop, 2010). According to Abraham et. al., (2007), the variables in this model are perceived threat, perceived benefit, cues to action, and perceived self-efficacy. Perceived threat consists of perceived susceptibility and perceived severity of the diseases. For example, does the individual believe he or she is at risk of contracting TB through overcrowding, or HIV through unprotected sexual intercourse. Perceived severity indicates whether an individual believes that TB and HIV is a severe or lifelong illness that can lead to death. Perceived benefit is the belief that the strategies designed to reduce the threat of illness are going to be effective. While a perceived barrier is the potential negative consequences including, but not limited to physical,



psychological and financial. Cues to action are triggers that prompts an individual to engage in a behaviour that promotes healthy living and includes interpersonal or environmental cues (i.e. media publicity) that motivates a person to act to improve their health. The cues require perceived self-efficacy to have the confidence in one's ability to successfully act on the cue. This incorporates the need to feel competent to effect long-term change. For example, the attitudes and beliefs expressed by those infected with HIV is the realization that they made bad choices as they go through daily life struggles. They inject drugs intravenously and are not ready to disclose this habit or HIV status.

Enabling factors represent the necessary conditions that must be present for a successful implementation of TB/HIV collaborative programming (Crosby & Noar, 2011). These factors include availability of health resources which can be described in terms of geographical location, human and material resources. In remote and arduous to reach areas, lack and retention of adequately trained health personnel are commonly problematic. These areas also experience a high turnover of staff. Another critical factor is the financial input into the implementation of TB/HIV collaborative programs, and this is tied to strong political will considering that other programs compete for scarce resources. According to Harries et al. (2009), there is a scarcity of printed data on human resources for TB/HIV collaborative program. As a result, it is difficult to comment with sound evidence on the current state of human resources nor the additional human resources required to implement a collaborative program.

Reinforcing factors are attitudes of the people in the community that help to support or make difficult healthy behaviour necessary to reduce the impact of TB and HIV diseases. These reinforcing factors play significant roles in reinforcing positive or negative behaviours through reward, feedback and punishment (Green & Kreuter, 2005). Psychosocial support is an integral

component that care providers regard as essential for people with HIV (Gonzalez et al., 2004). Support for patients and families can have a positive effect on adherence to therapies thereby contributing to the essential aim of integrating prevention with treatment and care (Padian et al., 2011). People Living with HIV/AIDS and TB experience so-called “double stigmatization”. HIV stigma emanates from its association with socially undesirable sexual behaviour (Mbonu et al., 2009). A common cause of TB stigmatization arises from fear of transmission from TB-infected individual to susceptible community members. The effects of stigmatization are the prevention of adequate social and medical care, and people are less likely to disclose infection, therefore, less likely to be tested (Courtwright & Turner, 2010). In this study, the participants expressed that the attitudes of the community members towards patients with TB and HIV varies from place to place depending on the attitude of the community member or healthcare staff. The patients also reiterated that some community members are helpful, and some stay away from you. One of the participants in the study said the LGBTQ community in University of Saskatchewan has good support system.

#### 5.6.6 Gaps in TB and HIV Services

The following gaps emanated from the study:

##### *5.6.6.1 Access to health care*

Access to health care can be described as the appropriate use of personal health services to accomplish the best health outcomes. Attaining access to proper care involves the following specific steps: 1) Enter the health care system. 2) Get access to the location of care facilities where patients can receive needed services. 3) Find a health care provider whom the patients consider as trustworthy and they can communicate with (Levesque et al., 2013). The extent to which a population gains access to health care depends on financial, organizational and social or

cultural factors. (Gulliford et al., 2002). In this study, participants indicated that entering the healthcare system is hindered by the rurality and remoteness of the community in which they live. Also, they must travel to big health centres in Saskatoon, Regina, and Prince Albert to access needed health care services, and for those that live on-reserve lack of transport is a constant challenge. Furthermore, participants expressed concern about the proximity of health services to their area of abode in which they are reluctant to access care because of familiarity with service providers. According to Canadian Institute for Health Information (2011), rural populations are particularly vulnerable with respect to accessing health care because many Indigenous populations live in rural or remote areas. This geographical distance, sometimes compounded with seasonal isolation and lack of transportation, can limit their ability to reach health care services.

#### *5.6.6.2 Funding*

In this study, participants disclosed that funding for TB and HIV is through multiple sources and this has impaired the services provided concerning efficiency and effectiveness of services. Also affected is staff recruitment, role and discipline of health providers due to this differential funding sources. In Saskatchewan funding for TB control services is provided by the Ministry of Health, and various health regions who are responsible for funding “off reserve” Aboriginal populations. The former First Nation and Inuit Health Branch (FNIHB) of Health Canada, now called the Indigenous Health Service (created in 2018) is responsible for provision of funds for “on reserve” Indigenous population, and this includes Northern Intertribal Health Authority (NITHA) which comprises of 33 “on-reserve” Indigenous communities, a partnership of Lac LaRonge First Nations, the Peter Ballantyne Cree Nation, and the Prince Albert Grand

Council. NITHA also functions to design and implement the communities' health programs and employ most of their health staff through funding contribution agreement with FNIHB.

This complex health funding system among the Indigenous populations is attributed to the multijurisdictional funding of health programs in which funds are channeled from Province/Territories, Federal and Agencies. The challenges that emanate from this funding system are lack of coordination and inefficient delivery of services (Storch, 2005).

Funding for HIV in Saskatchewan is through the provincial government, and this is distributed to Regional Health Authorities (RHA) to implement intervention strategies developed by the Saskatchewan HIV Strategy. The funds are used for engagement of clinical expertise, social marketing, education/training, HIV Point of Care (POC) Testing and peer-to-peer pilot programming.

In general health care in Canada is predominantly delivered through a publicly funded health care system. However, this is according to the provision of the Canada Health Act of 1984 (Government of Canada, 1985). Health care is organized, delivered and funded by the ten provinces. The federal government co-finances 20% of total provincial/territorial health care expenditures. The federal government also provides direct delivery of services to Inuit, First Nations residing on-reserves and to those living in their traditional territories; and members of Canadian Forces.

#### *5.6.6.3 Surveillance for TB and HIV*

According to UNAID (2017), surveillance is recognized as the most important activity in understanding the trends of epidemics and make possible sound strategies are developed for responding to them. Surveillance of HIV among TB patients is increasingly seen as important, as

the HIV epidemic has continued to fuel the TB problem and as new solutions have emerged to tackle this developing situation.

This study reveals that in Saskatchewan surveillance of TB and HIV is performed separately and there is no process for sharing data between the two control programs. To achieve satisfactory outcomes concerning health program planning and implementation, the importance of conducting surveillance cannot be overemphasized. Several studies conducted in Canada show inconsistency in the rate of TB and HIV co-infection (Long & Boffa., 2010). The World Health Organization recommends routine, universal HIV testing of patients with TB. In Canada, several official statements and peer-reviewed publications dating back to 1992, have recommended routine, universal HIV testing of patients with TB (Long and Boffa. 2010)

#### *5.6.6.4 Transportation*

In this study, participants expressed difficulty with transportation, and this is particularly felt in rural and remote communities, especially among Indigenous people that live on reserves. The need to travel for treatment and services imposes a financial burden in the form of transportation costs and hotels. The availability of dependable transportation impacts a person's ability to access appropriate and well-coordinated health care. According to a publication by three northern health regions in Northern Saskatchewan, in both the Athabasca Health Authority (AHA) and Mamawetan Churchill River Regional Health Authority (MCRRHA) regions, transportation issues are of primary concern. Three of the AHA communities are accessible only by air and the remaining two have only seasonal road access.

To solve the transportation issue, some First Nation members are covered by Medical Transportation Benefits of Non-Insured Health Benefits (NIHB) Program. The NIHB Program provides a confined range of medically necessary health-related services not provided through

private insurance plans, provincial/territorial health or social programs or other publicly funded programs to eligible registered First Nations and recognised Inuit. The NIHB benefit applies only to status Indians and Inuits, and not include Métis and other Indigenous people who are not eligible for registration under the Indian act (Lavoie & Forget., 2018). This adds to the complexity of the healthcare system amongst the Indigenous population leading to unequal access to health.

#### *5.6.6.5 Coordination of referrals*

According to the WHO successful implementation of TB/HIV collaborative services requires the joint efforts of implementers of TB control programs and HIV control programs as well as their equivalent in nongovernmental organizations, other civil society organizations including communities and faith-based organizations, and the private-for-profit or corporate sector. In this study, coordination of referrals is hindered by factors such as patient's chaotic life, difficulty in accessing services due to location, the high mobility of patients, and insufficient human resources. It is essential that the referral system should be robust enough to capture most patients with the diseases who would then be able to access existing clinical or public health services including any extended coverage.

Most importantly it is required that patient is not lost within the health system thereby leading to catastrophic consequences of disease progression or multi-drug resistant TB. It is therefore essential to identify synergies in both programs and to look for opportunities for entry points that would provide links for counselling, diagnosis, treatment, and prevention services for patients with TB or HIV infections. In this study, participants attributed the frequent loss to follow-up to differences in location and distance of treatment and care.

#### *5.6.6.6 Health System constraints*

The study identified several widespread health system deficiencies and policies that contribute to suboptimal access to TB and HIV services including human resources, staff turnover, medication, laboratory, and adherence support.

High turnover and difficulty in the recruitment of qualified staff were significant themes identified in the study, especially for small and remote communities in Saskatchewan. The study found that many disease-specific health care staff and specialists preferred working in urban communities. According to participants in the study, there are no infectious disease or internal medicine specialists in First Nations communities, and they rely on visiting specialists to conduct clinics. The shortage of specialized staff, and staff shortage in general lead to overburdened staff and inability to successfully manage HIV and TB patients and programs.

The assurance that the public has in the health care system is associated with the availability of safe and effective medicine, and measures put in place to ensure its' rational use. In past decades, advances have been made in HIV therapy with six drug classes comprising 24 individual antiviral agents (Tseng et al., 2012). Patients who are adherent to use of medications with undetectable viral load has made HIV a manageable chronic disease. In contrast to HIV, TB is curable with the administration of effective drug treatment regardless of age, sex, gender or type of TB disease.

##### *5.6.6.6.1 Medication support*

As part of implementing patient-center care a component of WHO's End TB strategy (WHO, 2015), all patients should receive educational, emotional and economic support. In Saskatchewan, participants indicated that there are challenges concerning availability, access, and distribution of TB and HIV medication, especially in rural areas.

Adherence to treatment is crucial to the treatment of TB and HIV infections because it affects the extent and duration of response to TB and HIV pharmacotherapy. Treatment for TB must be taken daily for at least six months, and antiretroviral treatment for HIV is a lifelong journey. However, patients frequently stop taking their medication once they start to feel better. In 1994, WHO (1997) endorsed the strategy of Directly Observed Therapy (DOT) to improve adherence to TB medication by requiring health workers, community volunteers or family members to observe and record patients as they take their medication.

In Canada, DOT is still the standard practice to significantly improve adherence (Alvarez et al. 2015). The challenges to implement DOT for all TB patients are the considerable human resources cost, timing of visits that is appropriate for client and DOT provider, privacy regarding the location of visit, and geographical distance which limits the number of clients one DOT staff can see in a day. Rigid adherence to medication is fundamental to sustained HIV suppression, reduced risk of drug resistance, improved overall health, quality of life, survival, as well as to decrease the risk of transmission (Chesney, 2006).

Adherence to treatment can be influenced by a patient's social situation and clinical conditions, the prescribed regimen, and the patient-provider relationship (Schneider et al., 2004). From participants' perspectives in the study, nonadherence is often due to behavioral, structural, and psychosocial barriers, for example, low level of social support, stressful life events, high-level of substance misuse, homelessness, poverty, nondisclosure of HIV status, denial, and stigma. To improve adherence to TB and HIV medication comprehensive multidisciplinary care is required that would support patients' complex needs. Examples are case managers, pharmacists, social workers, government and non-government stakeholders involved with TB and HIV, and mental health care providers. Drug abuse treatment programs are essential to



address substance use. A respondent suggested a strong link of medication disbursement with methadone therapy because it is rare that methadone patients miss their medication.

#### 5.6.6.6.2 Laboratory support for TB and HIV

This is an essential part of the diagnosis, treatment, prevention and control of TB and HIV. Early diagnosis and timely treatment of any form of drug-susceptible or drug resistance TB are fundamental to control measures. WHO endorses rapid TB diagnostics and DST should be available to all who need it, in line with the TB strategy (WHO, 2017). Delays in laboratory confirmation of TB and reporting of drug-susceptibility results can lead to delays in initiation of therapy, prolonged infectiousness, and inappropriate therapy and missed opportunities to prevent transmission. There is a growing concern in many countries facing extremely high rates of tuberculosis (TB) and HIV co-infection with an increase in multidrug-resistant (MDR) and extensively drug-resistant (XDR) infections (WHO, 2017). According to WHO (2015), the main framework in TB control as it concerns diagnostics are; A) active case finding/systemic screening. This is the systematic identification of people with suspected active TB, in a predetermined target group, using tests, examination or other procedures that can be applied rapidly. B) Contact tracing, TB contacts are people who have close contact with active or infectious TB patients. They are highly susceptible to infection and should be investigated systematically for active TB infection. Screening tools used for TB diagnosis are Radiography of the chest, sputum smear microscopy, growth-based detection, molecular techniques (Nucleic Acid Amplification Testing. NAAT), tuberculin Skin test (TST), Interferon-gamma Release Assay (IGRA). In Saskatchewan respondents identified the following as gaps in the provision of excellent laboratory services; 1) different location of TB and HIV laboratory services. TB control laboratory is in Saskatoon, while HIV is located in Regina. 2) At point of care, getting a patient

to come back for their result of Mantoux test is often problematic.<sup>3</sup>) It is difficult to track down people who need testing and collection of samples. Therefore, it is suggested that a mobile laboratory should be established in rural and remote areas.

#### 5.6.6.6.3 HIV control: Model for success.

In 2014, UNAIDS published an ambitious treatment target to help end the AIDS epidemic called 90-90-90 (UNAIDS, 2017). This states that by the year 2020, 90% of all people living with HIV will know their HIV status, 90% of all people diagnosed with HIV will receive sustained antiretroviral therapy (ART), and 90% of all people receiving ART will have viral suppression (UNAIDS, 2014, p.1). The strategy is to get HIV under control based on the principle of universal testing and treatment. HIV testing is essential to achieve the first 90%, that is, people in a population that will know their HIV status. This service according to WHO entails pre-test information and post-test counselling; linking the patient to appropriate HIV prevention, treatment and care service, and other clinical and support service; and coordinating with laboratory services.

According to a publication by the Government of Canada in 2018, there are several factors associated with achieving each of the 90-90-90 targets. To address the first target will require increased effort on HIV testing uptake by ensuring robust advocacy on risk perception, accessibility of services, community knowledge and awareness. The second target to treat all diagnosed with HIV with ART is a policy that is relatively recent in Canada and would take some time for physicians and patients to adjust to. Prompt initiation of treatment, and more tolerable regimens and adherence support to influence uptake of treatment over time. The third target requires that patients remain engaged to care. In this study, a participant suggested that a clear policy on diagnosis, prevention and treatment, together with an increased effort to track

down people who need testing by use of the mobile laboratory is required and would support a provincial strategy. This is consistent with the WHO's 2015 report on consolidated guidelines on HIV testing services, which advocated that countries should address the testing gap, push testing into the communities, support linkage to care, encourage focused and appropriate targeting, and improve quality to prevent misdiagnosis (WHO, 2015).

In Saskatchewan, there are significant challenges to implement 90-90-90 strategies, which are still not endorsed by the Saskatchewan Ministry of Health and various agencies. However, Dr. Ryan Meili an infectious disease specialist and member of a group called Saskatchewan HIV/AIDS Research Endeavour (SHARE), in news posted in CBC (August 2015), proposed prompt implementation of 90-90-90 strategies to boldly attack the HIV epidemic in Saskatchewan, but necessary resources are yet to be mobilized (CBC news, 2015).

#### *5.6.6.7 Need for collaborative service*

The need for TB and HIV programs to collaborate was internationally recognised by WHO in 2004 when an interim policy was published by WHO's HIV department and Stop TB (WHO, 2004). In areas with high TB and HIV incidence and prevalence, it is essential to ensure effective coordination between TB and HIV services so that patients can access the care they need from both services. This is especially important in TB/HIV co-infected patients where they have to navigate two separate health care systems, thereby leading to additional time and transport cost. This view was expressed by participants in the study in which collaboration should be extended to other pertinent specialities, for example, Addiction and Infectious diseases specialities.

Successful implementation of TB and HIV collaborative activities depend upon the background knowledge of the epidemiological, socio-economic, behavioural and administrative

characteristics that affect the diseases and therefore, tailoring interventions in a manner that enables logical introduction into existing programs that are often overwhelmed with large numbers of patients and a deficiency of human and other resources (Howard & El-Sadr, 2010). Furthermore, building on well-established TB control infrastructure would be cost effective due to long-term experience in providing, monitoring, and supervising the care of patients (Harries et al., 2006).

According to Friedland et al. (2007), three types of models are proposed for a TB/HIV collaborative program (Fig 5.2). In this study, participants expressed different preferences to which model is the ideal (Model 1) Referral model of a patient between separate TB and HIV programs. Patients seek HIV testing service, HIV care and treatment support at a different location than the TB clinic (Model 2) Partial integration of services. This can be achieved through deliberate efforts by health providers and facilities to ensure that services are delivered on the same day, within the same facility, but not the same staff or in the same clinic (Model 3) Full integration of services, TB and HIV services (Counselling, and testing for HIV, ART, TB screening and treatment) are provided in the place by the same staff (Ansa et al. 2012). Despite different delivery models, it is expected that outcomes should be identical by ensuring TB treatment success-cure/completion of therapy, reduction in HIV disease progression and mortality, and a decrease in transmission of both diseases (Friedland 2007).

In a study by Daftary et. al. (2007) in South Africa, patients compared their experiences at TB and HIV clinics. At the TB clinics, they complained of lack of individual attention and privacy, and referral to DOTS and hospital facilities were rushed and impersonal. In comparison, they found that services for HIV were more personalised and attitudes were friendly. Also, some patients refused to access HIV services at TB and/DOT clinic out of fear of status disclosure or

being recognised by neighbours due to where HIV clinic is not far from home. This is especially significant in rural and remote areas where everyone knows each other. This is similar to what participants alluded to in this study.

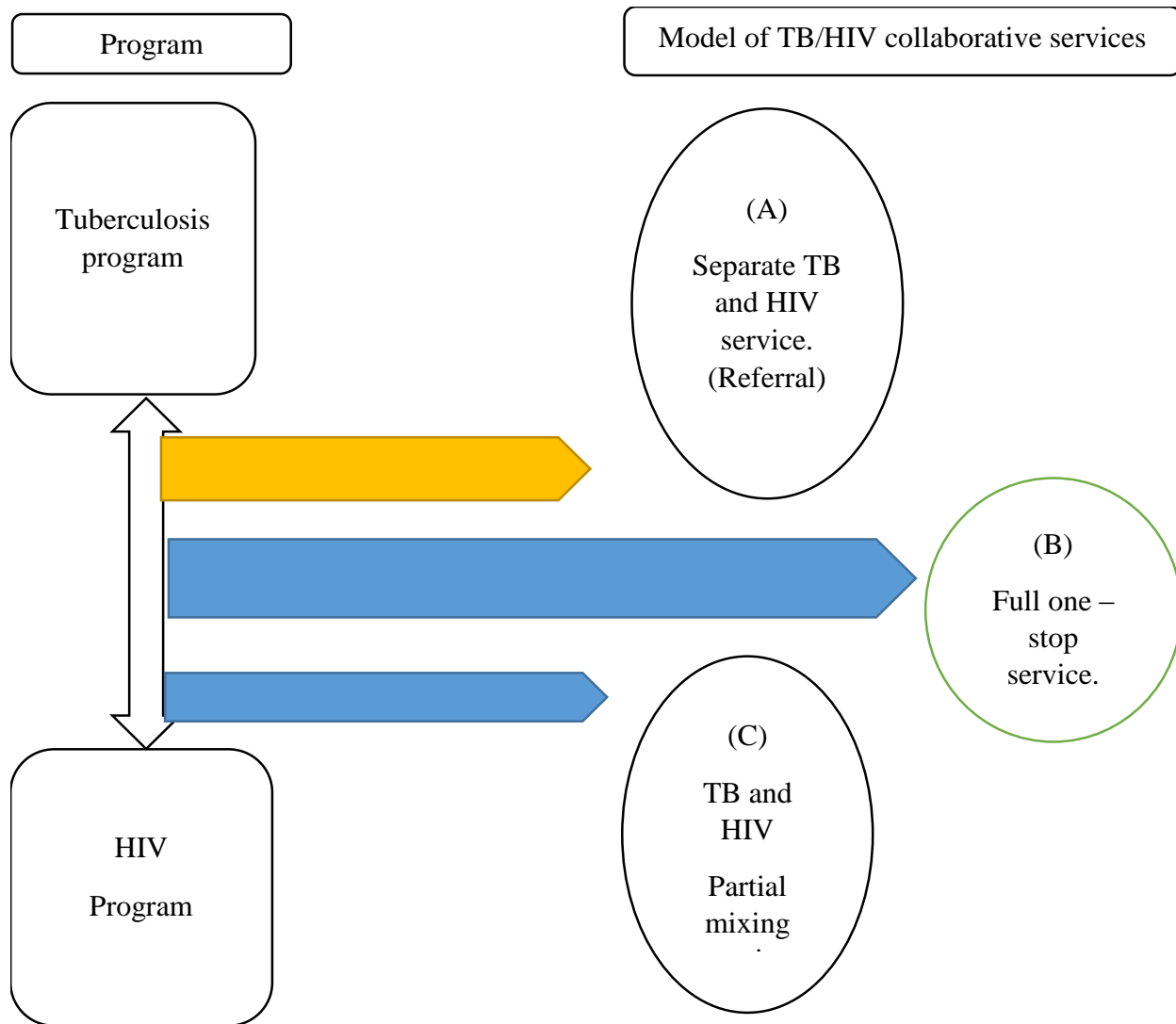


Figure 5.2: Model of TB/HIV collaborative services.

### 5.7. Conclusion

The primary purpose of this study is to make a case for the establishment of a policy on TB and HIV collaborative services in Saskatchewan. There is no policy on collaborative programming even though the statistical evidence pointed towards a high incidence and prevalence of TB and HIV in the province, especially among the Indigenous peoples living in urban, rural, on and off-reserve areas. Therefore, there is an urgent need to plan for an

appropriate intervention that is effective and sustainable and would reduce the epidemic of TB and HIV in affected or vulnerable populations. The plan should include strategies that would address all aspects of the social determinants of health, that is, physical, social, economic, environmental, biological and behavioral factors that affect TB and HIV in Saskatchewan communities. In addition, it is crucial to provide appropriate human and material resources and establish inter-sectoral collaboration with other services from within the health sector and beyond, including civil society, professional associations, international, inter-governmental and non-governmental organizations, that are essential to TB and HIV prevention, control and treatment. Also important is ensuring that intervention strategies adopt a sustainable people-centred integrated care that support adequate housing and diet, support from family and friends, socially stable environment, good employment and working conditions, proper education and literacy.

To accomplish the establishment of this TB/HIV collaborative policy, this study started with a needs assessment study, which involved a systematic approach to data gathering and analysis that identified the population health needs and priorities, the situation analysis of TB and HIV in the population, the present state of implementation of intervention programs, and met and unmet needs. The PRECEDE aspect of the PRECEDE-PROCEED model was used as a guide to formulate appropriate questions in the semi-structured interviews that were used in the needs assessment.

Using the PRECEDE framework helped to provide a template to develop a consistent procedure for evaluating TB/HIV programming. Furthermore, the model gives relevant information about social, epidemiological, environmental, behavioural, and administrative factors that affect TB and HIV infections in the Saskatchewan population. The results of this

study gave insight into the identification of gaps in the present implementation of TB and HIV control programs in Saskatchewan, which is described under the following headings; access to health care, funding structure for TB and HIV programs, surveillance for TB and HIV, transportation challenges, coordination of referrals, and health system constraints. The PRECEDE framework was effective in identifying the met and unmet needs of the current TB and HIV programs in Saskatchewan and elements for a collaborative program that will lead to improved program performance and improve outcomes.

To achieve an efficient joint TB and HIV programming, there should be harmonisation of evidence-based national and provincial policies and program direction established on internationally acceptable policies and guidelines. The results from this needs assessment can be used to plan and implement TB/HIV collaborative programming in Saskatchewan (paper 3).



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## 6. Paper 3: TB/HIV COLLABORATIVE PROGRAMMING: POLICY GUIDELINES ON IMPLEMENTATION

### 6.1 Contribution of Paper 3 to the thesis

Paper 3 proposes a means to intervene in the epidemic of TB and HIV in Saskatchewan, using evidence-based methods of diagnosis of social, epidemiological, behavioural, educational and administrative factors in PRECEDE aspect of PRECEDE-PROCEED model. The results from paper 2 were used to develop a logic model which provides the framework for implementation. This paper is yet to be published.

### 6.2 Abstract

**Objective:** To develop policy recommendations on the implementation of TB/HIV collaborative programming in Saskatchewan through the application of a locally developed logic model combined with WHO recommendations with the goal of reducing the incidence and prevalence of TB and HIV in Saskatchewan.

**Method:** The process of developing the Logic model for TB/HIV collaborative programming in Saskatchewan consisted of 3 steps; Step 1 is the exploratory step or needs assessment step in which the PRECEDE model, social, cultural, epidemiological, behavioural, environmental, and administrative assessments, were utilized as a template to design interview questions for the needs assessment data collection, (Paper 1). Step 2 involved data analysis and identification of unique factors that affect the epidemiology of TB/HIV in Saskatchewan (Paper 2). Step 3 is the intervention step, with the primary objective of defining specific evidence-based interventions and activities to target identified factors that affect the occurrence of TB and HIV. Also, the result of data analysis was incorporated into WHO recommendations for TB/HIV collaborative



activities (2012) to form the logic model. The overall goal of TB/HIV collaborative activities is to establish and strengthen the mechanisms for delivering collaborative/integrated TB and HIV services, which in effect will reduce the burden of TB in people with HIV, and also reduce the burden of HIV in patients diagnosed with TB.

**Results:** A logic model which graphically depicts the relationships between the objectives, input, activities, and outcomes for implementing TB/HIV collaborative programming in Saskatchewan, Canada, was designed.

**Conclusion:** Collaborative TB and HIV programming in Saskatchewan is expected to bring about best practices in social support, clinical care, and public health strengthening necessary to reduce the incidence and prevalence of TB and HIV in the population. This collaborative programming will also lead to efficient use of both human and financial resources through the search for, and eliminating, areas of service duplications in both programs. Furthermore, synergised program management and efforts in the areas of surveillance and data management, laboratory services, drug management, treatment, health education/ promotion, monitoring and evaluation will result in better health outcomes and enhanced impact.

### 6.3 Introduction

The synergistic relationship between TB and HIV infections potentiates the incidence and prevalence of both diseases in the population. The lifetime risk of a person infected with TB to develop clinical TB is 5-10% in an HIV negative person, whereas it is 50% in an HIV positive person (Corbett et al., 2007). Therefore, in settings where the prevalence of HIV is high, TB is the most common infection to develop among people living with HIV. This reality indicates that TB control will not be accomplished unless a joint HIV control is put in place.

The improvement of outcomes of both diseases depends upon looking at varying degrees of collaboration and integration between existing TB and HIV programs (WHO, 2004). WHO started a collaborative pilot program in 3 sub-Saharan African countries (Malawi, Zambia and South Africa) referred to as the ProTest (promotion of voluntary testing), the project aimed to develop a district-based strategy for a joint TB and HIV response. Evaluation of these projects shows that TB and HIV control programs can work together effectively by providing comprehensive prevention, care and support services for people living with HIV/AIDS and/or TB. Also, collaborative activities were both necessary and feasible (Howard et al., 2012). Terris-Prestholt et al. (2008) in the study of the cost of Zambia ProTest initiatives that integrate TB and HIV services among people living with HIV concluded that when the two services are integrated, or there is some form of collaboration, it is relatively inexpensive. Also, collaborative programming has the advantage of prompt diagnosis of HIV among patients with TB or HIV among TB patients resulting in early initiation of life-saving TB or HIV treatment (WHO, 2012). Established in 2001, the global TB/HIV working group was charged with the responsibility to advise the WHO on the development of policy on collaborative TB/HIV activities and to identify key activities to decrease the burden of TB and HIV infections in populations affected by both diseases (WHO, 2004). WHO global initiatives and initial results support the need for collaborative programming (WHO, 2009).

In Canada, TB and HIV control services remain separate and often fragmented and are likely to lead to suboptimal outcomes. Canada operates a federal system of government and health costs are shared across federal, provincial, and territorial governments. Health care delivery to most of the population is by the provincial government, while the federal government is responsible for health care services to specific populations including First Nations people

living on reserve, Inuit communities, and federal prisons (Government of Canada, 2016). The federal government also provides policy direction on health matters in partnership with provincial and territorial governments. Also, the federal government provides funds for the health systems, health research, and enforcement of health regulations.

Funding for TB and HIV care is derived from multiple sources, fragmenting care delivery and accountabilities. Separate initiatives for HIV and TB control in Canada have been implemented. For HIV, in 2005, the Government of Canada launched the Federal Initiative to address HIV/AIDS in Canada (Government of Canada, 2012). This initiative provided funding for prevention and support programs reaching key priority populations, as well as research, surveillance, public awareness, and evaluation (Government of Canada, 2013). The goals were to prevent the acquisition and transmission of new infections, slow the progression of the disease, improve quality of life, and reduce the social and economic impact of HIV/AIDS. In response to substantial increases in HIV since 2003, a provincial leadership team was established to develop the Saskatchewan HIV strategies. The goals were similar and linked to the federal initiative which includes a reduction in the number of new HIV infections, improving the quality of life for HIV infected individuals, and reduction in risk factors for acquisition of HIV infections (Government of Canada, 2012)

The Government of Canada demonstrated its commitment to reducing the burden of TB in the population through implementation of a “Federal Framework for Action” that addressed the high rates of TB within affected communities and the factors that propagate the spread of the disease (PHAC, 2014). This framework focused on the population that contributed to the high burden of TB, which are, Canadian-born Aboriginal people and foreign-born individuals from high endemic TB regions. The goal was to reduce the incidence of reported TB cases by 3.6 per

100,000 or less by 2015 (this goal is yet to be achieved). The TB Partnership Working Group was established to ensure a collaborative approach to addressing the complex issues that contribute to TB in Saskatchewan (Government of Saskatchewan, Ministry of Health, 2013, pg. 8). The goals are linked to that of the federal framework for action against TB. Membership includes TB Control Saskatchewan, the Ministry of Health, regional health authorities, First Nations health authorities, and First Nations and Inuit Health Branch (FNIHB) of Health Canada.

The Federal and Provincial responses to TB and HIV co-infection are minimal. The actual level of TB-HIV co-infection in Canada is unknown, which is attributed to a lack of concurrent surveillance for the two diseases (Long & Boffa 2010). The Canadian Tuberculosis Standard recommended that all people with active TB disease should be tested for HIV and all HIV-infected people should be assessed for active TB or exposure to TB (Alvarez et al., 2014). There is no established policy toward TB/HIV co-infection programming in Saskatchewan, but the screening of TB patients for HIV and HIV patients for TB is promoted. As recommended by WHO, collaborative programming is necessary to reduce the burden of both diseases (WHO, 2009)

### 6.3.1 Rational for Collaborative Program

TB/HIV collaboration is mainly about changing the process of care, and multidisciplinary collaboration is expected to enhance the focus on patients, improve coordination, and maintain continuity (Ansa et al. 2012). At the program management level, Tuberculosis and HIV prevention and control programs share mutual concerns. HIV prevention care and treatment should be a priority for tuberculosis control programs, and tuberculosis prevention and treatment should be a priority concern for HIV prevention and control programs because both diseases impact the morbidity and mortality of each other. It can, therefore, be concluded that joint

program planning, implementation, and coordination of activities is critical to the successful control of both diseases.

#### 6.4 TB/HIV Collaborative Programming in Saskatchewan

The proposed Saskatchewan TB/HIV Collaborative Programming model is based on objectives recommended by the WHO (2012). Also, the various activities to implement these objectives were derived from the analysis of participants' responses to interviews in the study. The WHO's objectives are: "*(1) establish and strengthen collaboration between TB and HIV control programs; (2) reduce the burden of TB in those with HIV, and (3) reduce the burden of HIV in patients with TB*" (WHO, 2012, p. 9). The logic model for TB/HIV programming (Fig. 10) is the visual representation of the major elements of the suggested program for Saskatchewan. The structure identifies the main program components (objectives, inputs, activities and outcomes) and how they relate. It is a useful tool to build understanding and clarity about the program, identify resources needed for sustainable implementation, identify the sequence of activities that should be implemented, and serve as a basis for program evaluation

In this study, a total of 19 participants were interviewed using the PRECEDE framework as the template for the semi-structured interview to do the needs assessment. Analysis and interpretation of data collected were done using framework analysis which identified the social, cultural, epidemiological, environmental, and administrative factors that affect the epidemiology of TB and HIV in Saskatchewan. After that, the results of data analysis were incorporated into WHO recommendation of TB/HIV collaborative activities to form a logic model.

The process of how the results from PRECEDE model are incorporated to describe the logic model are described in the table below.

Table 6.1: Process of how results from the PRECEDE model are incorporated to describe the logic model

<b>PRECEDE model</b>	<b>Result from study</b>	<b>Logic model</b>
Phase 1 and 2 Social and Epidemiological diagnosis	a) High TB and HIV rates b) Socio-economic determinants e.g. poverty, poor housing, sexual and emotional abuse, history of residential school system.	<i>Objectives:</i> Establish and strengthen mechanism of collaboration between TB and HIV. <i>Input/Activities</i> -Set up TB/HIV coordinating at provincial level -Determine TB and HIV prevalence in the community -Develop operational guidelines for TB/HIV collaborative programming that would link to other relevant agencies that are responsible for reduction of socio-economic impact on TB and HIV in the communities. -Improved accessibility of services to make sure that patients get appropriate treatment and care by trained staff -Establish high level laboratory that would aid surveillance through routine offering of HIV and TB counselling and testing.
Phase 3	<i>Behavioral diagnosis</i> -Chaotic life style -drug addiction, alcoholism, unprotected sexual practice, needle sharing  <i>Environmental diagnosis</i> -Large geographic areas which are mostly rural -Saskatchewan northern communities	<i>Objectives:</i> Reduce the burden of TB in people living with HIV and HIV in people with TB <i>Inputs/activities</i> -Enhanced harm reduction services to prevent the spread of HIV and reduce other harms associated with drug use (e.g. easy access to clean needle, methadone therapy under medical supervision

<p>Phase 4</p>	<p><i>Predisposing factors</i>  Misconception about mode of transmission</p> <p><i>Reinforcing factors</i>  Minimal support from peers, community members</p> <p><i>Enabling factors</i>  -Inadequate manpower and lots of turnover of staff  -Limited and different sources of funds  -Difficulty in setting up appointments  -Transportation difficulty</p>	<p>-Reduction of stigmatization and discrimination through targeted information, education and communication for community members, people who inject drugs and sexual partners.  -Ensure comprehensive contact tracing  -Improve resource mobilization, alignment and deployment.  -Provide adequate workforce, and training  -Provide access to efficient and subsidized medical transportation especially in rural and remote areas</p>
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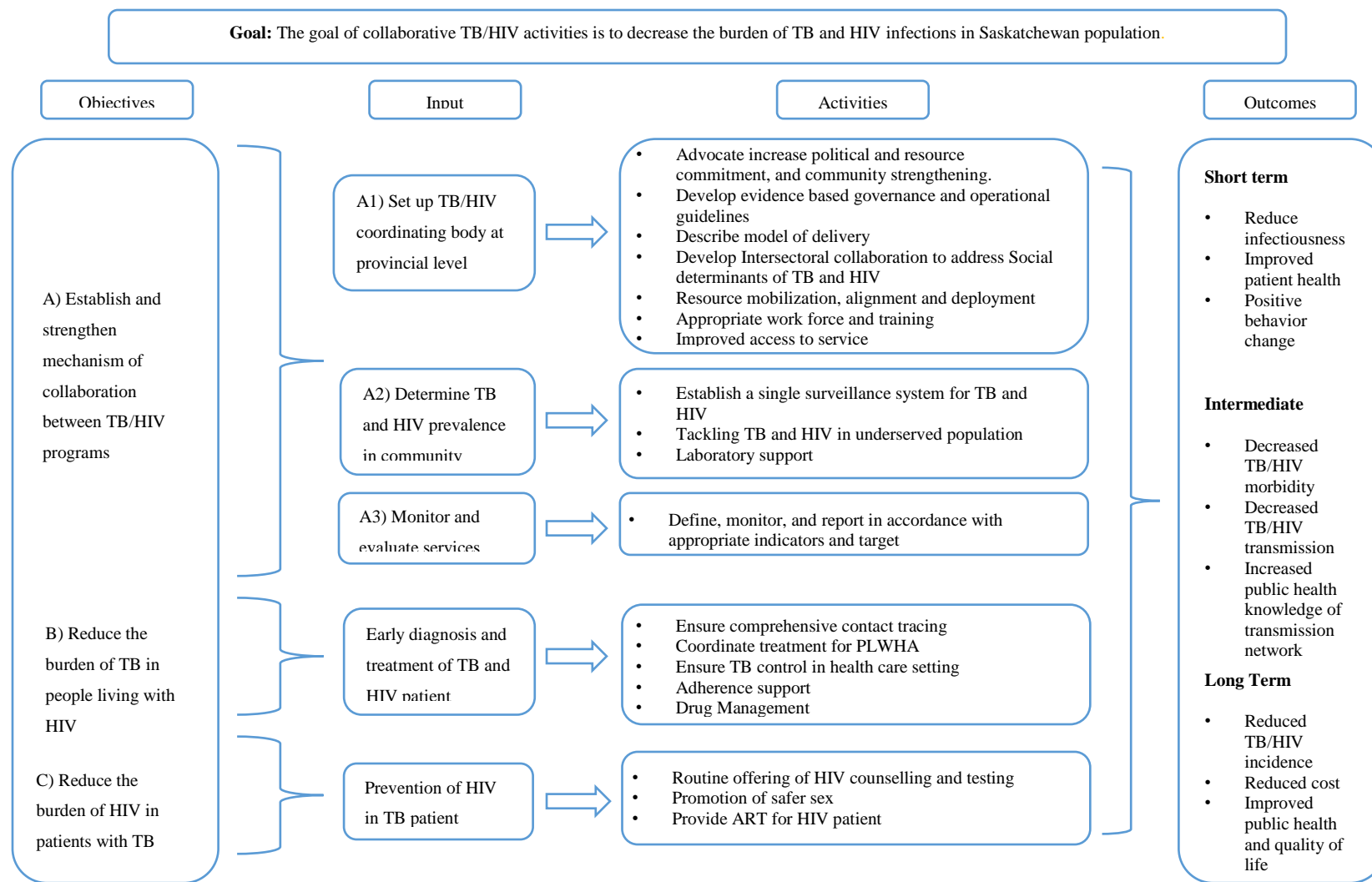


Figure 6.1: Logic Model for Saskatchewan TB/HIV collaborative program



#### 6.4.1 Objective 1: Establish and strengthen mechanism of collaboration between TB and HIV control program

According to The Global Funds (2008), the purpose of TB and HIV joint programming is for a better concentration of resources and harmonization of efforts that will lead to enhanced efficient, effective and sustainable services. Identifying areas for alignment of plans, and improving support systems and integration of services will, in turn, result in stronger collaborative TB/HIV activities (The Global Funds, 2008). The guiding principle should be that the provincial TB and HIV programs collaborate to ensure people with TB and HIV receive a continuum of high-quality care that is devoid of discrimination and stigmatization. In Saskatchewan, the participants expressed disconnection between TB and HIV control programs regarding lack of policy for collaborative services, data collection, access to services, the model of collaborative services, and building of partnerships with communities, stakeholders and other relevant Government services.

According to Havlir et al. (2008) implementation of collaborative TB/HIV activities requires coordination between TB and HIV programs at all levels. Therefore, inputs to achieve each objective in the logic model were derived from a combination of WHO recommended activities for TB/HIV collaboration, gaps identified from the study, and TB/HIV collaborative initiatives from other countries (for example, European Union countries, South Africa, Zambia, Botswana, Myanmar, and Nepal).

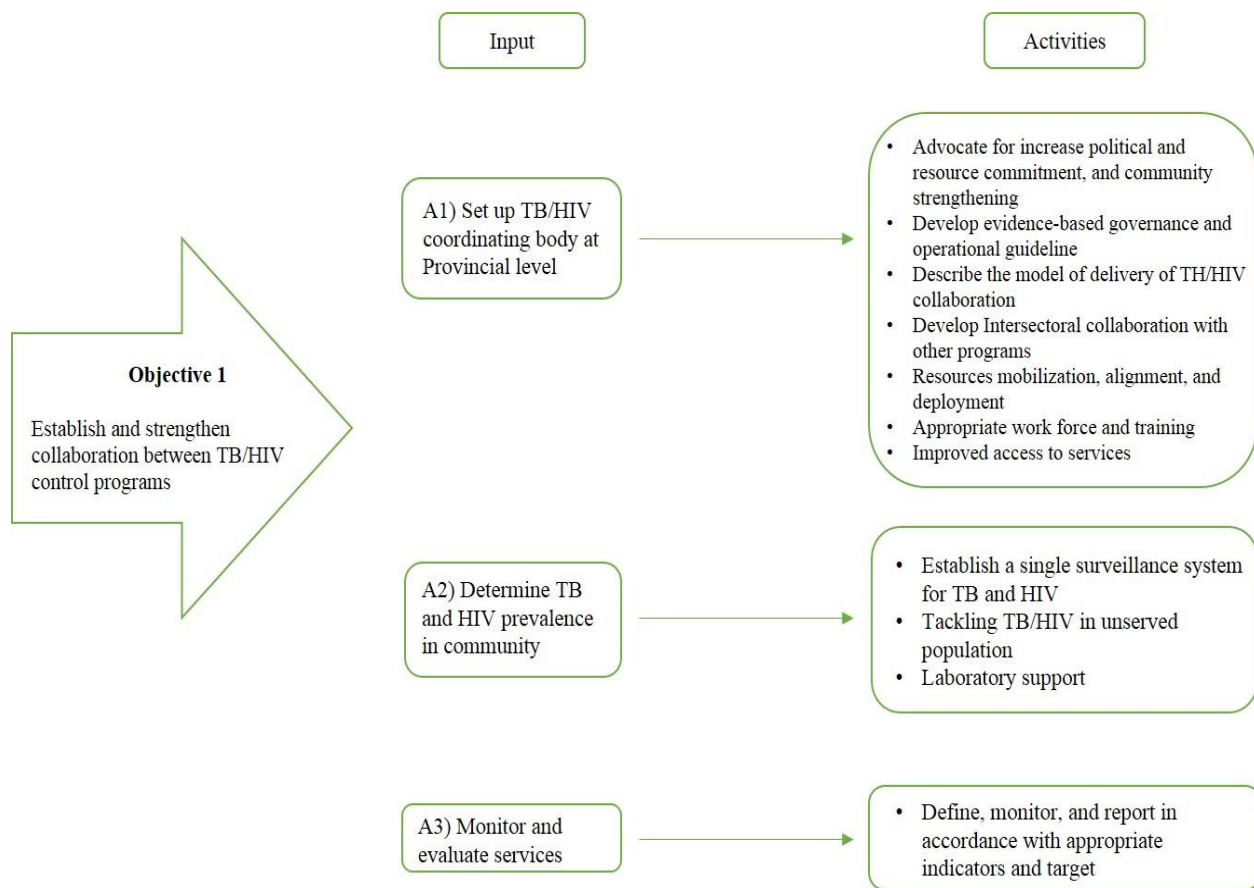


Figure 6.2: Excerpt of logic model for Objective 1

6.4.1.1 Objective 1, Input A1: Set up a TB/HIV coordinating body at the provincial level.

At the provincial level members will be drawn from the existing TB partnership working group, Saskatchewan HIV provincial Leadership team (HIV PLT), community leaders from “high incidence TB and HIV areas,” Community based organizations in Saskatchewan province, and non-governmental organizations. (Appendix E for a list of CBOs, NGOs’ and Stakeholders in Saskatchewan).

The role required from this coordinating body at the provincial level are to advocate for increased political and resource commitment to TB/HIV collaborative activities and develop

joint capacity building. Joint capacity should include, governance and operational guidelines, planning, coordination and implementation of collaborative TB/HIV services. This is similar to the proposed implementation TB/HIV collaborative programming in Ethiopia, Kenya and Rwanda sponsored by United State President’s Emergency Plan for AIDS Relief (PEPFAR), (Howard et al. 2012). Furthermore, this body should come up with the models of delivery of TB/HIV collaboration/integration that are evidence-based, client and family-centered, and compatible with national, provincial, health regions, and First Nations health authorities. In this study, there are differences in opinion about the model of service integration/collaboration among patients and service providers. The service providers and stakeholders prefer referral or partially integrated model, that is patient may either access TB services and be referred for HIV care or HIV care and be referred for TB services, the reason being that not all of them has the expertise or the training to provide both TB and HIV services at the same location. Patients prefer the fully integrated model whereby access to both TB and HIV care are in one location, because key clinical services like screening, voluntary counselling and testing, comprehensive medical management, screening and treatment for substance abuse can be obtained in one location without loss to follow-up. According to the Global Fund, it is essential to recognize that there is no” one- size –fits- all” approach but there should be a strong consideration for “one-stop service” approach in which integrated services begin at the patient’s entry point. Finding a balance that meets the patient needs yet satisfies the service provider is an important programming aspect that needs to be addressed before program implementation. Also, they should develop inter-sectoral collaboration with other programs, especially those that cater to alleviating social determinants that impact both diseases. Examples are; Mental Health and

Addiction action plan, housing, transportation, and health education, which is like what participants said in the study.

The most important consideration is the type of service that will be efficient, effective, and accessible to patients. The choice of type of collaboration /integration depends on many factors, such as availability of human resources, location of existing facilities, government policies, and infection control consideration.

There is a need to ensure an appropriate workforce are available to deliver collaborative TB/HIV control. The success of TB/HIV collaborative activities depends on having good quality and adequate staff. From the responses of study participants, it is apparent that there is a shortage of human resources concerning quality and quantity to cope with the burden of TB and HIV. The challenges identified are, a) insufficient Directly Observe Therapy (DOT) providers at the community level, b) difficulty in recruitment of infectious diseases specialist doctors to cope with long waiting list of newly diagnosed TB and HIV cases, c) high turnover or inability to retain qualified staff in rural and remote areas especially in far northern Saskatchewan, d) need for training or re-training of staff to cope with TB/HIV co-infection, e) need for interdisciplinary teamwork to provide addiction and harm reduction services, f) and differential hiring of staff by government organizations which create challenges in supervision and accountability role of TB and HIV program workers. For example, TB workers in on-reserves communities are hired by Health Canada, whereas the health regions are responsible for hiring off-reserve workers. To ensure appropriate workforce, the health region and First Nations organizations need to give realistic estimates of human resources needed to deliver TB/HIV services. In addition, there should be financial incentives for working in rural and remote areas with the goal of retaining their services. It is important to strengthen the role of Non-governmental organizations,

community-based organizations and other relevant stakeholders to provide support programs for TB and HIV services at the community level. To improve competencies in the management of TB and HIV infections, it is essential to provide training to staff on a regular basis.

Health outcomes improve with better healthcare access, and the extent to which a community gains access to health services depends on socio-economic, cultural and environmental conditions that prevail within the community. (Gulliford et al., 2003). Limited or poor access to TB and HIV services leads to advanced disease situations that are catastrophic for the patient. From this study, the following factors are barriers that affect access to health care;

1. Physical and environmental barriers. According to the participants, Northern Saskatchewan poses the geographical challenge in terms of communities spread out over a very vast area. This geographical distance, sometimes compounded by seasonal isolation and lack of transportation especially among First Nations that resides off- reserves, limit patients' ability to reach health care services.
2. a) Barriers at health facility level: The participants identified the following challenges; location of health facilities, difficulty in arranging appointments which may be due to patients' life circumstances, lack of coordination of referrals which may lead to difficulty in navigating the health system, difficulty in getting medications, and shortage of staff. b) Barriers at health worker level: The health workers play a crucial role in providing caring, non-discriminatory and quality health services to patients with HIV and TB. However, different behavioral patterns that often emanate from the health workers have direct influences on the health-seeking behavior of the patients. The participants identified common behaviors displayed towards them as negative and are perceived as stigmatizing behaviors. c)

Barriers at the patient/community level: The main barrier at this level is the fear of stigma and discrimination.

Therefore, to improve access to health care services, it is recommended that coverage of existing Medical Transportation Benefit of Non-Insured Health Benefit (NIHB) should be expanded to include all Indigenous peoples living on and off reserves and Metis, because now there are criteria to be eligible for this benefit. This is expected to improve honoring of dates and time of appointments and easy identification of where health facility is located. A joint TB/HIV advocacy, media communication, and social mobilization should be developed to ensure consistent communication that would target the individual needs of clients and patients. It is also critical to build partnerships with communities, PLWHA, NGOs, the private sector and stakeholders to address and raise awareness to tackle stigma among populations at high risk. These recommendations were consistent with that of Okot-Chono et al. (2009) who indicated that implementation and utilization of collaborative TB/HIV services would remain suboptimal if barriers to TB and HIV programs are not identified and addressed, especially in the area of policy dissemination, training health providers, logistics management and monitoring.

**Community empowerment:** This should be an essential component of joint TB and HIV programming and with the focus on the delivery of integrated community-based TB and HIV services. Community-based organizations often have the comparative advantage of knowledge and understanding of the local context and have more flexibility in adapting to local situations. Community systems also tend to have more capacity to function in difficult-to-reach, remote areas and conflict zones, which offers a unique opportunity for increased efficiency and maximized synergy between relevant programs. The critical issues as adduced by respondents in this study are the varying attitudes of peers and community members to people with TB and

HIV. The participants also indicated that in some First Nations reserves HIV is vilified, while in other reserves stigmatization is less experienced by patients as a result of nonjudgmental leadership and healthcare staff. Implementing community strengthening system is consistent with the core components of The Global Fund (2014), which are;

*A) Providing enabling environments for improving policy and governance affecting the determinants of TB and HIV epidemiology. B) Identifying community networks and relevant stakeholders to coordinate effective collaborative activities for TB/HIV. C) Ensure adequate funding, human resources and organizational capacities. D) Planning service delivery should be comprehensive to ensure proper accessibility to all in need of the service. F) Effective monitoring and evaluation should be embedded into program planning and implementation. (The Global Funds, 2014, pg.6)*

People living with HIV/AIDS (PLWHA) and those infected with TB have always been stigmatized leading to profound social consequences that are linked to their rights, self-identity, accessibility to health care service and social interaction (Mawar et al., 2005). Daftary et. al, (2012) in her study of TB and HIV co-infected patients in South Africa described a unique form of stigmatization because of the dual diagnosis. According to Daftary et. al. (2012), even though HIV was the driving factor behind disease-related stigma and discrimination, the intricate association between the two illnesses led to identities associated with TB becoming even more undesirable and stigmatized. Therefore, integrated services may reinforce negative public perceptions and could impact on the uptake of TB care. In this study respondent that are HIV positive indicated their reluctance to disclose to others their HIV status and would not access TB/HIV facilities that are close to their area abode due to fear of being recognized.

The activities to strengthen the community against TB and HIV stigmatization involve raising community awareness and addressing fears and misconceptions. Possible avenues include provision of information on TB and HIV in acceptable written form, mass media and meetings with relevant community members (Courtwright & Turner, 2010).

*6.4.1.2 Objective 1, Input A2: TB and HIV prevalence in the community.*

Surveillance of HIV among TB patients and TB among HIV patients is recognized as necessary in TB/HIV collaborative programming because HIV epidemic continues to fuel the global TB epidemic. It is therefore essential to ensure that HIV positive TB patients are identified and treated accordingly (WHO, 2012).

*6.4.1.2.1 Establish single surveillance system.*

According to participants in the study, TB programs do not have access to HIV data because both programs work in “silos”. Therefore, data for TB and HIV co-infection cannot be easily verified. Surveillance is critical to monitoring the progress of implementing TB/HIV co-infection programs. It is essential that accurate data be reported from both TB and HIV programs and shared with appropriate staff in the community, health region and at provincial and national levels. Information collected when analyzed will enhance communication, planning and execution of prevention and care programs. According to the WHO (2014), evidence from descriptive studies has shown that robust HIV surveillance among TB patients is critical to understanding the trends of the epidemic and in the development of sound strategies to address the dual TB/HIV epidemic. In addition, community-based studies have reported high rates of undiagnosed TB both among people living with HIV and HIV-negative individuals (Wood, 2007).



To determine the prevalence HIV among TB patients and TB among HIV patients in the populations require the establishment of an effective surveillance system that allows for early detection of any warning in TB-HIV epidemiology and calls for adequate action through a better understanding of the magnitude of the problem. This can be achieved by offering provider-initiated diagnostic counselling and HIV testing to all TB patients with an option to opt out, which is HIV test performed on a patient after notifying him or her that the test will be performed, the patient has the option to decline. Furthermore, there should be effective referral linkages between TB program, HIV program and harm reduction services to ensure access TB and HIV prevention, diagnosis, treatment inclusive of drug treatment services for people who use drugs.

All people living with HIV should routinely be screened for TB using a clinical symptom-based algorithm (Getahun, 2011) which are current cough, fever, weight loss or night sweats at the time of first presentation for HIV care or contact with a health-care worker.

#### 6.4.1.2.2 Tackling TB and HIV in underserved and vulnerable population.

TB and HIV infections tend to affect the same subpopulation of high risk and socially marginalized groups comprising of injecting drug users, prisoners, homeless people, sex workers, and men who have sex with men (MSM). In Saskatchewan, the Indigenous and rural Indigenous population are mostly affected. These groups are at the risk of delayed diagnosis, drug resistance, and poor treatment outcome. Participants in the study well articulate this socio-economic determinant. According to them, TB and HIV are mostly among drug users, those involved in the sex trade, chronic alcohol users and sexual transmission. Also, poverty, residential school survivors, and factors that create a low self-image or poor self-esteem are also implicated as socioeconomic determinants that affect TB and HIV.

Those affected by TB and HIV also have a history of trauma: abuse, neglect, sexual abuse, physical abuse, emotional abuse and neglect. All these problems create profound challenges to navigate a complex health care system. As a result, it is highly essential to give priority to these groups with “chaotic” lifestyles to improve the efficacy of TB/HIV intervention program because the effectiveness of program depends on psycho-social stabilization. Patients will find it difficult to access health care if they must contend with underlying social problems

Activities for tackling TB and HIV in underserved populations are; a) Establishment of integrated, multidisciplinary, case management support for underserved and vulnerable population, with the involvement of appropriate stakeholders, NGOs, and CBOs in Saskatchewan that have necessary skills, organization and resources that would manage people with complex social and clinical needs. b) Ensure a standard of TB/HIV health care in prisons (WHO, 2016).

#### 6.4.1.2.3 Laboratory services.

Laboratories play a central in TB and HIV control and surveillance as well as patient diagnosis and care. According to WHO (2009), essential to care of patients with TB and HIV is *“a robust network of TB and HIV laboratories with adequate biosafety, modern methods of diagnosis, standard operating procedures and appropriate quality assurance”* (WHO, 2009, pg. 26)

Strengthening the provincial laboratory system is critical to the implementation of TB and HIV collaboration. As suggested by a participant in the study, the resources that go into communicable diseases should be under one group. Presently, the HIV and Hepatitis C laboratory is under communicable disease in Regina. This is completely separated from the TB control laboratory which is based in Saskatoon.

Activities for TB and HIV laboratory services in Saskatchewan derived from the study, and which are also in conformity with some the suggestions made by Hochgesang et al. (2017) are; a) Provision of common laboratory services for TB and HIV based in the same facility. In remote and hard to reach areas, mobile laboratory services should be provided. b) Strengthen TB/HIV collaborative activities through routine HIV testing of all TB patients and routine CD4 count for all HIV positive TB patients. c) Establish policies that would improve information management system, that is, specimen tracking, test result reporting, information sharing between TB and HIV programs and between physicians and public health officials.

*6.4.1.3 Objective 1, Input A3: Monitor and Evaluate services*

HIV program and TB-control program should lay the foundation for coordinated indicators to collect data for monitoring and evaluation of collaborative TB/HIV activities (WHO, 2009 p. 19-41). (Appendix F).

**6.4.2 Objective 2: Reduce the burden of TB among people living with HIV**

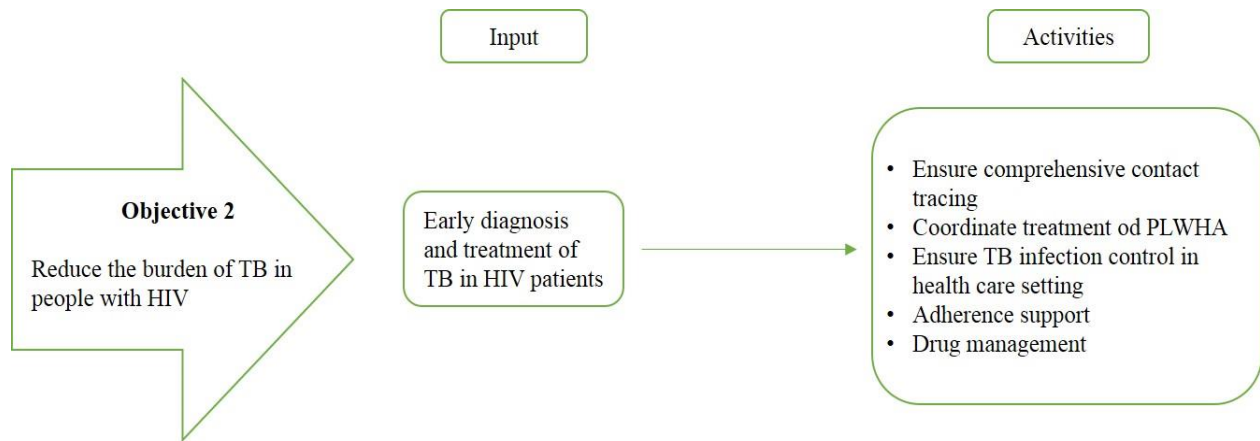


Figure 2.3: Excerpt of logic model for Objective 2

*6.4.2.1: Objective 2 Input 1: Early diagnosis and treatment of TB in HIV patients*

Early diagnosis with prompt initiation of treatment are important for an effective TB control in HIV patients. Delayed diagnosis leads to poor prognosis at the individual level and transmission of TB at the community level. Drug-resistant TB in form of multidrug-resistant (MDR) TB and Extensively Drug Resistant (XDR) TB has emerged as a serious global epidemic and poses a threat to HIV infected people (Dubrovina et al., 2008). HIV has been linked to increase mortality in susceptible and drug-resistant TB (Quy et. al., 2006). Therefore, ensuring comprehensive screening of people exposed to a case of active TB has the potential to improve early diagnosis and prevent further transmission especially in HIV patients with high risk of disease progression.

From the study and WHO (2012) recommendations, the activities to ensure early diagnosis of TB among HIV patients are:

**Activity 1:** Ensure comprehensive contact tracing is undertaken, and that it aims to identify all close contacts of active TB cases, not just household contacts, and provide appropriate follow-up and treatment, this being particularly important for underserved populations such as the homeless, prisoners and individuals with complex and chaotic lives.

**Activity 2:** Coordinated treatment of People Living with HIV/AIDS (PLWHA) who have TB with anti-TB medications and antiretroviral therapy (ART). This requires careful clinical management, but the treatment of TB should have priority over ART (WHO, 2003). Adherence to medications is enhanced by Directly Observed Therapy (DOT) (Gaur et al. 2010).

**Activity 3:** Adherence support. Lack of adherence to treatment remains a significant obstacle to effective treatment of TB and HIV. Co-infection presents further adherence problem because of high pill burden and adverse effect. Adherence to taking TB and HIV medications is crucial to the treatment of these diseases to prevent treatment failure that leads to high mortality or the

development of drug-resistant strains. According to participants in the study, adherence to medication is poor among patients with TB and HIV due to stigmatization, poverty, lack of transportation, cultural issues, social exclusion, and access to health services.

Activities for adherence support include strengthening of Directly Observe Therapy for TB and HIV treatment at the level of health facilities and community. A participant suggested that DOT should be combined with Methadone therapy because Intravenous Drug Users will in most cases not miss taking Methadone medication.

**Activity 4:** Drug management and improvement. Improvement of health outcomes for those infected with TB and HIV requires an effective logistics management system that ensures adequacy of drugs and other supplies at various levels of the health system and health facilities. Strengthening existing procurement and supply chain management systems is essential for joint TB and HIV programming (WHO, 2004).

Study results recommended activities to improve drug management and procurement are that include; a) inclusion of a pharmacist as a member of the provincial committee that develops the policy for TB/HIV collaborative services. This ensures that pharmaceutical management is considered at the TB and HIV planning phase and throughout different layers of health intervention to promote an uninterrupted availability of medications. b) Review drug distribution network to ensure adequate drug delivery, accessibility, prompt access to drugs which will thereby improve adherence. c) Constant revision of provincial guidelines to incorporate new development of TB/HIV medications. d) Identify enough financial and human resources during the planning phase to build capacity for TB and HIV medication delivery.

### 6.4.3 Objective 3: Decrease the burden of HIV in TB patients

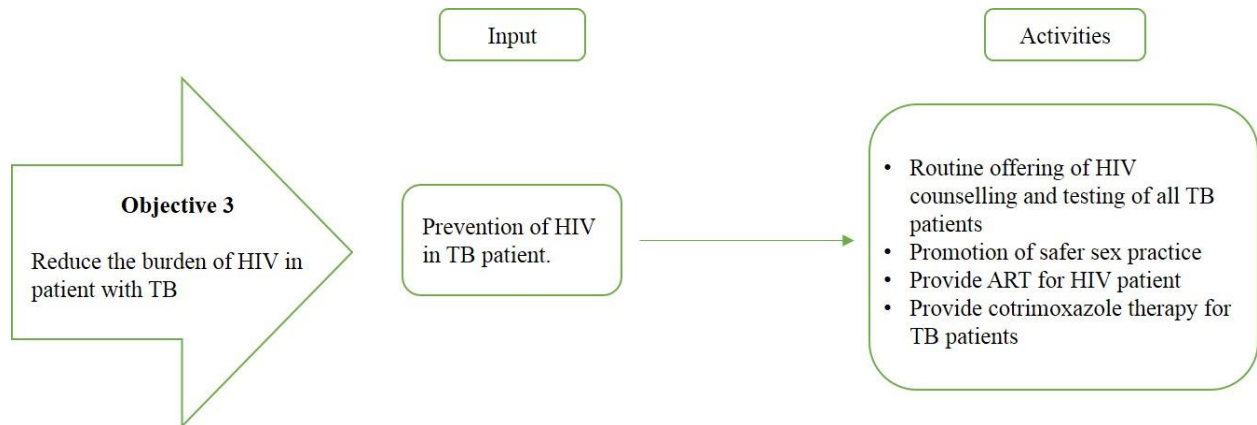


Figure 6.4: Excerpt of logic model for Objective 3

#### 6.4.3.1 Objective 3, Input 1: Surveillance of HIV among TB patient.

Surveillance of HIV should also be conducted among TB patients to inform program planning and implementation. According to the participants, surveillance for TB and HIV in Saskatchewan is performed separately, and there is no process for sharing data between the two control programs. In 2013, Saskatchewan proposed to increase screening uptake for HIV in individuals with TB by 50%. This includes screening process for HIV tests in all TB patients above 13 years whether on treatment or prophylaxis.

From the study results and WHO (2012) recommendation, the activities for surveillance of HIV among TB patients are, a) making HIV testing as an entry point for HIV care and treatment services. b) Offering provider-initiated diagnostic counselling and HIV testing to all TB patient. c) Encourage HIV prevention methods using male and female condoms, prevention of sharing of contaminated needles among injection drug users, and behavioral therapy. d) All health facilities should implement standard procedures for reduction of occupational and

nosocomial exposure to HIV such as injection safety, blood safety, and safe waste disposal. d) Initiation of prophylaxis and treatment is strongly recommended by WHO (2004). This is starting Anti-retroviral therapy (ART) in all TB patients living with HIV irrespective of their CD4 count.

The use of a logic model in this research has produced a graphical description of TB/HIV collaborative programming that communicates program goal, activities, output, and intended outcome. Furthermore, this model has helped to incorporate evidence-based research to design a program that integrates planning, implementation, performance measurement and evaluation. To health planners, the model produces a clear description of how a program should be designed and how success will be measured by addressing existing gaps in the surveillance system, referral process and preventive effort as it pertains to TB/HIV collaborative programming.

## 6.5 Conclusion

The paper sets the framework for an effective collaboration between TB and HIV/AIDS program in Saskatchewan, by using the logic model and results from the interviews conducted using the PRECEDE framework, with the intention to aid program planning, implementation and evaluation.

The overall success to implementing this collaborative program will be measured through evidence of sustained political commitment, intensified case finding, strengthening of surveillance procedure, and coordinating treatment to ensure that people with HIV/AIDS and people with TB receive a continuum of high-quality care that is equitable in accessibility to the whole population, and is devoid of discrimination or stigmatization. To be fully successful, the overall program design and implementation should be within available resources. The short term

and long term expected outcomes are reduction in TB/HIV incidence and prevalence in Saskatchewan.



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## 7. CONCLUSIONS

The purpose of this study was to undertake a needs assessment for TB-HIV collaborative programming in Saskatchewan. The aim was to identify key areas that will support operational collaboration within the separate TB and HIV programs that are currently implemented. The purpose is based on the rationale that both diseases are intricately linked with each other, and therefore can be termed a Syndemic because they share the same underlying social, economic, environmental, behavioral factors that promote such interaction and worsen the diseases. The most significant risk of developing active TB is infection with HIV, and the leading cause of mortality among people living with HIV is TB. The Syndemic framework, therefore, presents a way of knowing why diseases cluster together in a population immensely affected by poverty, social exclusion, gender-based violence and other forms of social and environmental stress (Singer, et al., 2017). To accomplish a better understanding of how epidemics, interact both at the level of population and individual, Tsai et al. (2017) proposed that studies should incorporate data from multilevel analysis and the information obtained would help in the identification of appropriate interventions to improve health of the vulnerable population.

This concluding chapter summarizes the use of PRECEDE aspect of PRECEDE-PROCEED model to develop interview questions for data collection (Paper 1), analysis of result using the Framework analysis (Paper 2), policy recommendation for TB/HIV co-programming in Saskatchewan (Paper 3), strengths and limitations of this study, contribution of the study to research, suggestions for future research, and practical implications of the study.



## 7.1 Using the PRECEDE model in a needs assessment for TB/HIV co-programming in Saskatchewan

A qualitative approach was adopted through a semi-structured interview of participants to conduct this needs assessments process that answered the research questions. The research questions were:

- What are the intervention services provided towards the control of HIV and TB and the various organizations and stakeholders that provide these services?
- What is the human, material and financial resources available for HIV and TB control programs, the service capacity and capability, and the barriers to accessing the service?
- What are the gaps (met and unmet needs) in HIV and TB programs?
- What is collaborative TB and HIV key interventions that will decrease the burden of infection in the population affected by both diseases?

The PRECEDE aspect of the PRECEDE-PROCEED model was used to develop the questionnaire for participants, and their responses were analyzed to provide insight into ways collaborative TB/HIV program will be designed and implemented. The use of this model is similar to the approach used in clinical diagnosis in individual patients, whereby, just as a medical diagnosis precedes treatment, so should evidence-based educational diagnosis precede an intervention plan. PRECEDE has the advantage of incorporating health behavior theories that are important in conducting research into TB and HIV services because these infections have complex multidimensional behavioral factors that affect its epidemiology in a population. The strength of using PRECEDE in this study are:

- 1) It provides a comprehensive structure and template for assessing health needs for designing, implementing and evaluating health intervention.

- 2) The phases in the model help researcher to develop a coherent plan that addresses the necessary issues.
- 3) The model significantly provides useful guidance for coding and analyzing data. “a priori” codes were derived from the PRECEDE framework and its associated theories, while emergent codes were inductively derived from familiarization with data collected. Findings were organized according to major components of PRECEDE. The model gives insight to ways successful collaborative TB and HIV programming will be planned and implemented through the identification of multiple social, environmental, behavioral and other factors affect the epidemiology of both diseases in Saskatchewan. This process supported the Syndemic framework, which is the overarching theory that supported this study (Singer et. al., 2017).

## 7.2 The state of TB and HIV in Saskatchewan

Key findings that emerged from the study described escalating TB and HIV infections in Saskatchewan, and this is compounded by unreliable data on TB/HIV co-infection rates because the two programs operate differently and do not share data. Social factors play an important role in the epidemiology of TB and HIV in Saskatchewan and these conditions disproportionately affect the Indigenous communities. A critical social factor described by participants is the psychosocial effect of residential schools on the Indigenous people. The horrendous abuse experienced by those who attended these schools has been linked to intergenerational transmission of personal trauma, compromised family system, poverty, homelessness, intravenous drug use (IDU), chaotic lifestyle, low level of education, history of sexual and emotional abuse (Wilk et al., 2017). All these socio-cultural factors are directly or remotely linked to increasing transmission of TB and HIV (Reading & Wien, 2009).

Behavioral factors broadly affect TB and HIV programs in two ways; first, they influence patient's health-seeking behavior. Second, they impact medication adherence and completion rates. Participants described that fear of isolation through stigmatization, the attitude of health staff, peers and community members lead to concealment of disease and delay in seeking treatment. Furthermore, the Indigenous population in Saskatchewan is mobile as described by a participant in this study, there is frequent movement from one community to the other, either within the province or outside the province. This is supported by Snyder & Wilson (2012), they reported that in Canada, approximately 54 per cent of Aboriginal peoples are urban and change their place of residence at a higher rate than the non-Aboriginal population. This high rate of mobility may affect the delivery and use of health service. In this study, the participants indicated that frequent movement affect negatively, the booking an appointment or ensuring adherence to TB or HIV.

Environmental factors affect the risk of exposure, the risk of infection and risk of developing the diseases. The plan was to identify controllable or preventable factors related to TB and HIV infections that would aid in planning for intervention. Doing this would involve identification of the effect physical and socioeconomic and their implication on TB and HIV epidemiology in Saskatchewan. Regarding the physical environment, Saskatchewan has large areas with geographically isolated communities, and there are communities designated as "off and on" reserves where the First Nations live. According to Statistics Canada (2017), "36% of on-reserve and 16% of off-reserve First Nations people in Saskatchewan lived in crowded homes, that is, more than one person per room". Furthermore, First Nations peoples living in these reserves report poor health outcomes, high level of at least one chronic disease, poor mental health, being unemployed, and limited access to healthcare services.

Educational and ecological diagnosis involves the development of a unique plan that increases the likelihood that changes in behaviors already identified will occur through the identification of predisposing, reinforcing, and enabling factors. Predisposing factors are antecedents to behavior that provides the rationale or motivation for individual practices that promote the propagation of TB and HIV in the population. These are knowledge, attitude, and beliefs. Knowledge about TB and HIV is high amongst the community and patients in Saskatchewan through the effort of intensified awareness by both TB and HIV control programs. According to participants, the attitude and beliefs exhibited by patients infected with these diseases are affected by chaotic lifestyle, lack of education, drug addiction, poverty, homelessness, overcrowding and stigmatization. These conditions mostly affect the Indigenous population which then explain why they are over-represented in the incidence and prevalence of TB and HIV in the province. Reinforcing factors represent behavior that provides continued reward or incentive for persistent or repetition of the action. Participants identified minimal support from peers and community members, high level of stigmatization, rude and judgmental health staff as reinforcing. Enabling factors represent the necessary conditions that must be present for a successful implementation of TB/HIV collaborative program. These factors include availability and accessibility of health resources and service. In Saskatchewan remote and hard to reach areas, lack and retention of adequately trained health personnel are experienced continuously. The financial input to collaborative services is critical, and this is tied to strong political will considering that other programs compete for scarce resources.

Administrative and Policy diagnosis identified policies, resources, and model of service delivery that is needed for implementation and sustainability of TB/HIV collaborative programming. This includes challenges, barriers, met and unmet needs to program intervention.

Fundamental strategies include prompt health sector response to emerging TB and HIV epidemic. This should be done through the establishment and harmonization of National and Provincial guidelines that would provide TB and HIV collaborative care and services at health facilities and community levels, and develop national protocols and standard for good clinical practices. Furthermore, this should be in partnership with TB and HIV stakeholders which including government and non-government organizations, clinicians, pharmacists, epidemiologists, public health officials, drug control agencies, representatives of relevant ministries, and leaders of affected communities. The scope and timing to start TB and HIV collaborative services should be phased-based depending on prevailing local conditions to avoid disruption of services. Priority should be given to TB and HIV high incidence areas in Saskatchewan.

### 7.3 Policy recommendations for moving to TB/HIV co-programming in Saskatchewan

TB and HIV collaborative program reforms should identify areas of synergies that will minimise duplication of activities through alignment of critical components of the health system.

From the study, these include the following;

- Funding for TB and HIV programs in Saskatchewan should be streamlined through coordination and input from National and Provincial TB and HIV programs, stakeholders that are involved with TB and HIV activities, and other relevant bodies to address funding needs and allocation. Uninterrupted funding is necessary because TB treatment ranges from six to eight months, while HIV treatment with ART is lifelong.
- The entry point to TB and HIV preventive, diagnostic and treatment services should be effective and prevent loss-to-follow-up as patients navigate the health system including other essential services, such as social services, harm reduction services among drug injecting users, contact tracing and prevention chemotherapy.

- Establishment of joint information dissemination strategy by TB and HIV programs that would reduce risky behavior and vulnerability and minimize the risk of occupational TB and HIV infections.
- Clinical management of TB and HIV should improve patient's access to services regarding distance, time, cost of medication, universal access to antiretroviral therapy and anti-tuberculous drugs, regular drug supply and Direct Observation Treatment (DOT). Ensure early diagnosis by providing access to high-quality diagnostics, ensure comprehensive TB and HIV contact tracing, improve data collection through comprehensive joint surveillance and monitoring, and tackle TB and HIV in high-risk groups.
- Encourage inter-sectoral collaboration that will address the issues of complex socio-economic determinants of TB and HIV, including high-risk behaviors that are significant drivers of disease transmission. There is also the need to use social determinants approach to reduce health inequities among and between Saskatchewan populations. Building a partnership with communities, PLWHA, Non- governmental organizations, and private sectors in the areas of transportation, education and community mobilization.
- Co-location of services improves access, referral and coordination of services.
- Address inadequate human resources especially in rural and remote areas of Saskatchewan. Given the scope of TB and HIV epidemic, there is a need for additional staff. Existing staff may need to be trained or retrained.
- The overall program design must be within the constraint of available resources in order to be successful.

TB and HIV are diseases of high public health importance. The occurrence of both diseases in a population often leads to catastrophic consequences when control and eventual elimination of these diseases are not urgently and adequately addressed. The incidence and prevalence of TB and HIV have reached an epidemic proportion in Saskatchewan, despite present “siloes” control measures. This study provides evidence for implementation of collaborative programming between TB and HIV through systematic qualitative research using PRECEDE framework to guide interview questions (Paper 1), Data analysis (Paper 2), and guidelines for TB/HIV collaborative programming at program management and health facility levels (Paper 3).

### **Strengths of the study**

Statistics indicated that TB and HIV constitute a public health crisis in Saskatchewan that disproportionately affects Aboriginal peoples. To fully understand the problem of TB and HIV, it is essential to know the extent of interaction between these diseases and the social, economic, behavioral, educational, and administrative factors that operate dynamically to influence the vulnerability of individuals and excess burden of diseases in the population. In this study, the use of Syndemic theory and PRECEDE model provided a “roadmap” that incorporated these factors in data collection, analysis, and design of TB/HIV collaborative programming.

### **Limitations of study**

Only patients with HIV consented to be interviewed. No patient with TB or TB/HIV co-infection volunteered to be interviewed. This may introduce the possibility of bias to the study as patient experiences in each of the programs, as well as those requiring services from both programs, were not included. There is also the need to stay within the confines of my ethics approval, which is minimal risk. Ethics application approval that include vulnerable and Indigenous communities are usually long in duration and cumbersome.

#### 7.4 Contributions to research

My research has made some contribution to health policy development in Saskatchewan. There is no established policy on TB/HIV collaboration programming in Saskatchewan, therefore, this needs assessment study is the first to be done in the province. The results and recommendations are baseline evidence-based information for researchers and health policy makers towards planning and implementing effective TB and HIV collaboration services that would decrease the occurrence of both diseases in the population. Also, the research has major contributions from patients on the ways they want collaborative programming to be implemented.

#### 7.5 Recommendations for future research and practical applications

Research plays a vital role in shaping the policy for TB and HIV collaborative programs. Identified areas for future studies include A) Medium and long-term joint strategic planning to successfully and systematically scale up collaborative TB/ HIV activities nationwide and deliver integrated TB and HIV services, preferably at the same time and location with due consideration to the prevention of TB transmission should be developed. B) Further research is needed to investigate factors that enhance or act as barriers to adherence to preventive measures and medications use. That is, what are the variables that predict nonadherence or what promote adherence to medication. The focus should be on vulnerable populations to TB and HIV in Saskatchewan. These are; injection drug users, alcohol-dependent individuals, inmates in correctional centres, children, homeless people, refugees and migrants.

The perceptions of these participants gave valuable insights into the desirability, challenges, identification of support frameworks, and service realignments that participants perceived as being able to aid implementation of a collaborative TB/HIV program and improve accessibility, acceptability, and coverage.



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## APPENDIX A

Invitation to participate in interview and information sheet

### **Researcher(s):**

Dr. Abayomi Olaniyi, Doctoral student, Health Sciences Program, University of Saskatchewan.

Dr. Shelley Kirychuk, Department of Medicine, Canadian Centre for Health and Safety in Agriculture, University of Saskatchewan.

Dr. Heather Ward, Department of Medicine, Division of General Internal Medicine, University of Saskatchewan.

**Funding:** Department of Medicine, University of Saskatchewan

**Contact Phone Number:** Dr. Abayomi Olaniyi. 306-966-6073

### **Introduction:**

You are invited to participate in this research study because you are involved in patient programming related to TB and/or HIV. This research project is a needs assessment for co-programming for those individuals co-infected with Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) in Saskatchewan.

Your participation is voluntary. It is up to you to decide whether or not you wish to take part. If you wish to participate, you will be asked to sign this form. If you do decide to take part in this study, you are still free to withdraw at any time and without giving any reasons for your decision. The interview will be audio-recorded, and the audio record will be transcribed into a typed document. You may request to have the audio-recording turned off at any time. You may refuse to answer any question that you are uncomfortable with.

Please take time to read the following information carefully. You can ask the researcher to

explain any words or information that you do not clearly understand. You may ask as many

questions as you need.

### **Who is conducting the study?**

This study is being conducted by Dr. Abayomi Olaniyi, a doctoral student in the Health Sciences program at the University of Saskatchewan. He is supervised by Drs Shelley Kirychuk and Heather Ward of the Department of Medicine of the University of Saskatchewan.

### **Why is the study being done?**

The aims of this study are to: (1) identify key issues that may support operational collaboration of TB and HIV co-infection services in Saskatchewan, and; (2) to suggest strategies that will

promote collaboration of prevention, treatment and care of patients with TB and HIV co-infection in Saskatchewan.

**What does the study involve?**

This part of the study involves an audio recorded in-person interview. The interview will take about one hour. The interview questions ask you to share your knowledge and thoughts about TB and HIV programming in Saskatchewan.

**What are the benefits of participating in this study?**

If you choose to participate in this study there may be no direct benefits to you. The benefits will be derived at the end of this study from the research findings on the collaborative opportunities for TB and HIV programming in Saskatchewan, with the potential for improved efficiency, accessibility, and adherence to treatment for those co-infected with TB and HIV in Saskatchewan.

**Are there possible risks and discomfort?**

We do not anticipate there will be any risks involved with participation.

**What happens if I decide to withdraw?**

Participation is entirely voluntary. You can withdraw from the study at any point in time without any penalty. The information that is shared will be held in strict confidence and discussed only with my supervisors Dr Shelley Kirychuk and Dr Heather Ward. If you decide to enter the study and withdraw at later time information will be retained for analysis.

**Will I be informed of results?**

At the completion of the study the research team will create a summary of the research results, which will be provided to you upon completion, if you wish.

Would you like to receive a copy of the research results?

Yes \_\_\_\_\_ No \_\_\_\_\_

**What will the study cost me?**

You will not be charged for any research-related activities. You will not be paid for participating in this study. You will not receive any compensation, or financial benefits for being in this study, or as a result of the data obtained from research conducted under this study.

**Will my taking part in this study be kept confidential?**

Your confidentiality will be respected. Research records identifying you may be inspected in the presence of the Investigator or his or her designate, by representatives of the University of Saskatchewan's College of Medicine, and the University of Saskatchewan's Research Ethics Board for the purpose of monitoring the research. However, no records, which identify you by name or initials, will be allowed to leave the Investigators' offices. Confidential codes only known to the researcher will be used to identify responses. The transcribed interview with only codes and no names will be kept in a locked filing cabinet in the office of the Supervisor Dr. Shelley Kirychuk at the University of Saskatchewan. All coding keys will be kept separate from

the data. All data and coding keys will be locked in the offices of the researcher or Dr. Kirychuk at the University of Saskatchewan and will be kept for a minimum of 5 years. The results of this study may be presented in a scientific meeting or published, but your identity will not be disclosed.

**Questions or Concerns**

If you have any questions or want more information about this study before, during or after participation, you can contact Dr. Olaniyi or one of the supervisors at: Dr. Abayomi Olaniyi. 306-966-7885; Dr. Shelley Kirychuk. 306-966- 6649 or Dr. Heather Ward. 306-966-2180.

If you have any concerns about your rights as a research participant and/or your experiences while participating in this study, contact the Chair of the University of Saskatchewan Research Ethics Board, at 306-966-2975. This research project has been approved on ethical grounds by the University of Saskatchewan Research Ethics Board on \_\_\_\_\_.

APPENDIX B

Consent to Participate

**Needs Assessment for a Tuberculosis (TB) and Human Immunodeficiency Virus/Acquired Immunodeficiency syndrome (HIV/AIDS) co-infection program in Saskatchewan**

- I have read (or someone has read to me) the information in this consent form.
- I understand the purpose and procedures and the possible risks and benefits of the study.
- I was given sufficient time to think about it.
- I had the opportunity to ask questions and have received satisfactory answers.
- I understand that I am free to withdraw from this study at any time for any reason and the decision to stop taking part will not affect my future relationships.
- I give permission to the use and disclosure of my de-identified information collected for the research purposes described in this form.
- I understand that by signing this document I do not waive any of my legal rights.
- I understand that I will be audio recorded as part of this interview
- I will be given a signed copy of this consent form.

I agree to participate in this study:

_____	_____	_____
<i>Name of Participant</i>	<i>Signature</i>	<i>Date</i>
_____		_____
<i>Researcher's Signature</i>		<i>Date</i>

## APPENDIX C

### Interview Protocol and Guide

**CODE:**

**Date:**

**Place:**

**Interviewer:**

**Occupation of participant:**

#### **Instructions**

- 1) Opening statement and greeting
- 2) Describe Aims, Objectives and rationale of research

*(Read Introduction in consent form)*

#### **Main interview questions**

##### **1. Tell me about your role?**

*Probe: the position /role; what they actually do; what are their defined responsibilities; how long have they worked.*

##### **2. What is your comment on the situation of TB and HIV in the community?**

*Probe: explore awareness/attitudes/perception on co-infection*

##### **3. What are your views about collaborative TB/HIV healthcare services?**

*Probe: explore awareness/attitudes/perception and their ideas about collaborative services.*

##### **4. -What type of collaborative TB/HIV activities do you offer?**

**-Where do you receive your directive from?**

**-What are your thoughts on the implementation or feasibility of these activities?**

**-What support do you receive from higher levels of management?**

*Probe: exactly what TB/HIV services do they provide if any; explore managerial hierarchy; inquire on site infrastructure/resources/coordinative capacity; explore support from management regarding financial/training/motivation; What they perceived as barriers or facilitators for TB and HIV service provision; what are their likes/dislikes on providing added services; access to services.*

##### **5. How do you think collaborative TB/HIV services will be received/adopted by the patients you serve?**

*Probe: specific ways of promoting TB/HIV care; inquire about service uptake; how they perceive patient's decision; example of patient experience.*

##### **6. What do you think about screening HIV-positive patients for TB or TB patients for HIV?**

*Probe: probe on stigmatizing views; patient or provider initiated, opt-in or opt-out.*

##### **7. How do you coordinate treating patients who may be receiving medical care for another condition (i.e., TB or HIV) from another health facility?**

*Probe: explore programs' coordinative capacity and referrals; what are on ground barriers/facilitators to non-collaborative program; what is their personal experience- is the level of collaboration making work easier or more difficult?*

**8. Can you think of any ways to improve the delivery of health services in relation to TB and HIV infections?**

*Probe: gather comments on how constraints/barrier may be resolved*

**9. Who else will you recommend to be interviewed?**

APPENDIX D

Framework matrix

**PHASE 1 and 2 of PRECEDE model**

a) Quality of life

b) Epidemiological Assessment

<b>Participant</b>	<b>Community/Physical environment.</b> (Urban/Rural/Remote, Type of service in community, Disease situation in community)	<b>Effectiveness of program/health system constraint.</b> (Utilization of services, Stigmatization, Screening methods, Data management, Barrier, Adherence)
(06/1)	TB, mostly found among First Nations. - Areas of low and high incidence	Administratively, data collection, policy, and budget, TB and HIV programs work in silos. -Data for TB and HIV co-infection cannot be easily verified. TB does not have access to HIV data.
(04/1)	People should open up about doing drugs or HIV status	
(04/2)	Big problem in community	
(04/3)	Lots of friends have HIV and Hep C. -Happy with service in PA and the location of clinic	- Lots of stigmatization because people are not educated enough. -HIV clinic set up adequate in terms of location, and getting medication.
(04/4)	HIV big problem	
(08/1)	Mostly among IDU's -Overcrowding. -Organization link HIV patients and those at risk to available services; these are Social services, housing, addiction services, and legal helps.	-Adherence is poor. -Completion of treatment affected by lack of knowledge, stop medication when they get better. Start medication when they experience a flare up. -Combine daily witness of methadone therapy with TB or HIV drugs. Patients on Methadone are always compliant.



	<ul style="list-style-type: none"> <li>-Mobile services in hospital treatment centers and prisons.</li> <li>-Provide education materials in drop centers, safe sex materials and needle exchange programs.</li> <li>-Drive them to appointment centers</li> </ul>	<ul style="list-style-type: none"> <li>-Rare that addict miss methadone.</li> <li>-The pharmacists are important to improve adherence. Most patients have a good relationship with them.</li> <li>-Language can be a barrier especially people from North Saskatchewan.</li> <li>-Patients are not coerced to do screening.</li> <li>-Access HIV service due to other social concerns, for example; housing, no food for some days, warrant for arrest.</li> <li>-All clients are triaged to know their needs and to establish confidence. Then keep track of appointments and give friendly reminder for medications.</li> </ul>
(01/1)	<p>Convergence of 2 small epidemics.</p> <ul style="list-style-type: none"> <li>-HIV has overtaken TB in terms of epidemic in Saskatoon.</li> <li>-Consult in PA and La Ronge</li> </ul>	<ul style="list-style-type: none"> <li>All HIV patients are tested for TB using TST.</li> <li>-Mode of transportation to PA by car, and La Ronge by plane.</li> <li>-From an operational point of view DOT is good for TB and HIV co-infection. Taking into cognizance not counting stigma and recognition of patients</li> </ul>
(02/1)	<p>Raising rate of HIV a big concern</p> <ul style="list-style-type: none"> <li>-TB a reportable disease</li> <li>-HIV test for all TB patients above 13 years, whether on treatment or prophylaxis.</li> <li>-Program report to SHR then Provincial ministry of health, then PHAC.</li> <li>-TB advisory committee comprising health ministry, Lab, lung association, NITHA, FNIB, Northern medical health.</li> <li>-Difficult to get feedback from patients.</li> <li>-Do opt out screening.</li> <li>-Very mobile population</li> </ul>	
(02/2)	<ul style="list-style-type: none"> <li>-Huge problem in Northern community.</li> </ul>	<p>Stigmatization not really bad in First nation communities it has normalized</p>

	<p>-“One stop shop” comprising; Diagnosis, follow up, referral, Needle exchange program.</p> <p>-New diagnosis enters through TB. TB program does a physical exam. If positive follow with MEDs. And keep connected with a physician</p> <p>-Do Methadone and DOT</p>	
(02/3)	<p>-Work with Clinicians and community nurses.</p> <p>-Set up clinics, contact tracing and Medication audit. Report drug adverse effect. Work with people doing DOT.</p> <p>-Has stationery, mobile clinics. Also do tele health.</p>	<p>Some communities are open to accepting people with TB. In others TB is a taboo.</p> <p>Workers do DOT. The policy is for treatment to be minimally invasive to a patient’s lifestyle.</p> <p>-Positive TST are booked and refer to a TB specialist physician. X ray then done.</p> <p>-Some stigmatization around TB less in HIV</p>
(09/1)	<p>Problem of poverty.</p> <p>-Mostly in Northern Saskatchewan.</p> <p>-Often have co-infected patient.</p> <p>-**Coordination between TB and HIV pharmacist to administer medication.</p> <p>-Delivery of drugs are” siloed” but not treatment of patients with TB and HIV</p>	<p>Medication prone to side effects and easily lead to resistance.</p> <p>-Some communities think TB or HIV do not exist among them.</p> <p>-Fear of people knowing about their diseases because most of the health workers are known to them.</p>
(02/4)	<p>Program implemented in accordance to SHR and provincial strategies of 2010-2014.</p> <p>-Link with TB is through share patient management.</p> <p>-Mandate to have all above 14 years TB tested for HIV.</p> <p>-Staff: Manager, Pharmacist, SW and supporting staff.</p>	<p>-Determinants of adherence to drugs are; housing, addiction issues, chaotic lifestyle affecting medical appointment, medication fatigue.</p> <p>-Gay population is adherent to taking medication.</p> <p>-IDU’s are usually less adherent to taking medication.</p> <p>-Schedule appointment don’t work. Except drop in.</p> <p>-RUH location is difficult to access and therefore difficult to manage appointment.</p>

	<ul style="list-style-type: none"> <li>-Work with Infectious disease specialists.</li> <li>-Street gang to get all IDU to test for HIV.</li> <li>-Tough to access rural and remote areas.</li> <li>-Some doctors o to Northern communities.</li> <li>-**Lots of staff turnover.</li> </ul>	<ul style="list-style-type: none"> <li>-Goal to increase uptake of screening by 50% from 2009 data. This has been achieved through by education and automatic screening.</li> <li>-Service focus on harm reduction, Blood work, getting immunization, education.</li> </ul>
(07/1)	<ul style="list-style-type: none"> <li>-Determinants of adherence to drugs are; housing, addiction issues, chaotic lifestyle affecting medical appointment, medication fatigue.</li> </ul>	<ul style="list-style-type: none"> <li>Gay population is adherent to taking medication.</li> <li>-IDU's are usually less adherent to taking medication.</li> <li>-Schedule appointment don't work. Except drop in.</li> <li>-RUH location is difficult to access and therefore difficult to manage appointment.</li> <li>-Goal to increase uptake of screening by 50% from 2009 data. This has been achieved through by education and automatic screening.</li> <li>-Service focus on harm reduction, Blood work, getting immunization, education.</li> <li>Some do not want to be screened even when they know their partners are HIV positive.</li> <li>-Double stigmatization with TB/HIV co-infection, especially in northern community. Patient may shut down</li> </ul>
(07/2)	<ul style="list-style-type: none"> <li>Mostly among drug users, those involved with sex trade, chronic alcohol users and sexual transmission.</li> <li>-Poverty, residential school survivors, and factors that create a low self-image or poor self-esteem.</li> </ul>	<ul style="list-style-type: none"> <li>-AIDS Saskatoon created 601 outreach were people irrespective of drug addiction and previous criminal records have their basic needs met,e.g. Food requirement, laundry, computer use, resumes, and socialization.</li> <li>-Informal drop in model with no intake process, no paperwork, no requirement for self-identification.</li> <li>-We are available for everyone on their terms.</li> <li>-Focus more on risk reduction now, e.g. Condom distribution, developing and distribution of literature in plain language and sent to urban and rural areas.</li> <li>-People know about services by word of mouth. Do AIDS awareness week</li> </ul>

(03/1)	<p>-In Rural and remote areas, stigmatization is a challenge because of familiarity of patient with service provider. Confidentiality may not be assured</p>	<p>It is important to have all partners on board for collaborative program.</p> <p>-Funding must be adequate and dedicated to ensuring sustainability. There is tendency to tag funding of a program to another with the same capacity and staff and expect to do more</p>
(01/2)	<p>TB and HIV are emerging problem in Saskatchewan.</p> <p>-From archeology and anthropological studies TB existed pre-contact in North America.</p> <p>-The epidemic was due to starvation, poverty, and overcrowding.</p>	<p>Effectiveness of program depends on psycho-social stabilization.</p> <p>-Co-occurrence with addiction has increased HIV mortality.</p> <p>-Through Methadone-assisted recovery program, the patient has access to see addiction counselor and physician.</p> <p>-Interaction with the pharmacist is also beneficial.</p> <p>-It is important we treat people and not the disease (HIV patient saying I don't want to be treated for HIV because it will only prolong his life....)</p> <p>-Lack of transportation for some services. If they are first nations and covered by treaty to attend medical appointments.</p> <p>-Combination of DOT and methadone will be effective</p> <p>-They come for their medication every day, and have good interaction with the pharmacist.</p> <p>-Health care delivery can be by distal model or traveling clinic.</p> <p>-Due to the mobility of the first nation's people, some services can be accessed in the city. Access is better in rural where service is culturally sensitive.</p>
(05/1)		<p>Ideally 2-4 viral load testing should be done per year after diagnosis. HIV genotype testing to check for drug resistance should be done before medication or change of medication.</p> <p>-Large land mass, but sparse and widely distributed population. Difficult to have lab in all populations.</p> <p>-May be solved by Telehealth or medicine.</p>

		-Transportation in small communities is the biggest problem. -Solution to adherence can be by the use of smart phone. Minutes
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PHASE 3 of PRECEDE model

Behavior and environmental assessment

<b>Participant</b>	<b>Behavior linked with TB/HIV</b>
	-Risk factors -Help seeking behavior
06/1	They are risk takers. - High mobility of population from remote/rural to urban areas
04/1	Scared to tell about HIV. -Drugs, Alcohol and difficulty getting out the habit. -Inadequate education and lack of jobs
04/2	Inability to keep up with date to fill prescription. - Disclosure of sharing needles to partners
04/3	- Denial. - Life choices, Sharing needles and unprotected sex
04/4	

08/1	Denial about HIV
01/1	
02/1	
02/2	
02/3	
09/1	
02/4	<ul style="list-style-type: none"> <li>- Increase of HIV among IDU's.(Majority)</li> <li>- Gays and bisexual.</li> <li>- Disease process are not the same, but affect similar population with similar circumstances</li> </ul>
07/2	<ul style="list-style-type: none"> <li>- HIV patients have lots of life stressors. Alleviating some of these stresses should be part of a prevention strategy.</li> <li>- If basic needs of individuals are met they will be inclined to engage in better prevention.</li> <li>- Living conditions contribute to illness e.g. overcrowding.</li> <li>- Unhealthy family of origin.</li> <li>- Embedded in reserve is not healthy to navigate their lived environment.</li> </ul>
03/1	<ul style="list-style-type: none"> <li>- Increased incidence of HIV in the past decade.</li> <li>- Saskatchewan has the highest rate of new infection in Canada.</li> <li>- Rate of HIV peaked 2 years ago with 200 new cases.</li> <li>- 70% of cases among IDU.</li> <li>- In Northern perspective the rate of HIV is similar to the provincial.</li> </ul>

	<ul style="list-style-type: none"> <li>- There are areas of hot beds for HIV.</li> <li>- Progress made in terms of TB program.</li> <li>- Rate of being infected with TB is low if you are born in Canada. Except among high risk groups, e.g. homeless or incarcerated in a correctional facility or immigrant from endemic countries.</li> <li>- The northern areas have a high rate of new and persistent TB. Some have periodic outbreaks.</li> <li>- The northern Saskatchewan with a population of 36,000 has 50% of TB cases in Saskatchewan. This is similar to HIV rates.</li> <li>- Now started to see high rates of TB/HIV co-infection, but not everywhere. This is a potential significant threat in our context.</li> </ul>
01/2	<ul style="list-style-type: none"> <li>- Interface between host and environment.</li> <li>- TB is deprivation, poor housing, and poverty.</li> <li>- 70%-80% of HIV in Saskatchewan caused by IDU.</li> <li>- There is an interface between HIV and drug an addiction</li> <li>- Many addicts have a history of trauma, abuse, neglect, and sexual abuse, physical and emotional abuse.</li> <li>- Chaos in their daily lives. No housing, income support, and are involved with criminal activities to get money. Some in sex trade.</li> <li>- Need to stabilize the individual first before medication.</li> </ul>
05/1	
07/1	<ul style="list-style-type: none"> <li>- Fear to disclose HIV so that they are not labelled as IDU.</li> <li>- Homelessness and poverty</li> </ul>

PHASE 4 of PRECEDE model

Predisposing factors

Enabling factors

Reinforcing factors

<b>Participants</b>	<b>Predisposing factors.</b> (Values, Perception, knowledge, attitudes)	<b>Enabling factors.</b> (Manpower availability, availability of resources, accessibility)	<b>Reinforcing factors.</b> (Attitudes of peers, health personnel and community members)
06/1		Issue of confidentiality and stigmatization.  - Saskatchewan run different TB and HIV program	No support, stigmatization concern.
04/1	Made bad choices in life.  - We go through struggles in life		- Like coming to P.A health facility. It is like a close knit family.  - Nothing here in PA. People live on drugs and alcohol and trying hard to get out of them.
04/2		Moved to Little Red (45 min. drive to PA) from Sturgeon Lake	Familiar with health workers.  - I only tell those I associate with of HIV status.  - They are comfortable with me, no bad feelings



04/3	<p>Some HIV positive patient tells others, they do not have the disease.</p> <p>- Grateful baby does not have it.</p>		<ul style="list-style-type: none"> <li>- Rude and judgmental health workers.</li> <li>- Some wear gloves even when taking the pulse.</li> <li>- Some people behave badly to you.</li> <li>- Needle haring and unprotected sex.</li> </ul>
04/4			Some are helpful, some stay away from you.
08/1	- Knowledge is improving. Some people still call it dirty disease	<ul style="list-style-type: none"> <li>- No formal appointment people just walk in.</li> <li>- Multiple sources of funding; Ministry of health, Saskatoon health region.</li> <li>- Always high demand for additional manpower. Especially in mental and addiction services.</li> <li>- Referrals from case managers, Positive living program (U of S), Avenue A community center, Nursing staff in hospitals.</li> <li>- Patient are referred to Westside clinic, 2nd Avenue clinic, Willowgrove, Idylwide</li> </ul>	

01/1	<p>In some reserve HIV is criminalized and vilified.</p> <ul style="list-style-type: none"> <li>- Smooth delivery of treatment in reserves depends on leadership and health care staff who are non-judgmental.</li> </ul>	<ul style="list-style-type: none"> <li>- TB conduct clinic off site.</li> <li>- Had to look for funds to go to PA</li> </ul>	<p>Worry about confidentiality and anonymity in reserves.</p> <ul style="list-style-type: none"> <li>- This varies from place to place.</li> <li>- It depends on nonjudgmental chief and popular health staff.</li> <li>- In some reserve HIV is criminalized and vilified.</li> <li>- DOT is good if identification of patients and stigma can be controlled.</li> </ul>
02/1	<ul style="list-style-type: none"> <li>- A big concern in the general population</li> <li>- HIV education has come a long way.</li> </ul>	<ul style="list-style-type: none"> <li>- Some patients in the North are transferred to Saskatoon.</li> <li>- Coordination between TB and HIV programs for patients with both infections. For medication, Blood work, and skin testing</li> <li>- Some TB drugs are not compatible with HIV drugs.</li> <li>- There are mobile clinics for TB. Scheduling time and frequency of operation may be a challenge.</li> <li>- No resources to see all the people that need to be seen.</li> </ul>	<ul style="list-style-type: none"> <li>- Education to create awareness.</li> <li>- A patient preferred to tell people that she had HIV, but in actual fact had TB. Thought should be the other way round.</li> </ul>
02/2	<p>You never know when you are going to see them. Always in and out.</p>	<p>Most IDU are First Nations. Appointments are not easy to fix.</p>	<p>Once you have a client you try not to let them stray from you. This is the mindset.</p>

		<p>Do mainly phone referrals, this takes 75% of the time.</p> <ul style="list-style-type: none"> <li>- Some lost in the mix in the process of getting appointment, treatment and getting medication.</li> <li>- Funding through the Parkland Health Region.</li> <li>- Inadequate staff. Recent case audit shows 200 clients who are HIV positive</li> </ul>	<ul style="list-style-type: none"> <li>- We take them to TB control ourselves when they have a positive skin test.</li> <li>- Explain procedures and referrals.</li> <li>- They live in close community, close homes and a lot of IV drug use.</li> <li>- First Nations community has high rates of IV drug use and limited access to needle exchange program so they end up sharing needles.</li> <li>- Men who had sex with men is on the rise in PA.</li> <li>- The population is very transient. If you place a skin test you will not know where they are in a couple of days.</li> </ul>
02/3		Have stationary and mobile clinics. Also have telehealth service	
09/1	<ul style="list-style-type: none"> <li>- People in Saskatchewan do not know the statistics about HIV and TB co-infection rates.</li> <li>- Under education about what is happening in the society.</li> </ul>	<p>Access to medication is central in Saskatoon. This is restrictive. Patients have to travel to get medication.</p> <ul style="list-style-type: none"> <li>- 2 pharmacists. Saskatoon takes care of Northern SK. Regina the South.</li> </ul>	

	<ul style="list-style-type: none"> <li>- We tell them about co - infection rates and it is increasing.</li> </ul>	<ul style="list-style-type: none"> <li>- Approved prescription can be filled anywhere.</li> <li>- PA is different, no pharmacist attached. Consultation is through ID physician.</li> <li>- Pharmacy: patient ratio poor in Saskatoon</li> </ul>	
02/4	<ul style="list-style-type: none"> <li>- Multifactorial, partly due to patients, their disruptive life. Also the appointment system where they are told to come back later to read the skin result.</li> </ul>	<ul style="list-style-type: none"> <li>RUH is hard to get to. It is hard to get patient to read result of test.</li> <li>- There is funding to recruit physicians. PLP has its own funding from provincial health.</li> <li>- HIV strategy funds have first time funds for 3 years.</li> <li>- Lots of Funding for HIV, but is mainly temporary. (SW for 3 years)</li> <li>- Need for staff training and additional funds for TB/HIV co-infection.</li> <li>- Struggling to recruit ID doctors. Long waiting list of newly diagnosed cases. Sometimes wait for 1 year.</li> <li>- TB funding is different from HIV funding for northern support.</li> </ul>	

		- Transportation cost is huge.	
07/1	<ul style="list-style-type: none"> <li>- Initially it was getting drugs for HIV, now it is convincing patients to take the drugs.</li> <li>- A lot of people do not think it is a problem. Because it affect mainly the IDU (the forgotten people).</li> <li>- Lot of misconception about how it is transmitted.</li> <li>- Some people feel it is a gay disease.</li> <li>- People have the opinion it is a death sentence</li> </ul>		
07/2	<ul style="list-style-type: none"> <li>- Most clients already have challenging life issues and having TB or HIV is part of scrappy things they encounter.</li> <li>- They know doing IDU is illegal, this push them underground. They are not ready to talk about this.</li> <li>- Prevention requires people to admit they are doing something illegal.</li> <li>- Overcoming this hurdle has helped in harm reduction.</li> </ul>	<ul style="list-style-type: none"> <li>- Office open for limited hours of the day. People need 24hrs service.</li> <li>- Main challenge is not able to provide housing services.</li> <li>- 2/3 of funding from Public health agency of Canada (Federal government). Rest from provincial funding and donations and fundraising.</li> <li>- Rely mostly on volunteers and are used mainly for fundraising and administrative duties like</li> </ul>	

	- Service providers should initiate talk about discrimination and stigmatization.	writing newsletters Most are not comfortable with interacting some of the clients e.g. Alcoholics. Also rely on students doing practicum.	
03/1		<p>In primary care perspective, there is no resident specialized HIV services. We rely on visiting infectious disease specialist or Internal medicine specialist, who conduct clinics in LaLouche and LaRonge locations.</p> <p>- Access difficult for those living outside these communities, they may need to travel to the big centers in Saskatoon or Prince Albert</p> <p>- Some clients do not have coverage for travel expenses, which is another challenge.</p> <p>- TB has an established centralized program in TB Saskatoon Health region, with services delivered through partners; these are Northern health service, Public health department in health regions, Primary health care, First Nation</p>	

		<p>partners and the Ministry of health.</p> <ul style="list-style-type: none"> <li>- TB program is long established and have relationship with the communities through mobile and regular clinics. With HIV services, establishment of program depends on the community.</li> <li>- People do not want to access services close to home. May be familiar with service providers.</li> <li>- The community is key to planning and service delivery.</li> </ul>	
01/2		<ul style="list-style-type: none"> <li>- What we have is case management. Outreach staff goes to the homes of patients.</li> <li>- Not co-management</li> <li>- TB and HIV is a complex issue which is multifactorial.</li> <li>- Should be more efficient in resource allocation.</li> <li>- High intensity coordinated care is needed in the initial</li> <li>- Stage for stabilization.</li> </ul>	

		<ul style="list-style-type: none"> <li>- It is a mental health issue. Stabilization is hard to achieve and complicated.</li> <li>- Care should be integrated into the Primary Health Care Model.</li> <li>- They need to graduate out of Social determinants/factors. The most important is affordable housing.</li> <li>- A form of Environmental management.</li> <li>- Co-management requires cross training. Somebody doing infectious disease should be trained in addiction.</li> <li>- Interdisciplinary Teamwork required.</li> <li>- Tribal council work with people they already align or have rapport with.</li> </ul>	
05/1		<p>The resources that go into communicable diseases should be combine under one group.</p> <ul style="list-style-type: none"> <li>- HIV and Hep C is under Communicable disease control in Regina. Completely separated</li> </ul>	



		<p>from TB control which is based in Saskatoon.</p> <ul style="list-style-type: none"><li>- It is good to pool resources together since TB and HIV affect the same population, in terms of staff.</li><li>- Usually need staff because they provide a wide range of services.</li><li>- There is need for Medical Lab tech. A lot of them will be retiring in 5 to 10 years.</li></ul>	
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**PHASE 5 of PRECEDE model**

**Administrative and Policy assessment**

Type of collaboration

Met and Unmet needs

TB/HIV medication

Participant	Type of collaboration	Met and Unmet needs	TB/HIV medication
06/1	<p>Partial integration and collaboration is good.</p> <ul style="list-style-type: none"> <li>- One clinic for both will not be successful.</li> <li>- Full integration difficult to achieve.</li> <li>- Support partial integration of services with a focus on human behavioral issues and environmental interaction.</li> </ul>		
04/1		<ul style="list-style-type: none"> <li>- It is good to have a health worker check on us once a while.</li> <li>- There are days that symptoms get worse. We may encounter lack of attention or discrimination in walk-in clinic.</li> </ul>	<p>Got use to going for medication every week because she was on methadone.</p> <ul style="list-style-type: none"> <li>- Now on bi-weekly because she is not on methadone.</li> <li>- Common law died with full blown AIDS.</li> <li>- The medication makes me nauseous.</li> </ul>

			<ul style="list-style-type: none"> <li>- Go around the communities telling her story and encouraging patients to take medication.</li> <li>- It is a struggle going through the pills.</li> <li>- Cannot eat and get stiff in the stomach</li> </ul>
04/2		Transportation is a problem.	<ul style="list-style-type: none"> <li>- Initially getting medications every month. I don't have to come to town every month</li> <li>- They will not give you for more than 7 days</li> <li>- Hard to get pills every week.</li> <li>- Go one or two days without taking pills</li> </ul>
04/3	<ul style="list-style-type: none"> <li>-Having the services together is handy.</li> <li>- DOT is good, sometimes people are too sick to get up</li> </ul>		<ul style="list-style-type: none"> <li>Started taking medication when she became pregnant. Stop medication before pregnancy.</li> <li>- Taking HIV medication makes her nauseous.</li> <li>- Seeking for marijuana license because it helps.</li> <li>- The common law also takes medication</li> </ul>

04/4		- Is get medication from methadone clinic	It is always good to get the medication in Methadone clinic.  - Medications made me sick and I quit taking them for 4 years.
01/1	<ul style="list-style-type: none"> <li>- I do not make rules for TB program, they're very much on their own.</li> <li>- No provincial structure for HIV that is comparable to TB.</li> <li>- The referral system has worked very well</li> <li>- Worthwhile if DOT can be incorporated into HIV</li> </ul>	<ul style="list-style-type: none"> <li>- Not good at detecting latent TB infection.</li> <li>- No provincial TB/HIV co-infection program.</li> <li>- Good that TB clinic is conducted off site</li> </ul>	- TB and HIV drugs cause reconstitution inflammatory syndrome
02/2	<p>Entry point (new diagnosis), positive HIV, if the skin test is positive for TB, the TB team will do a physical examination and decide care plan.</p> <ul style="list-style-type: none"> <li>- If already on HIV medication and positive for TB, the TB control worked round HIV medication. So we all keep connected.</li> <li>- Nine months TB medication by DOT should be given in</li> </ul>	<ul style="list-style-type: none"> <li>- Always short of staff. Rotate available staff to work with ID physician, Lab, and skin testing.</li> <li>- Referral cannot be tracked to know if appointments were honored.</li> </ul>	

	<p>conjunction with HIV medications.</p> <ul style="list-style-type: none"> <li>- do referral, TB clinic about 7 blocks way.</li> </ul>		
02/3	<ul style="list-style-type: none"> <li>- Prefer TB and HV patients to be seen in one clinic.</li> <li>- Less appointment are required.</li> <li>- Easier on patients</li> </ul>	<ul style="list-style-type: none"> <li>- Transportation is an issue. Difficult to contact patients by phone. Numbers may have changed or no reception in the area</li> </ul>	
09/1	<ul style="list-style-type: none"> <li>- Pharmacist can give both TB and HIV together instead of in isolation.</li> <li>- It is easier to test for HIV on the TB side.</li> <li>- We cannot get patients to come for reading after Skin test.</li> </ul>	<ul style="list-style-type: none"> <li>- Getting medication is a challenge it depends on where they live. TB drugs are dispensed to TB crew.</li> <li>- HIV drugs are access through regular pharmacy.</li> <li>- Stocking of drugs is a challenge, especially in rural areas.</li> <li>- Patients move back and forth through the province and the correctional centers (provincial or federal). No continuity on release from prison.</li> <li>- Loss opportunity to educate patients.</li> </ul>	<ul style="list-style-type: none"> <li>- Medication prone to side effects and easily convert to resistance.</li> </ul>

		<ul style="list-style-type: none"> <li>- First six months of the administration of medication is critical to establish a routine on</li> <li>- Health workers in some of the communities are well known to patients.</li> </ul>	
02/4	<ul style="list-style-type: none"> <li>- Like Co-infection infection program because of synergy and similar health determinants.</li> <li>- Program should include TB, HIV and Hep C.</li> <li>- There is some form of collaboration at the moment. TB &amp; PL are under the same director. There is TB/HIV working group where information is shared and standard tests discussed.</li> <li>- Collaborative program will need rework, staff training, resources and manpower.</li> </ul>	<ul style="list-style-type: none"> <li>- Lots of problems getting the patient to come back to read Mantoux test.</li> <li>- Appointments are difficult arranged with patients. This may be due to patient's disruptive life. May be structural when patients are expected to come back after 3 days for reading.</li> <li>- Staff need training in TB management.</li> <li>- HIV/TB co-infection program will need rework of staff training and funds.</li> <li>- Lots of funding, but temporary.</li> <li>- Lots of turnover in the position of HIV coordinator.</li> </ul>	<ul style="list-style-type: none"> <li>- Delivery of HIV medication through DOT is worth trying. A dual DOT</li> <li>- The disadvantage is TB drugs are taken for a limited time. HIV medication taken for life.</li> <li>- Challenges on timing of taking medication.</li> </ul>

		<ul style="list-style-type: none"> <li>- Vigorously promoting HIV testing. The goal is to increase testing by 50%.</li> <li>- Street gangs working hard to promote testing among IDU's</li> </ul>	
07/1	<ul style="list-style-type: none"> <li>- There has been discussion about location in one primary care, but stigmatization is huge.</li> <li>- Single entry process, but 2 sites, clinics for +HIV. These sites are RUH and West side community clinic. Patients are referred by Family doctors.</li> </ul>	<ul style="list-style-type: none"> <li>- We ran across patients who have tried alternative medicine (Aboriginal medicine) and prayers.</li> <li>- A lot of success with DOT when it comes to methadone. But not everybody is on methadone.</li> <li>- Gap is social</li> </ul>	
08/1	<ul style="list-style-type: none"> <li>- Nice to have some sort of collaboration.</li> <li>- Referral better. That is what work for us and the nurses. We get referral by phone</li> </ul>		
02/1	<ul style="list-style-type: none"> <li>- We had a discussion about TB/HIV joint service.</li> <li>- Need for more research.</li> <li>- It is complex. TB short treatment plan, whereas HIV is lifetime.</li> </ul>	<ul style="list-style-type: none"> <li>- Challenges with DOT providers at provincial level. Unique structure in the reserves versus RHA.</li> <li>- TB workers in reserves are hired by Health Canada. The nurse in the community delegates delivery of</li> </ul>	

	<ul style="list-style-type: none"> <li>- Same social determinant.</li> <li>- Joint staff training on TB /HIV is important.</li> <li>- Logistical difficulty to have the 2 program in one place. In terms of staffing, training, physicians. But it can be done.</li> <li>- We are diligent with TB medication, but HIV is self-administered.</li> <li>- Key piece to have someone oversee the delivery of both medication,e.g. a community health worker.</li> <li>- In the process of developing a document on the role and responsibility of DOT providers.</li> </ul>	<p>medication to patients. No supervisory or accountability role on TB workers.</p>	
07/2	<ul style="list-style-type: none"> <li>- The ideal is to have people work together.</li> <li>- Funding model does not support collaborative service.</li> <li>- Competition for funding created animosity amongst health providers</li> </ul>		



01/2	<ul style="list-style-type: none"> <li>- I think the best model is that of the West Side community clinic.</li> <li>- Family physician treats patient for addiction. Has an infectious disease specialist. Health region provides addiction counselor.</li> <li>- Population approach, harm reduction and addiction medicine as outreach strategies. So that they can be brought into detox, rehabilitation and other services.</li> <li>- The 2 diseases are complicated and in a challenging clinical scenarios.</li> <li>- In order not to lose synergy these diseases cannot be treated in silos.</li> <li>- The program should bring key players together in order to provide comprehensive, coordinated, wraparound, Efficient, respectful, and cost effective services.</li> </ul>		
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	<ul style="list-style-type: none"> <li>- Disease of entry into service does not matter.</li> <li>- Mental health and addiction should be integrated.</li> <li>- Opportunity to look at collaboration between addiction and other specialties like infectious diseases</li> </ul>		
03/1	<ul style="list-style-type: none"> <li>- TB/HIV collaborative service makes sense and should be patient centered.</li> <li>- TB/HIV collaborative services are on the radar for implementation.</li> <li>- Service delivery in Northern Saskatchewan is complex.</li> </ul>	<ul style="list-style-type: none"> <li>- We have managed to avoid multi drug resistant TB. There are efforts to see that TB is brought under control</li> <li>- Expansion of services depends heavily on the specialists. Transportation to Northern Saskatchewan needs to be addressed.</li> </ul>	
05/1	<ul style="list-style-type: none"> <li>- Need for strong and clear policy on diagnosis, treatment and prevention (looking at the social determinants, e.g. lifestyle, housing etc)</li> </ul>		

## APPENDIX E

Community based organizations in Saskatchewan.

- **Athabasca Health Authority, Mamaweeatan Churchill River & Keewatin Yatthe**
  - Scattered Sites/601 La Ronge (AIDS Saskatoon)
- **Prairie North Health Region**
  - Battlefords Family Health Centre (Aboriginal Primary Health Centre)
  - Meadow Lake Alliance Church
  - Lloydminster Native Friendship Centre
  - Meadow Lake Outreach Ministries
- **Prince Albert Parkland Regional Health Authority**
  - PA Metis Women's Association
  - Family Futures
  - 601 Prince Albert (AIDS Saskatoon)
- **Regina Qu'Appelle**
  - All Nation's Hope AIDS Network
  - AIDS Programs South Saskatchewan - Circle of Courage
  - Carmicheal Outreach
  - Planned Parenthood Regina
  - Street Workers Advocacy Program (SWAP)
- **Saskatoon Health Region**
  - AIDS Saskatoon
  - Out Saskatoon (formerly Avenue Community Centre for Gender & Sexual Diversity)
  - Person's Living With AIDS Network of Saskatchewan
  - Saskatoon Indian Metis Friendship Centre
- Sunrise Health Region, 601 Yorkton (AIDS Saskatoon)

## APPENDIX F

### TB/HIV Indicators Measured in HIV Care Setting

Indicator A1	Percentage of adults and children enrolled in HIV care who began TB treatment.
Indicator A2	Percentage of adults and children enrolled in HIV care who underwent TB screening.
Indicator A3	Percentage of HIV-positive TB patients who are on CPT during anti-TB treatment.
Indicator A4	Percentage of HIV-positive patients who start or continue taking ART during anti-TB treatment.

## APPENDIX G

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