

“It’s for sure conscious that we stay central”: Barriers in  
Accessing Preventive Resources for Chlamydia among  
Youth in Southwest Calgary

by

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## **Abstract**

*Chlamydia is the most commonly reported notifiable infection among youth (15-24 years) in Alberta. However, controlling infections has been challenging for Calgary, which has the youngest population of major cities in Canada. Health reports indicate that despite the high chlamydia incidence among youth, they are not using preventive resources as expected, thus the need to examine the barriers in accessing such resources among youth in Southwest Calgary. The researcher postulated that there are spatial dimensions to the social barriers to accessing preventive resources, and that social and spatial factors work synchronously to hinder access.*

*Opinions about the potential impact of social media dating applications on sexual activities are also examined. Data collection, which was guided by a Social Ecological Model, followed an exploratory sequential mixed-methods design. In-depth interviews were conducted with 23 youth and 4 service providers. Thereafter, a survey of the barriers was conducted with a sample of 382 youth. Thematic and descriptive statistical analytical methods were used to examine qualitative and quantitative data respectively. Geospatial analyses of the patterns of facility non-use and the spatial distribution of barriers were also conducted. Although 79.8% of youth had heard about a preventive resource, only 41.4% had used any resource before. The principal barriers reported were stigma, intimidating healthcare spaces, and uneasiness accessing resources. There was an inverse relationship between geographic distance and access for the communities on the extreme western segment of the study site.*

*The efficacious combination of qualitative, quantitative, and geospatial analytical methods to examine the barriers to sexual health resources among youth is an indication of the practicality of merging traditional qualitative and quantitative methods with geospatial methods to community health inquiries. Lastly, 44.5% of survey participants agreed that social media dating applications influenced sexual activities to a very great extent, thereby providing additional evidence to inform the ongoing social media-sexual health discourse in the health geography and public health arena.*

*Keywords: Youth, Chlamydia, Sexually Transmitted Infections, Social Media, Spatio-Social, Determinants of Health, Access, Preventive Resources, Geospatial, Social Ecological Model, Calgary, Canada*

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# Table of Contents

<b>Abstract.....</b>	<b>ii</b>
<b>Acknowledgements .....</b>	<b>iii</b>
<b>Table of Contents .....</b>	<b>iv</b>
<b>List of Tables .....</b>	<b>x</b>
<b>List of Figures.....</b>	<b>xii</b>
<b>Chapter 1: Introduction .....</b>	<b>1</b>
1.1 Overview .....	1
1.2 Research Purpose.....	4
1.3 Problem Statement.....	6
1.4 Rationale.....	8
1.5 Central Question.....	17
1.6 Hypotheses .....	17
1.7 Objectives.....	18
1.8 Significance of the Study.....	19
1.9 Thesis Chapters .....	21
<b>Chapter 2: Literature Review.....</b>	<b>23</b>
2.1 Importance of Geography for Health.....	25
2.2 The Geospatial Approach to Health Research.....	33
2.3 Barriers in Accessing Healthcare Resources .....	38
2.4 Social Media and Sexual Activities.....	46
2.4.1 Implications of Social Media for Geography of Health.....	48
2.5 Summary of the Approach Used .....	51
<b>Chapter 3: Methodology and Theoretical Framework .....</b>	<b>52</b>
3.1 Study Setting .....	52

3.2	Research Design and Methods .....	55
3.2.1	Environmental Scan .....	57
3.2.1.1	Description of Resources for Youth .....	58
3.2.1.1.1	Walk-in or Family Doctor .....	58
3.2.1.1.2	Alberta Health Services' Sexual and Reproductive Health (Education) ....	58
3.2.1.1.3	Alberta Health Services' Sexual and Reproductive Health - Clinical Services	59
3.2.1.1.4	The Alex Community Health Center – Youth Health Centre.....	62
3.2.1.1.5	Centre for Sexuality.....	62
3.2.2	Qualitative Approach .....	63
3.2.2.1	Study Population and Sampling .....	63
3.2.2.2	Interview Development .....	66
3.2.2.3	Interview Data Analysis .....	68
3.2.3	Quantitative Approach .....	69
3.2.3.1	Survey Development .....	70
3.2.3.2	Study Population and Sampling .....	72
3.2.3.3	Survey Data Analysis .....	73
3.2.3.4	Spatial Analysis.....	75
3.2.3.4.1	Sample Size .....	75
3.2.3.4.2	Data.....	77
3.2.3.4.3	Thematic Mapping and Geovisualization.....	78
3.2.4	Social-Ecological Model.....	79
3.2.5	Ethics, Confidentiality, and Data Management.....	80
3.2.6	Study Rigor and Triangulation.....	81
	<b>Chapter 4: Analytical Results and Discussion .....</b>	<b>84</b>
4.1	Qualitative Findings Based on Thematic Analysis of Interview Data.....	84

4.1.1	Barriers in Accessing Preventive Resources .....	85
4.1.1.1	Personal Barriers .....	85
4.1.1.1.1	Perceived Irrelevance .....	86
4.1.1.1.2	Potential Feeling of Uneasiness.....	87
4.1.1.1.3	Minimal Knowledge.....	89
4.1.1.2	Interpersonal Barriers .....	91
4.1.1.2.1	Stigma.....	91
4.1.1.3	Organizational Barriers .....	94
4.1.1.3.1	Silence about Sexually Transmitted Infections .....	94
4.1.1.3.2	Nature of Online Information.....	96
4.1.1.3.3	Mode of Operation and Nature of Facilities .....	98
4.1.1.3.4	Vague Education Curriculum Outcomes .....	100
4.1.1.4	Community Barriers .....	100
4.1.1.4.1	Calgary, including Southwest Calgary .....	100
4.1.1.4.2	Weather Conditions .....	102
4.1.1.4.3	Traditional Values and Ethnic Background.....	102
4.1.1.4.4	Distance and Transportation System .....	104
4.1.2	Social Media, Sexually Transmitted Infections, and Targeted Testing Reminders	105
4.1.2.1	No Influence of Social Media.....	105
4.1.2.2	Social Media Have Influence .....	107
4.1.2.3	Views on Targeted Testing Reminders .....	113
4.2	Quantitative Findings Based on Statistical Analysis of Data .....	118
4.2.1	Qualtrics Survey Demographics .....	118
4.2.2	Statistical Analysis of Survey Data.....	120
4.2.2.1	Use or non-use of preventive resources.....	120
4.2.2.2	Barriers to Access to Preventive Services .....	128

4.2.2.2.1	Inter-Level Comparisons of Determinants .....	128
4.2.2.2.2	Intra-Level Comparison of Determinants of Access .....	130
4.2.2.3	Comparison of Barriers within Social Variables .....	134
4.2.2.3.1	Gender Differences.....	135
4.2.2.3.2	Age Differences.....	136
4.2.2.3.3	Racial Differences .....	137
4.2.2.3.4	Relationship Status Differences.....	138
4.2.2.3.5	Highest Level of Education Differences.....	139
4.2.2.4	Social Media and Sexual Activities.....	140
4.3	Spatial Analysis of Survey and Administrative Data .....	145
4.3.1	Spatial Distribution of Barriers per Community .....	145
4.3.2	Spatial Analysis of Facility Non-Use and Social Determinants.....	149
4.3.2.1	Income Distribution and “Never Used Preventive Facility” .....	149
4.3.2.2	Unemployment Rate and “Never Used Preventive Facility” .....	151
4.3.2.3	Educational Attainment, Silence, and Non-Use .....	152
4.3.2.4	Reported Spatial Barriers and “Never Used Preventive Facility” .....	155
4.3.3	Youth-Friendly Facilities, Transit, and Communities with High Barriers.....	155
4.4	Discussion.....	161
4.5	Challenges Encountered .....	177
4.6	Limitations.....	179
4.7	Strengths.....	182
<b>Chapter 5:</b>	<b>Implications and Conclusion .....</b>	<b>184</b>
5.1	Summary of Study.....	184
5.2	Implications .....	188
5.2.1	Theoretical Implications of the study.....	188
5.2.2	Practical Implications of the Study .....	189

5.3	Recommendations .....	193
5.4	Conclusion.....	195
5.5	Future Studies.....	196
<b>Appendices.....</b>		<b>199</b>
Appendix A .....		199
A.1	: Rates of reported sexually transmitted infections cases per 100,000 people in Canada, by sex and age group, 2008-2017 (Public Health Agency of Canada, 2019).....	199
A.2	: Surveillance data by province/territory, year, infection and sex, 2013-2017 (Public Health Agency of Canada, 2019) .....	205
A.3	: Rates of reported chlamydia cases in Canada, by age group and year, 2008-2017 219	
Appendix B : Incidence Rate (per 100, 000) of Chlamydia in Alberta, 2000-2015 (Alberta Health, 2015) .....		220
Appendix C : Incidence Rate (per 100,000) of STI/HIV in Alberta and Calgary (all diagrams copied from Alberta Sexually Transmitted Infections and HIV 2019 (Alberta Health, 2020). .....		221
C.1	: STI/HIV rates by age and gender in Alberta, 2015 to 2019.....	221
C.2	: Chlamydia cases by age and gender in Alberta, 2019.....	222
C.3	: STI/HIV rates by age and gender in Calgary Zone, 2015 to 2019.....	222
C.4	: Chlamydia cases by age and gender in Calgary Zone, 2019.....	223
Appendix D : Comparison of Chlamydia Incidence Rates among the Quadrants of Calgary, 2010 to 2014.....		224
Appendix E : Calgary Showing All Four Quadrants.....		225
Appendix F : Communities in the Southwest Quadrant of Calgary .....		226
Appendix G : City of Calgary Ward Boundaries.....		227
Appendix H : Interview Schedules.....		228

H.1	: Interview Protocol for Youth .....	228
H.2	: Interview Protocol for Service Providers .....	233
Appendix I	: Survey.....	235
Appendix J	: Interview Transcripts (Samples) – Youth .....	244
Appendix K	: Demographics of Survey Participants whose Responses were Spatially Analyzed .....	247
Appendix L	: Ethnic and Economic Profile of Communities with high “Conservative Community, so Silence” .....	248
Appendix M	: First Source of Sexual Health Information for Youth by Age, Gender, and Racial Identity .....	249
M.1	: First Source of Sexual Health Information for Female Youth .....	249
M.2	: First Source of Sexual Health Information for Male Youth.....	251
Appendix N	: First Source of Sexual Health information by Level of Education.....	252
Appendix O	: Frequency of Mention of Sexual Health Resources by Level of Education .....	254
Appendix P	: Preventive Resource Use by Gender, Age, and Racial Identity .....	257
Appendix Q	: Community Barriers by Gender, Age, and Racial Identity.....	259
Appendix R	: Breakdown of Responses as Articulated by Qualitative Interview Participants (Youth and Service Providers) .....	263
R.1	: Barriers to Access .....	263
R.2	: Opinions on the Influence of Social Media on Sexual Risk Activities .....	264
R.3	: Opinions on Targeted Testing Reminders on Social Media Dating Apps .....	264
Appendix S	: Profile of Interviewees .....	265
<b>References</b>	.....	<b>267</b>

## List of Tables

Table 1: Demographic profile of research participants in Southwest Calgary .....	118
Table 2: First Source of Preventive Sexual Health Resource Information .....	120
Table 3: Frequency of mention of sexual health resources.....	121
Table 4: Ease of preventive resource use and history of preventive resource use.....	122
Table 5: Preventive resource use by gender .....	123
Table 6: Preventive resource use by age.....	124
Table 7: Preventive resource use by racial identity .....	125
Table 8: Preventive resource use by educational attainment .....	127
Table 9: Preventive resource use by years lived in Calgary .....	128
Table 10: Inter-level comparisons of determinants of access.....	129
Table 11: Personal-level barriers to access to preventive resources.....	130
Table 12: Interpersonal-level barriers to access to preventive resources .....	131
Table 13: Organizational-level barriers to access to preventive resources.....	132
Table 14: Community-level barriers to access to preventive resources .....	133
Table 15: Calgary-specific barriers to access .....	134
Table 16: Principal barriers within gender.....	135
Table 17: Principal barriers within age cohorts .....	136
Table 18: Principal barriers within racial identity .....	137
Table 19: Most significant barriers within relationship status.....	138
Table 20: Percentage of most significant barriers within level of education.....	139
Table 21: Views of youth on the extent of influence of social media on sexual activities .....	141

Table 22: Views of youth about the extent of social media impact on knowledge about prevention .....	143
Table 23: Views of youth on automatic test reminder on dating applications.....	144
Table 24: Distance between communities and facilities.....	161
<b>Table 25: Summary of Principal Recommendations by Survey Participants.....</b>	<b>193</b>

## List of Figures

Figure 1: Proportion of individual relationship statuses that had/had not used preventive resources before .....	126
Figure 2: Views of youth about how social media could influence risky sexual activities .....	142
Figure 3: Relationship between travel time and resource non-use .....	146
Figure 4: Relationship between facility proximity and resource non-use .....	147
Figure 5: Relationship between silence and resource non-use .....	148
Figure 6: Relationship between household income and resource non-use .....	150
Figure 7: Relationship between unemployment rate and resource non-use .....	152
Figure 8: Relationship between educational attainment and silence .....	153
Figure 9: Relationship between educational attainment and resource non-use .....	154
Figure 10: Location of sexual health facilities and median household income .....	156
Figure 11: Relationship between resource non-use and location of facilities .....	157
Figure 12: Location of sexual health facilities in relation to “no facilities nearby” .....	158
Figure 13: Location of sexual health facilities in relation to travel time .....	159

# Chapter 1: Introduction

## 1.1 Overview

The global burden of sexually transmitted infections remains high. More than 1 million sexually transmitted infections are acquired daily worldwide and approximately 376 million new infections with 1 of 4 (chlamydia, gonorrhea, syphilis, and trichomoniasis) curable sexually transmitted infections are recorded each year (World Health Organization [WHO], 2019). Consequently, the majority of public health interventions for sexually transmitted infections are spread across chlamydia, gonorrhea, syphilis, and trichomoniasis (Newman et al., 2015).

Chlamydia remains the most common curable bacterial sexually transmitted infection worldwide. Estimated new global (among 15–49-year-olds) infections for chlamydia only decreased from 131 million in 2012 (WHO, 2016) to 127 million in 2016 (World Health Organization, 2019). It is a sexually transmitted infection that is caused by the *Chlamydia trachomatis* bacterium, which is transmitted through sexual contact with an infected person's sexual organ. Also, it can be perinatally transmitted to a child during childbirth from an untreated mother, resulting in neonatal conjunctivitis and/or chlamydia pneumonia (Centers for Disease Control and Prevention, 2017). The bacterium *Chlamydia trachomatis* also causes trachoma, which is considered the leading infectious cause of blindness worldwide (WHO, 2020).

For women, symptoms of chlamydia infection can include vaginal discharge, burning sensation when urinating, lower abdominal pain, pain during sexual intercourse, and vaginal bleeding between periods or after sexual intercourse. Among men, symptoms may include discharge from the penis, burning sensation during urination, burning or itching at the opening of the penis, testicular pain, or swelling. Bleeding of a receptive sex organ and eye infection through contact with infected genital secretions are also common symptoms (Government of Canada, 2021). Nonetheless, the majority (more than 50 percent of infected males and 70 percent of infected females) of infected people are asymptomatic, and therefore may not know they are infected unless they get tested (Harryman et al., 2014). Chlamydia infection can be detected through a urine sample test or through a swab of the infected area<sup>1</sup>. Once detected, chlamydia is easily treatable with antibiotics. Nonetheless, if untreated, chlamydia could result in serious health<sup>2</sup> implications, including the tendency to contract Human Immunodeficiency Syndrome, since it causes inflammation and sores that increase the risk of infection by the Human Immunodeficiency Virus to enter the body (Ward and Rönn, 2010). Furthermore, whereas men seldom have chlamydia-related health complications, untreated chlamydia among women could spread and cause tubal factor infertility, pelvic inflammatory

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<sup>1</sup> Different specimens and laboratory tests may be used for *Chlamydia trachomatis* screening. First voided urine samples can be tested for *Chlamydia trachomatis* using Nucleic Acid Amplification Testing. Urethral, vaginal, or cervical swabs can be tested for *Chlamydia trachomatis* using Nucleic Acid Amplification Testing. Rectal or pharyngeal swabs can also be tested for *Chlamydia trachomatis*, if available, and/or culture (Public Health Agency of Canada, 2019).

<sup>2</sup> A useful definition of health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (World Health Organization, 2006).

disease (PID), ectopic pregnancy, or chronic pelvic pain (Centers for Disease Control and Prevention, 2017). Like any other sexually transmitted disease, chlamydia can undermine the quality of life (both emotional and physical) and productivity of an individual or population (Romanowski, 2016).

Although resource-poor countries bear the most considerable burden of infections, curable sexually transmitted infections still pose a significant threat to global public health (WHO, 2016), even the health of residents of high-income countries such as Canada (Public Health Agency of Canada, 2019; Public Health Agency of Canada, 2013; Public Health Agency of Canada, 2012). Nevertheless, over the past decade, the rates of certain reported sexually transmitted infections have progressively and considerably increased across Canada (Giovannetti, 2019; Racco, 2017). Between 2008 and 2017, sexually transmitted infections spanned all age groups, sexes, provinces, and territories (See Appendices A1, A2, and A3) (Public Health Agency of Canada, 2019). In addition, the rates of infection increased in the following manner: chlamydia by 39%; gonorrhea by 109%; and infectious syphilis by 167% (see Appendix A1)<sup>3</sup> (Public Health Agency of Canada, 2019).

Infection rates of chlamydia have increased appreciably since 1991 when chlamydia became a notifiable disease, and it is presently the most prevalent bacterial

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<sup>3</sup> In spite of these statistics, chlamydia was focused on because it is more commonly reported than syphilis and gonorrhea (Public Health Agency of Canada, 2017).

sexually transmitted infection in Canada. Between 1991 and 1997, reported infections decreased steadily, with annual national reported incidence reduced to 112.7 per 100,000 from 171.7 per 100,000 persons (Health Canada, 2001). Between 1998 and 2015, rates steadily rose from 39,372 to 116,499 annual cases. Furthermore, in 2017, 76% of reported chlamydia cases in Canada were among people in the 15-24-year group. More precisely (see Appendix A3), the highest rate of reported cases (1,870.5 cases per 100,000) was among youth of 20 to 24 years, followed by those of 15 to 19 years (1,209.0 cases per 100,000) (Public Health Agency of Canada, 2019).

## **1.2 Research Purpose**

The incidence and spread of sexually transmitted infections are directly affected by social and behavioral determinants, and the role of health promotion<sup>4</sup> is to enable people to take control of these determinants so they can attain their full health potential (WHO, 1986; U.S. Department of Health and Human Services, [HHS ODPHP], 2020). A health promotion approach recognizes [sexual] health as an integral aspect of the “health and well-being of individuals, families, and communities” (Ford et al., 2017, p.579), and motivates public health experts to adopt strategies that are helpful in promoting sexual

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<sup>4</sup> Health promotion encompasses approaches that enable “people to increase control over, and to improve, their health” (World Health Organization, 1986), thereby improving health outcomes for health conditions (Ford et al., 2017).

health, strengthening community capacity, and increasing access<sup>5</sup> to quality preventive sexual health resources (HHS ODPHP, 2020; Ford et al., 2017, Public Health Agency of Canada, 2001).

The goal of the project discussed in this thesis was to use qualitative, quantitative, and geospatial analytical methods to examine the social determinants<sup>6</sup> of access to preventive resources for sexually transmitted infections - through the lens of chlamydia - among youth between 15 to 24 years<sup>7</sup> in Southwest Calgary. The spatial aspects of the social barriers to access were also examined.

The first of its kind in the study area, this project provides valuable and targeted information and policy-relevant recommendations for the mitigation of barriers in accessing quality sexual health resources among youth in the community. The study followed an exploratory sequential mixed-methods (qualitative-quantitative – including spatial) design to meet this goal. The research was reinforced by analysis of primary community-based data using qualitative, statistical, and applied geographical (geovisual)

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<sup>5</sup> “Access” defies a single definition due to the complex nature of healthcare access. For purpose of this study, it is defined as the potential use of healthcare resources as demonstrated through the dimensions of availability, accessibility, affordability, acceptability, and accommodation that are prescribed by Penchansky and Thomas (1981).

<sup>6</sup> Social determinants encompass the living and working conditions that negatively or positively influence health-related decisions and eventually shape people’s health (Mikkonen and Raphael, 2010; Raphael et al., 2020).

<sup>7</sup> Based on the UNESCO definition of youth (<http://www.unesco.org/new/en/social-and-human-sciences/themes/youth/youth-definition/>). “Youth” is used collectively in this study to denote *mature minors/teenagers* (15-19 years) and *young adults/non-teenagers* (20-24 years) unless otherwise specified.

methods, which had not yet been used in combination to investigate chlamydia in Southwest Calgary.

### **1.3 Problem Statement**

In Alberta, sexually transmitted infections constitute significant and persistent health issues with short-term and long-term social, emotional, economic, and health costs (Alberta Health, 2011; Alberta Health, 2008). The past decade has been predominantly characterized by ever-increasing chlamydia incidence rates, which at certain times have even surpassed national rates<sup>8</sup> (Alberta Health, 2008). From 1999 to 2009, chlamydia rates increased by 207%, with over 13,000 cases reported in 2009 alone (Alberta Health, 2011). Overall, chlamydia incidence steadily increased from 6,035 in 2000 to 16,662 cases in 2014 (Appendix B). Further, between 2002 and 2014, incidence increased by 76% for males and 163% for females (Alberta Health, 2015). Also, there were 18,206 cases of chlamydia in Alberta in 2019 which is an increase of 4.8% compared to 2018 (17,384 cases). Rates of reported chlamydia cases stood at 416.5 cases per 100,000 people which is similarly an increase of 3.1 percent compared to 2018 (403.6 cases per 100,000 populations) (Alberta Health, 2020).

In recent years, the distribution of chlamydia has varied immensely with geography and age. It continues to be the most common and most widespread bacterial

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<sup>8</sup> See Appendix A for information on provincial and national rates.

sexually transmitted infection in Alberta, particularly in Southwest Calgary and North-East Edmonton health zones (Fletcher, 2018). Moreover, chlamydia was reported as the sexually transmitted infection with the highest rate per 100,000 people in 2013/2014 - 2015/2016 for all local geographic areas in Calgary (Alberta Health, 2017). Agewise, youth are at the center of the chlamydia problem in Alberta (Alberta Health, 2020). Youth are more prone to infection by sexually transmitted infections than adults since they are predisposed to increased involvement in sexual activities and their attendant risks (unwanted pregnancy and infection with sexually transmitted illnesses) (Yahaya et al., 2010; Centers for Disease Control and Prevention, 2014). A case in point, peak chlamydia infection rates in Alberta (Appendices C1 and C2) and Calgary (Appendices C3 and C4) between 2015 and 2019 were mostly recorded for the 15-24-age (female) and 20-24-age (male) cohorts (Alberta Health, 2020). Despite these facts, youth have not been accessing existing Alberta-wide preventive resources (Rabinovitz, 2015; Simes, 2016; Tucker, 2016), which are central to reducing sexually transmitted infection incidence.

Bush et al. (2008) examined the spatial patterning of gonorrhea or chlamydia infections in the Calgary Health Region by mapping administrative data on prevalence rates and socioeconomic status. They found a correlation between areas of low socioeconomic status and areas of high prevalence rates for gonorrhea and chlamydia. Church et al. (2003) discovered that routine health visit, genital chlamydia trachomatis

infection, previous episode of genital chlamydia trachomatis infection, new sexual contact, sexual contact with a partner known to have a sexually transmitted infection, or a recent sexual assault were the clinical reasons for testing women for genital chlamydia infection. Gratrix et al. (2015) investigated the prevalence of, and the factors associated with, rectal chlamydia among female clinic attendees. Women who were a contact to a sexually transmitted infection were found to be less likely to have rectal-only chlamydia for both clinics.

Since none of these (Gratrix et al., 2015; Bush et al., 2008; Church et al., 2003) known existing studies were community-based, and since they did not permit youth to describe their perceived barriers, a community-based approach is employed in this study to discover whether youth were deliberately underestimating the possible health effects of sexual risk activities<sup>9</sup> (also “risky sexual activities” or “unprotected sex”) by refusing preventive services (Scott, 2013), or whether they were genuinely faced with seemingly insurmountable service access barriers (Goldenberg et al., 2008b).

#### **1.4 Rationale**

In general, based on the previously mentioned high incidence rates among youth, they should be at the core of every sexual health strategy. As a reinforcing factor,

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<sup>9</sup> Sexual risk activities are those sexual activities that place youth at risk for sexually transmitted infections and unintended pregnancy. “Risky sexual activities” and “sexual risk activities” are used in this study because they are the phrases that youth are familiar with.

protecting youth from disease should be the core goal of public health (UNAIDS, 2010) since youth health has immense economic (youth constitute a greater percentage of the workforce that could shape the global economy in the near future), public health, and demographic benefits. Specifically, youth, like everyone else, also have fundamental rights to life, development, quality health, and access to healthcare (United Nations Committee on the Rights of the Child, 2016). Investing in the health of youth can help reduce morbidity and mortality among youth immediately and later in adulthood. If the health of youth is promoted, the health of future offspring will also be safeguarded (World Health Organization, 2017).

The fact that there was no “good explanation for the hike in Calgary STI [sexually transmitted infections] cases” (Wood, 2017, p. 30) sparked the researcher’s interest in the chlamydia situation in Calgary. In 2017, the incidence rates per 100,000 people for similarly or even more highly urbanized Canadian cities were: 574.6 for Vancouver (BC Centre for Disease Control, n.d.), 427.3 for Toronto (Public Health Ontario, 2020), 365.2 for Montréal (Gouvernement du Québec, 2018), and 346.4 for Ottawa (Public Health Ontario, 2020). Calgary did not have the highest incidence rate (323.52 per 100,000) (Wood, 2018) of all these major Canadian cities, however, given the lack of good answers to Calgary's situation in the past, and the fact that it has the highest incidence within Alberta, it is a worthy case to tackle. Further, the benefits of preventive strategies were expected to be maximized if they were directed toward a setting such as Calgary,

which had the youngest population of all major cities in Canada, since the emphasis is on young people when sexually transmitted infections are being discussed (Calgary Economic Development, 2019).

The areas in the southwest were of particular interest since, at the time of the design of this study, its residents had a significantly higher chlamydia rate than the citizens in the other quadrants of Calgary. Compared to other quadrants of Calgary, Southwest Calgary steadily led chlamydia incidence rates from 2010 to 2014 – see Appendix D (Fletcher, 2018). One key question is, “[if] the bulk [not all] of the difference [in incidence between Southwest Calgary and the other quadrants] is driven by the volume of tests that are assigned that general delivery postal code” (Fletcher, 2018), what is responsible for the remainder of “the difference” that is not due to general delivery postal code? Also, despite the socioeconomic inequalities among the communities within southwest Calgary, the quadrant generally fares better than the other quadrants in terms of the social determinants of health (Mikkonen and Raphael, 2010; Government of Canada, 2019), thus the curiosity about the five consecutive years of high chlamydia incidence.

In addition, choosing a subsection of the city allowed for a more detailed and context-relevant analysis than would a study of the city as a whole, even though the whole city had more comparators (other quadrants). Nevertheless, the results from the

study may, in a general sense, still be relevant to chlamydia preventive strategies that affect youth in the other quadrants.

Moreover, chlamydia incidence among youth is an indicator of overall incidence since, as already indicated, they are at the center of the epidemic (Choudhri et al., 2018). Therefore, it made sense to target a quadrant that did not only have the highest number of youth in the last decade but also recorded the highest chlamydia incidence for five successive years (Fletcher, 2018) (Appendix D). In 2018 and 2019 for instance, Southwest Calgary had the highest number (52,917 and 53,533 respectively) of youth as compared to the other quadrants<sup>10</sup> of Calgary (Government of Alberta Interactive Health Data Application, 2020).

The researcher could have focused on northwest Calgary since that is where the University of Calgary, a larger school with an equally diverse enrollment, is situated. Nevertheless, northwest Calgary was not focused on because it trailed Southwest Calgary in terms of chlamydia incidence. As well, focusing on only one out of the four quadrants of Calgary was justified since it allowed the researcher to gain an in-depth, targeted, and fine-scale insight into the chlamydia situation.

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<sup>10</sup> The distributions of youth for the other quadrants of Calgary were as follows for 2018 and 2019:

- 2018: 51,083 for the northwest, 27,361 for the northeast, and 21,831 for the southeast;
- 2019: 52,289 for the northwest, 28,554 for the northeast, and 22,310 for the southeast.

Furthermore, reports of the resurgence of sexually transmitted infection rates in Alberta and the fact that chlamydia is the most commonly reported sexually transmitted infection (Wood, 2018) paint a vivid picture of the chlamydia situation in Alberta during the past decade. Consider the following facts:

- A total of 26,056 sexually transmitted infections/Human Immunodeficiency Virus cases were reported in 2019 alone (Alberta Health, 2020), including 416.5 chlamydia cases per 100,000 people (an increase of 3.1 percent compared to 2018) being reported for the same period;
- Count of chlamydia cases stood at:
  - 17,384 cases (403.6 cases per 100,000 people<sup>11</sup>) in 2018 - an increase of 4.8% (n = 796) as compared to 2017 (Alberta Health, 2019);
  - 18,206 cases (416.5 cases per 100,000 people<sup>12</sup>) in 2019 - an increase of 4.8% (n = 832) as compared to 2018 (Alberta Health, 2020).

Moreover, one of the fastest urbanization shifts in Canada has occurred in Alberta, where since 1961, there has been a 20.3% increase in the proportion of urban dwellers<sup>13</sup>. Alberta has the third highest<sup>14</sup> proportion of urban dwellers compared to all the other provinces and territories. In 2016, 83.6% of the population of Alberta lived in

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<sup>11</sup> An increase of 3.3 percent compared to 2017 (Alberta Health, 2019).

<sup>12</sup> An increase of 3.1% compared to 2018 (Alberta Health, 2020).

<sup>13</sup> In the 2006 census, the populations of Calgary and Edmonton, which are Canada's fastest-growing major urban areas, exceeded one million for the first time. Between 2001 and 2006, the population of Calgary grew by 13% and that of Edmonton by 10% (Statistics Canada, 2008).

<sup>14</sup> British Columbia (86.4%) and Ontario (86.2%) are in the lead.

urban settings (Alberta Government, 2017). Urbanization contributes to the creation of environments that facilitate interactions and norms that affect the transmission of infectious diseases, including sexually transmitted ones (Schläpfer et al., 2014).

Theoretically, there is evidence (see *Environmental Scan* subsection under *Methodology and Theoretical Framework*) that various organizations in Calgary such as The Alex, Alberta Health Services, and Centre for Sexuality are working relentlessly to promote the sexual health of youth. However, the persistence of sexually transmitted infections in Alberta and Calgary, especially among youth (Fletcher, 2018), influenced the assumption that existing mitigating strategies, including research methods and policy, could be more wide-ranging in helping explain and mitigate the factors that are instrumental in sustaining incidence. This persistence is also why a medley of analytical methods was employed in this study. By merging qualitative, quantitative, and visual analytical methods to explore the barriers to access (also “determinants of access” in this document), the robustness of evidence about the barriers among youth was achieved (Anderson, 2016; Creswell, 2009). The geographical and spatial analytical methods further strengthened the mixed-methods approach by revealing geographical patterns in the survey data and the spatial dimensions of the qualitative data.

To be considered comprehensive and efficacious in minimizing the burden of sexually transmitted infections, a prevention approach should have the capability of addressing most or all four categories of prevention activities, namely upstream, primary,

secondary and tertiary (Government of Canada, 2015). The upstream activities address determinants of health that make individuals either vulnerable to or resilient against diseases. Primary activities provide skills and information that help uninfected individuals to stay uninfected. Secondary prevention activities include elements like testing and partner notification that aim at identifying and treating infected individuals. Tertiary activities seek to improve the quality of life of those living with an infection through the provision of proper care and support. It is based on these conditions that the situation of this study in the Social Ecological Model is justified.

The Social Ecological Model was first conceptualized in the 1970s by Urie Bronfenbrenner, an American psychologist, who argued that to understand better how humans developed, they had to be studied in different environments (ecological systems) (The Psychology Notes HQ, 2019). The model was later adapted and modified by McLeroy et al. (1988) (Golden et al., 2015), who suggested that health behavior was influenced by the interaction among elements that operate at five levels – intrapersonal (also Personal in this document), interpersonal, institutional or organizational, community, and public policy (McLeroy et al., 1988, p. 355):

1. Intrapersonal (also referred to as “Personal” in this document) factors: characteristics of the individual such as knowledge, attitudes, behavior, self-concept, skills, etc. This includes the developmental history of the individual.

2. Interpersonal processes and primary group: formal and informal social network and social support systems, including the family, workgroup, and friendship networks.
3. Institutional factors: social institutions with organizational characteristics, and formal (and informal) rules and regulations for operation.
4. Community factors: relationships among organizations, institutions, and informal networks within defined boundaries.
5. Public policy: local, state, and national laws and policies, which require government action.

The model represents a multi-level approach to health promotion, including disease prevention. Not only does it describe the multiple and intricate micro and macro-level elements that operate at each level of influence, but it also is useful for analyzing in-depth the intricate interaction among the factors that influence health at each level. It also offers intervention strategies that are tied to each of these levels (Reifsnider et al., 2005; McLeroy et al., 1988; Centers for Disease Control and Prevention, 2015). In other words, it recognizes the intertwined relationship between the individual and their environment and the role of this relationship in shaping the individual's health (DeLongis and Holtzman, 2005). Likewise, the use of the Social Ecological Model is justified since it facilitates an explanation of the complex levels of factors that might be interacting to

determine access to preventive resources among youth. DiClemente et al. (2015) have noted the “advantage of the ‘synergy’ among the five levels that comprise the model” (p. 831).

There is a gap in our understanding of the deep interactions between social and spatial barriers among youth in Southwest Calgary. As well, contextual community-based literature on the barriers that youth in Southwest Calgary face is lacking. By exploring the barriers, the study provided a unique Southwest Calgary perspective to the literature on the determinants of sexual health service access. This study sought “not to generalize but rather to provide a rich, contextualized understanding” (Polit and Beck, 2010, p. 1451) of the impacts of the social determinants on access to sexual health resources among youth. Nonetheless, readers of reports on the findings may be able to extrapolate the study findings to settings that share socioeconomic and other demographic similarities with Southwest Calgary (Polit and Beck, 2010).

Also, since the use of social media dating applications<sup>15</sup> is commonplace in recent times, especially among teenagers, the researcher contributes a Southwest Calgary perspective to ongoing discussions on the potential for dating applications to contribute to

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<sup>15</sup> For the purpose of this study ‘social media dating applications’ (also referred to as “social media for the purpose of this document) is defined as “internet-based applications that permit users to construct a public or semi-public profile and create and maintain a list of other users (‘friends’) with whom they may share content and participate in social interactions and networking” (Gelinis et., 2017, p.2). More specifically, is used to denote the combination of social media and dating applications since they are linked (Niesen, 2017).

the sexual behaviours of users. The case for the inclusion of dating apps stems from the purported potential they have to undermine sexual health promotion efforts (Ollstein and Ravindranath, 2019; Belluz, 2017) by influencing sexual risk activities (Shapiro et al., 2017). The knowledge gained and policies recommended from this study are supportive in reducing such consistent disparities in incidence rates. Overall, this research is needed since it provides information that is relevant to sexual health planning initiatives for youth in Southwest Calgary.

### **1.5 Central Question**

What are the barriers, irrespective of whether they are perceived or experienced, in accessing chlamydia prevention resources among youth, 15-24 years, in Southwest Calgary, and what are the spatial dimensions of these barriers?

### **1.6 Hypotheses**

The central hypothesis is that the barriers to access have social and spatial aspects that work concurrently to hinder access to sexual health resources among youth in Southwest Calgary. The barriers have proven to be invaluable to public (sexual) health research (Collins et al., 2017; Asenso, 2012; Goldenberg et al., 2008b; Judd et al., 2006), but they had not been fully explored and analyzed by any of the few known Calgary-based studies on chlamydia (Gratrix et al., 2015; Bush et al., 2008; Church et al., 2003).

The following hypotheses were also tested to ascertain the relationship between resource use and the demographic variables (age, gender, years lived in Calgary, and racial identity) with binary nominal groupings:

1. Gender of Participant \* Ever Used any Preventive Resource(s)

H<sub>0</sub>: “Resource Use is independent of Gender”

H<sub>1</sub>: “Resource Use is not independent of Gender”

2. Age of Participant \* Ever Used any Preventive Resource(s)

H<sub>0</sub>: “Resource Use is independent of Age”

H<sub>1</sub>: “Resource Use is not independent of Age”

3. Racial Identity \* Ever Used any Preventive Resource(s)

H<sub>0</sub>: “Resource Use is independent of Racial Identity”

H<sub>1</sub>: “Resource Use is not independent of Racial Identity”

4. Length of residence \* Ever Used any Preventive Resource(s)

H<sub>0</sub>: “Resource Use is independent of Length of Residence”

H<sub>1</sub>: “Resource Use is not independent of Length of Residence”

## 1.7 Objectives

The following research objectives were met to answer the central research question:

1. To qualitatively explore and critically analyze the spatial dimensions of the social barriers to accessing resources for chlamydia among youth in Southwest Calgary.

2. To examine the opinions of youth regarding the possible associations between the use of social media dating applications and sexual health.
3. To quantitatively examine the barriers associated with access to preventive resources for chlamydia among youth, including resource use history (use/non-use of facilities).
4. To visualize and conduct a Geographic Information Systems-based analysis of the spatial patterning of prevention resource non-use for chlamydia among youth.

## **1.8 Significance of the Study**

The application and significance of this study are both varied, considering that detecting and alleviating the barriers to quality sexual health resource access constitute crucial steps toward mitigating sexually transmitted infections and their concomitant impacts (WHO, 2015). The number of youth in Calgary has been increasing (through new births and migration) in direct proportion to the increasing Canadian and Albertan population. Thus, to satisfactorily meet the sexual health needs of current and future youth in Calgary, the barriers to access to sexual health resources need to be exposed and mitigated.

Investigations of sexually transmitted infections have traditionally been based on individual risks, although the varying spatial incidence demands that context be considered. This approach was novel since, to the best of the researcher's knowledge, there was no known Calgary-based study that combined qualitative, quantitative, and

geospatial methods to explore the spatial aspects of the social barriers of accessing resources for chlamydia prevention among youth.

The findings granted further insight into the direct and indirect effects of access inconsistencies and service provision insufficiencies on incidence rates for sexually transmitted infections. The information revealed can guide public health decisions, resource planning, and strategies that are geared toward sexual health among youth. Equally important, Calgary-based sexual health providers now have added information on the opinions of youth regarding the extent to which social media inform risky sexual activities, all the more reason why prevention strategies should endeavor to harness their (social media) potentials whilst finding ways to protect youth against the negative influences on their health. Moreover, if youth are the users of social media applications, and if they are the beneficiaries of potential policies, then their opinions about this matter go a long way to guide and justify related policies.

In methodological terms, since the methods used, especially the geospatial analysis, had not been adequately used in the study area, the study was yet another way to re-emphasize the need for an approach using geospatial methods for sexual health research and practice in the fields of geography and public health. In addition, a thorough analysis of the spatial aspects of the social factors reminds public health researchers to pay extra attention to the geographical aspects of the social determinants and the combined social-spatial analytical approaches they dictate. This is especially significant

because although there is much awareness of the interaction between social and spatial factors in determining health, these interrelated factors have not always been jointly analyzed (Stacciarini et al., 2018). The maps in the study serve as effective exemplary planning tools for community-based sexual health service providers. The emphasis on maps here is the capability they have to reveal otherwise hidden patterns, which add to existing knowledge and understanding of the state of chlamydia. Lastly, the reports and publications produced based on the study findings will contribute significantly to the existing literature on sexual health resources access inequalities in the context of Southwest Calgary. As already mentioned, the findings might be transferable to contexts that are congruent with the study setting.

## **1.9 Thesis Chapters**

The thesis has five chapters. Chapter One comprises an overview of the study, research purpose, problem statement, rationale, central question and objectives, hypothesis, objectives, and significance of the study. In Chapter Two, relevant literature is reviewed for the following items: the concept of place, the importance of geography for health, the geospatial approach to health research, barriers in accessing healthcare resources, and social media and risky sexual activities as well as a summary of the approach used. Chapter Three comprises the study setting, research design and methods (environmental scan; study population and sampling; the design of data collection instruments; and data analyses), theoretical framework, ethics, confidentiality, and data

management, study rigor, and triangulation<sup>16</sup>. Chapter Four contains the results from and discussion of the qualitative and quantitative analyses, including mapping and spatial analysis of data. Finally, Chapter Five focuses on the summary of the study, implications of the study, recommendations, conclusion, and future studies.

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<sup>16</sup> Triangulation is the development of a comprehensive understanding of phenomena through the use of multiple methods or data sources (Patton, 1999).

## Chapter 2: Literature Review

Place is integral to explaining the complexities of health-related issues such as perceptions and behaviors (Goodchild, 2015). It is a contested, simple, yet convoluted concept whose meaning has been a subject of debate within and among disciplines. Place differs a bit from space. Space can refer to geometric space (or hyperspace) in which phenomena occur (that is, their location), as well as the relationships in a spatial network. Space is not only about geometry and coordinates; it is also a means and product / outcome of social relations. It is absolute (as in “emptiness” – e.g., ‘I need more space in the kitchen’); relative (as in ‘distances between objects’); and / or relational (as in ‘space only makes sense when considered as a fluid entity and in relation to other objects’). It is through this fluid nature of space that an understanding of place can be gained (Tyner, 2012).

Although place is a word of everyday usage, most times, we may not understand it. It is highly recognized among geographies that aim to describe the unique social and physical attributes of a specific region. It may be thought of as a location and locale (as in ‘specific setting with social relations’); or locality (as in ‘areas with unique combinations of social and economic processes’). Once people find themselves at a location or locale, they may have a sense of place, which denotes its significance to them, and their knowledge and awareness of it. Moreover, place can be approached from three primary perspectives: the descriptive approach, which is concerned with the uniqueness of places;

the social constructionist approach, which is concerned with how social processes make and unmake places; and the phenomenological approach, which is more interested in the deeper meaning of place to humanity. Since these approaches overlap and are all essential to explaining the complex role of place to humankind, they should be used in conjunction in an overlapping manner, rather than privileging a single approach (Cresswell, 2004; Tyner, 2012).

Place offers us a more in-depth view, knowledge, and understanding of the world when it is deeply thought about. To maximize its potential, place should be conceptualized by researchers as the outcome of processes that transcend the boundaries of a specific location instead of being seen in terms of boundaries. Place refers to how the world is made meaningful and experienced “in the context of power” (Cresswell, 2004, p. 12). The moment people give meaning to a particular space, through their experience about, ownership of, naming of, connections to, attachment to, and perceptions of it, that space becomes a place – this is not the same as social space, even though they might play the same role.

Despite the progress made in health research over the years, the influence and recognition of geography of place remain comparatively feeble (Macintyre et al., 2002). This is because empirical research is often constrained in its ability to reveal the role and characteristics of ‘place effects’ due to its overdependence on conventional and usually shallow representations of place. Such a constraint is due in part to the lack and varying

nature of concepts and methods needed to operationalize context-related ideas effectively. This signals the need for the development and / or application of theoretical approaches, which could serve as the basis for empirical means to establish the significance of place for health research (Curtis and Jones, 1998).

## **2.1 Importance of Geography for Health**

The debate about the relationship between geography (place / context) and health – “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, 2006, p. 1) – has continued unabated since the 1990s when there was heightened interest in the role of geography in shaping people’s health experiences (Macintyre and Ellaway, 2003). In the course of these debates, the effects of geography are sometimes minimally addressed by some researchers (e.g. Sloggett and Joshi, 1994; Duncan et al., 1993; McCartney et al., 2012) who generally conclude that spatial differences in health outcomes are due primarily to compositional rather than geographical factors. The frequent assumption is that the population characteristics of individuals in a place are predominantly responsible for the observed relations between places and health, making the place effects simply remnants of the compositional factors. Put differently, geographical context is only considered after all possible compositional effects have been considered (Macintyre et al., 2002).

Sloggett and Joshi (1994) report a “social gradient”<sup>17</sup> (Marmot and Allen, 2014, p. 1102) effect in premature mortality among a random sample of nearly 300,000 people in England between 16 and 65 years. Among men, in particular, individual socioeconomic circumstances surpassed ward socioeconomic deprivation<sup>18</sup> as a determinant of premature death. Concluding that irrespective of where they live, equally disadvantaged people have higher mortality risks, and living in a deprived area does not increase mortality risks for the socially privileged, they recommend tackling “disadvantage in individuals” (p. 1474) to efficiently reduce premature mortality. Similarly, in their disagreement with Blaxter (1990), Duncan et al. (1993) report that once individual levels of deprivation are considered, an area of residence has no significant impact on health-related behaviors. Further, in their examination of higher male mortality rates among two Scottish cohorts and one southeast England cohort (45-64 years), McCartney et al. (2012) conclude that income and power distribution at the individual level will help reduce health inequalities. They imply that mortality differences are not due to the differences between the study sites per se, but instead, to observed social gradients.

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<sup>17</sup> “Social gradient”: “The poorest of the poor, around the world, have the worst health [...]” and “in general the lower an individual’s socioeconomic position the worse their health” (World Health Organization, 2020, para. 11).

<sup>18</sup> “The lack of social and economic benefits which are considered to be basic necessities of a society or community or in a broader sense of a region. The regions with high demand and low supply of basic requirements often exhibit poor social and economic status compared to the other adjacent regions which mark the former as socio-economically deprived region” (Sarkar et al, 2014, p272).

It is suspected that place effects are often rejected due to the desire of researchers not to fall prey to ecological fallacy<sup>19</sup>. However, analyzing place effects on health (ecological perspective) is not the same as the misapplication of aggregate data as a substitute for personal data (ecological fallacy). Macintyre et al. (2002) have argued that the fear of highlighting income insecurity as a health determinant, with the concomitant worry of diverting the focus of policy from welfare issues, is another possible reason for the rejection of place as a causal factor in health. In addition, advancements in statistical analysis and improved capacity to analyze individual predictors of health from large datasets have diverted attention from the importance of place effects on health (Macintyre et al., 2002).

Furthermore, when poverty (income insecurity) reduction policies that are aimed at helping individuals are geographically targeted, they may sometimes end up not reaching those who require them, particularly when there are individual-level disparities in access to community poverty reduction interventions (Curtis and Jones, 1998; Taylor et al., 2017). This weakness of the place-based approach is particularly valid in settings where individual traits have proven to be stronger determinants of health variations than geographical factors (E.g., Qi et al., 2010; Tsai, 2010).

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<sup>19</sup> A failure in reasoning that arises when inferences are made about individuals based on the inferences made about the group they belong to (“Ecological fallacy”, 2021).

In addition, it has been argued that targeting an area instead of individuals induces policymakers to make sweeping generalizations about neighborhoods rather than paying attention to individual deficiencies and needs<sup>20</sup>. When this happens, policymakers may potentially apply perceptions and ideas about the characteristics of a given neighborhood to policy that is geared at individuals; thereby contributing nothing to reducing existing inequalities (Curtis and Jones, 1998; Taylor et al., 2017).

Finally, there are challenges in collecting data on place characteristics. First, it is difficult and expensive to determine the appropriate and standard spatial scale (regional, national, local) at which data should be gathered and / or aggregated to efficaciously meet different local health needs. Second, the inconsistency of area effects caused by changes in environmental conditions over time, as well as the difficulty in immediately knowing the specific outcome of those conditions, poses a challenge to hypothesizing health outcomes for specific points in time. Related to this last point, since it is demanding to establish the whole spectrum of health outcomes that the features of a particular location produce over time, the place features do not easily lend themselves to cross-sectional studies (Macintyre et al., 2002).

The above arguments notwithstanding, it is imperative to give the same level of attention to the geographical and individual-level determinants of health (Macintyre et

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<sup>20</sup> Marmot (2010) has shown the possibility of targeting places without ignoring the most disadvantaged by proposing a system of 'proportionate universalism' - helping all sections of society although the scale and intensity of the support should be proportionate to the level of disadvantage being experienced.

al., 1993; National Academy of Sciences, 2010), since the contextual and compositional effects complement each other (Collins et al., 2017) in determining health. Even when the contextual effects are emphasized as mere residues of unmeasured compositional effects, care is taken not to ignore them. This is particularly true when the elements operating solely at the level of the individual are not enough to explain some health outcomes (Sloggett and Joshi, 1994).

A more profound grasp of the influences of geographical context on health is among the problems of the utmost worth to contemporary geographers, especially since place effects eventually inform health variations. The relationship between geography (place/space and time) and health cannot be overstated, since, in addition to documented socioeconomic factors such as income, where and when people live, study, work, and are born affect and explain their health (Government of Canada, 2020). In other words, the prime goal of all areas of geographical expertise is to help explain health problems (Hunter, 1974; Dummer, 2008; Salazar, 2011). Locational issues continue to be of prime relevance in tackling health matters due to the underlying influence of environmental risk factors on people's health. Such environmental risks and associated health outcomes are usually influenced by the interrelationship between places (Dummer, 2008). Once geography is recognized, one can better appreciate and answer questions about, for instance, the effects of social factors (Mangili and Gendreau, 2005; Chen et al., 2020) and

climate change diffusion (e.g. Nelder et al., 2018; Ludwig et al., 2019) on disease as well as the impacts of disparities in access to health (National Academy of Sciences, 2010).

The investigation into the 1854 Cholera outbreak in London by John Snow (Johnson, 2006) was one of the first proofs that geography is essential to health, where the detection of the source and pattern of cholera led to modifications in water and waste management systems, and eventually to improvements in public health in London and the world at large. Related to Snow's study, Dummer et al. (2003) demonstrated increased risk of a lethal congenital anomaly for pregnant women who lived close to incinerators and crematoriums in Cumbria, northwest England. Although no causal effect is implied, the associations reported nevertheless substantiate the importance of geography to health outcomes by typifying how geographic proximity to pollutants was inversely related to positive health outcomes. Brenda et al. (2006) similarly investigated whether maternal residential proximity to hazardous waste sites or industrial facilities with chemical air emissions was associated with chromosomal anomalies in births. They found some relation between residential proximity to industries with emissions of solvents or heavy metals and chromosomal anomalies in births by older mothers. Specifically, Hispanic women who lived near hazardous waste sites were 7.9 times as likely (95% CI = 1.1, 42.4) to have offspring with Klinefelter variants. Elliott et al. (2018) conducted a community-based study in Ohio to explore the impacts of residential proximity to unconventional oil and gas wells on water contamination and health symptoms.

Proximity to wells was associated with increased general health symptoms. Communities that were near wells were also more likely to experience environmental health impacts. Similarly, Burra et al. (2006) assessed the prevalence and determinants of birth weight and preterm birth among residents living in proximity to an industrial site contaminated with a mix of industrial wastes arising from a former steel mill and coking works (the Tar Ponds) in Sydney, Nova Scotia, Canada. Linear regression analyses showed a reduction in birth weight among residents in a zone estimated to have higher levels of deposition of airborne effluent from the industrial site. On the other hand, they noted a decrease in the risk of preterm birth as residential distance from the site increased.

Geography is also useful for explaining the space-time dimensions of the clustering and diffusion of an infectious disease. The movement of people between places over time, and how movement informs disease diffusion is well understood through geography (Ye et al., 2016; Tunstall et al., 2004). Additionally, Jones et al. (2016) typify how spatial distribution of resources affects accessibility while Engler-Stringer et al. (2014) show the extent to which geographic context affects accessibility to nutritious and non-nutritious (calorie-dense) food outlets and eventually impact obesity rates.

Moreover, Piat et al. (2017) confirm that everyday places or therapeutic landscapes directly or indirectly impact mental illnesses. In a related study, Collins et al. (2017) found that physical environmental, climatic, and social conditions of locations affect mental health. Furthermore, the nature of policy in a given location can impact

health outcomes (Bell et al., 2017), and weak political commitment to public health can lead to the eventual exacerbation of health disadvantage in impoverished settings (Curtis and Jones, 1998).

The studies mentioned provide a few examples out of many that confirm the significance of geography to holistically explain and address pressing community health issues. Once we begin to intently consider the rich and intertwined relationship between people and the environment, we would be able to move away from focusing solely on “obvious” causal mechanisms (Cresswell, 2004), and toward cultivating stronger causal inference abilities, including identifying new opportunities for health intervention.

Last but not least, since health strategies that work for an individual in one place may not work for them in another setting, more effective and context-specific strategies must be thought of and implemented. Geography supports the notion that even when people are equally disadvantaged socially, they experience health differently depending on their location. Geography further highlights the heterogeneity of communities, in terms of their health situations, and the need for local policies that will concurrently impact populations and individuals (UNAIDS, 2016; Collins et al., 2017).

In summary, the difference in architectural design between a children’s hospital and a general hospital, the desire to better understand how microbiomes, indoor environments, and human health interact to inform health, the need for cultural sensitivity training in health care, the naming of Ebola and other diseases after the places they were

first discovered, the thought of the Zika Forest in Uganda when Zika virus is mentioned, and the identification of *where* disease vectors are endemic (Attaway et al., 2017), are all instances that prove that geography matters in health research and practice. Its relevance has necessitated the birth of place-based approaches (e.g. community health development, sustainable communities, collective impact, and neighborhood revitalization initiatives), which have proven and still prove to be effective in reducing health disparities on a large scale in geographic locations.

## **2.2 The Geospatial Approach to Health Research**

The fact that location and neighborhoods work hand-in-hand with biological and socioeconomic factors to inform the complexity and heterogeneity of diseases and other public health issues (including health inequities) necessitates the application of the geographic approaches to health (UNAIDS, 2016), especially considering that they can illuminate the locational and contextual influences on health. Wang (2020) has also remarked how the geospatial approach can help “mitigate various sources of uncertainty in assessing neighbourhood effect” (p. 9) since the neighborhoods that are most relevant would have been defined.

The geospatial approach encompasses the collection, modeling, and analysis of spatial data for planning, management and decision-making. It involves the use of Geographic Information Systems, Remote Sensing (RS), Global Positioning System (GPS), and internet mapping technologies, with Geographic Information Systems being

the primary component (Johnson, 2009; Cromley and McLafferty, 2012; Patel and Waters, 2012). The kind of spatial questions, the type of data, the layers to be collected and created respectively, and the type of data analyses are determined by the mode of transmission of the communicable disease in question (Cromley and McLafferty, 2012). Irrespective of the technology used, the geospatial approach has three main sub-approaches, namely thematic mapping, and geovisualization, spatial analysis, and spatial modeling (Ebener et al., 2015).

Geospatial methods support health policymakers and decision makers who seek to make accurate decisions about health risks and disparities, distribution and allocation of scarce resources, disease surveillance, management, and analysis (Fradelos et al., 2014; Nykiforuk and Flaman, 2011). They are useful for their ability to quickly reveal in-depth complex spatial and temporal trends, variations, and relationships that are sometimes hidden by non-spatial estimates (WHO, 2016; Jones et al., 2016), thereby permitting public health and decision-making professionals to arrive at faster and more efficient conclusions and decisions (Hanchette, 2003). Similarly, Nykiforuk and Flaman (2011) have observed that the “growing recognition in health promotion that consideration of context or settings is essential for effective public health research, practice, and policy” underscores the importance of the geospatial methods, since “a first step in examining context is to investigate the spatial component of the health behaviors at which health programs and policies are directed” (p.63).

The geospatial approach has been used to investigate, detect and explain spatial patterns and diffusion of communicable diseases (Dummer, 2008; Lessard-Fontaine et al., 2015), which are distinct due to their spatial variability and their diffusion over time (Cromley and McLafferty, 2012). To emphasize, the geospatial approach has been useful in providing real-time data to inform spatiotemporal analysis and remote monitoring of health phenomena (Teng et al., 2014). The popularity of GPS-enabled mobile devices and telecom geolocation data in recent years has further strengthened the effective application of the geospatial methods to health research since they have boosted the application of methods such as contact tracing<sup>21</sup> (Danquah et al., 2019) to the gathering of accurate place-based data to monitor the spread of diseases (Cesario et al., 2012). Risk assessment models in relation to the contamination of drinking water (Taylor et al., 2013) have also been achieved through the use of geospatial methods.

The geospatial approach has been used in sexually transmitted infection policy research where associated risk factors are not easily recognizable until the social and geographical processes that support them (risk factors) are well comprehended (Cromley and McLafferty, 2012). The wide-ranging usefulness of the geospatial methods to sexual health policy research may include their application to the exploration of geographic trends/disparities and diffusion of sexually transmitted infections (Carrel et. al, 2016;

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<sup>21</sup> Contact tracing is so much harder in diseases such as Covid-19 (as opposed to Ebola which kills quickly) where infected people may be asymptomatic for long periods of time. Kuraitis et al. (2020) have outlined some COVID-19-related contact tracing challenges.

Owusu, 2016; Marotta, 2017). The influences of distance (Carrel et al., 2016), case density/case clustering (Owusu, 2016; Marotta, 2017), and socioeconomic status (Bush et al., 2008; Owusu, 2016) on the diffusion of sexually transmitted infections are also clarified through the use of the geospatial methods. Similarly, the application of the geospatial methods to sexual health data enables sexual health researchers to establish the spatial correlation between core areas and clusters of core groups, thereby allowing for targeted and steady sexually transmitted infection interventions (Emch et al., 2012; Gesink et al., 2011; Bush et al., 2008). Furthermore, Geographic Information Systems and associated maps and models have proven to be useful in the evaluation of the spatial configuration, including the location, of sexual and reproductive health services as a way of improving upon accessibility and utilization (Yao and Murray, 2014), particularly when the limited supply of resources demands optimal and directed planning and placement of limited preventive resources (Marotta, 2017; Cromley and McLafferty, 2012).

To summarize, the geospatial approach has been used in numerous studies that address various geographic themes such as the spatial and / or temporal trends and patterns of diffusion of diseases (Chunara et al., 2012; Lessard-Fontaine et al., 2015; Carrel et al., 2016; Ye et al., 2016), healthcare inequalities (Krieger et al., 2003; Grady, 2006), and geographic access to health services and proximity to risk factors (McLafferty and Grady, 2005; Chirowodza et al., 2009; Luo and Qi, 2009; Okwaraji et al., 2012;

Engler-Stringer et al., 2014; Jones et al., 2016). Despite its outlined usefulness, the geospatial approach has often been criticized for being overly descriptive and interested in associations without explaining causal mechanisms (Openshaw, 1991). Geospatial analysis first seeks to answer the “where” questions; and then progresses to answer the “why” and “how” questions about the “where” (Baerwald, 2010). It is possible to answer the ‘why’ and ‘how’ questions, provided phenomena can be controlled, are in linear and straightforward relationships, and have no intertwined and unpredictable dimensions to their nature. This is not the case for public health issues since there is no definite reason and process that is single-handedly responsible for their occurrence (Edwards and Barker, 2014). In addition, geospatial analysis can be challenged by the often intricate and shallow (i.e., lack of key and meaningful information) nature of spatial data. Data aggregation over time and space lends some level of stability but causes information loss. Also, spatial autocorrelation, ecological fallacy, and the Modifiable Areal Unit problem (when the same dataset produces different results based on the areal unit to which they are aggregated) still constitute significant weaknesses of this approach (Openshaw, 1991; Dummer, 2008), considering they sometimes negatively impact statistical analyses, and consequently reduce the applicability of studies using a geospatial approach. Finally, insofar as geospatial analysis is a data-intensive approach, data availability, quality, and standardization remain critical challenges (Miller and Goodchild, 2015).

### **2.3 Barriers in Accessing Healthcare Resources**

The impacts of the determinants on health disparities have been well documented (Gibbons, 2005). Not only will “the largest health improvements [...] come from improvements in the social determinants of health” (WHO, 2008, p. 179), but there is also a close link between social conditions and health where “the magnitude of health inequalities is an indicator of the impact of social and economic inequalities on people’s lives” (Marmot and Allen, 2014, S517). In a study by Galea et al. (2011), the deaths that were attributable to such social factors as low education, racial segregation, low social support, and income insecurity were comparable to those attributed to behavioral and pathophysiological causes in the United States in 2000.

Income insecurity has long been identified as inextricably related to health (Krieger et al., 2003; Phipps, 2003; Gupta et al., 2007), and has historically been branded the “single largest determinant of health”, since “poorer people live shorter lives and have poorer health than affluent people” (WHO, 2020, para. 6). For example, the incidence and mortality rates for cancer, diabetes, cardiovascular diseases, and mental illnesses are higher among Canadians at the lower end of the social gradient (specifically those with relatively low incomes) than they are among those on the opposite end of the social gradient (those with relatively high incomes) (Shimmin, 2020; Public Health Agency of Canada, 2018).

Daly et al. (2002) examined the relationship between indicators of socioeconomic status and mortality for a representative sample of individuals in the United States. They found an inverse relationship between income status and mortality risk to be even stronger for women and older adults than for men and the younger adults, respectively. They also found that during their pre-retirement years, women with low family incomes have higher mortality risks than men. Bushnik et al. (2020) similarly examined socioeconomic disparities in life and health expectancy among the household population in Canada. They discovered that life expectancy and good functional health were both higher among Canadians with the highest education (among men rather than women) and income (among women) standings than they were among those with a lower income or less education. They concluded that education- and income-related life and health expectancy disparities were possibly wider in present times than they were 15 years ago. Preddy et al. (2008) also assessed the relationship between poverty and health in the City of Edmonton, Alberta. They found that residents of Low socio-economic status neighbourhoods had poorer health than those in Average and High socio-economic status neighbourhoods. Hill and Jorgenson (2018) tested whether income inequality undermined life expectancy in the United States. State-level income inequality was discovered to be inversely associated with life expectancy among females and males.

Moreover, there is a linkage between interpersonal connections<sup>22</sup> and health behavior since social ties serve as buffers against stress. In this regard, Eng et al. (2002) discovered increased risk of fatal coronary heart disease among socially isolated men. Likewise, a participatory action study (Loignon et al., 2015) in Quebec concludes that situations such as violence or stress hinder healthy lifestyles and access to quality healthcare among people living in poverty. Besides, the perceived social distance between people living in poverty and healthcare practitioners also obstructs effective interpersonal communication and consequently discourages people living in poverty from using healthcare facilities. A review of the literature on Tuberculosis stigma<sup>23</sup> also revealed that high Tuberculosis diagnostic holdups and treatment noncompliance were partly due to stigma (Courtwright and Turner, 2010), which not only prevents marginalized people from accessing opportunities but also reinforces stereotypes towards poverty (Talib, 2019).

Stigma is a frequently used public health term. However, healthcare providers find it difficult to address stigma in their everyday practices (Canadian Public Health Association and Calgary Sexual Health Centre, 2017). Goffman (1963) considers stigma as an “attribute that is deeply discrediting” (p. 3). Dudley (2000) further defined stigma

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<sup>22</sup> Connections among people that facilitate the sharing of feelings, information, knowledge, and experiences (Seraj and Toker, 2012).

<sup>23</sup> Stigma: “a powerful social process that is characterized by labeling, stereotyping, and separation, leading to status loss and discrimination, all occurring in the context of power” (Nyblade et al., 2019, p. 1). It has also been defined as “a dynamic process of devaluation that significantly discredits an individual in the eyes of others” (MacLean, 2018, p. 62).

as “negative social meanings or stereotypes assigned to a people when their attributes are considered both different from and inferior to societal norms” (p. 449). Stigma is a (collective) trait that is intentionally or unwittingly acted out against youth by the people they relate to or encounter at school, home, and in (traditional) healthcare settings (Corrigan et al., 2005; MacLean, 2018). Its pervasiveness has to do predominantly with the connotation that sexually promiscuous people contract sexually transmitted infections. In other words, the profundity of stigma as a barrier is increased when stigma toward curable sexually transmitted infections like chlamydia is combined with stigma toward incurable infections like Human Immunodeficiency Virus /Acquired Immune Deficiency Syndrome and stigma toward sexual behaviours (Mahendra et al., 2007). Stigma may be described as being Internalized – people’s acceptance of the negative feelings and beliefs associated with attributes about themselves or phenomena; Perceived – one’s perception of the stigma directed towards others or phenomena; Enacted – when discriminatory attitudes are essentially meted out to a stigmatized group or a phenomenon; Layered or compounded -- when one possesses at least two stigmatized identities; and Institutional or structural – when stigmatization is perpetrated through institutional practices, policies, and processes (Canadian Public Health Association and Calgary Sexual Health Centre, 2017; MacLean, 2018).

With regard to sexually transmitted infections, numerous social determinants have lent helpful explanations in attempts to understand disparities in access to sexual health

resources and concomitant inequalities in the burden of sexually transmitted infections. Dunkle et al. (2010) explored the links between economically motivated relationships, transactional sex, and risk behavior for sexually transmitted infections among unmarried African American and white women. They indicate that regardless of race, a large number (33.3%) of women reported economic reasons for staying in relationships longer than they might otherwise have wanted (in particular, relationships that potentially increased their chances of contracting sexually transmitted infections). African American women were also more likely than white women (21.6% vs. 10.5%) to cite economic hardship as a key motivational factor in their choices to have transactional sex with non-regular partners.

A low level of formal education has sometimes also been recognized as a barrier to accessing sexually transmitted infection testing. In a rural setting in Botswana, Rajaraman and Heymann (2007) found that people with primary school education were 1.69 times more likely to accept a Human Immunodeficiency Syndrome test than those with no formal education. Further, highly educated women in countries such as Burkina Faso, Ethiopia, Haiti, and Zambia more willingly used sexually transmitted infection resources than do their uneducated contemporaries (WHO, 2009). Annang et al. (2010) used data from the United States National Longitudinal Study of Adolescent Health to assess how education reduces disparities in sexually transmitted infections. They examined racial differences in relation to the association between education and sexually

transmitted infection diagnoses among young black and white women. An inverse relationship between education and sexually transmitted infection diagnosis was found.

Worthington et al. (2010) explored HIV testing experiences and service views of Canadian Aboriginal youth. The majority of study participants reported being treated with care (80%), respect (77%), or kindness (76%) during their last HIV test. Nonetheless, hostility (19%), fear (12%), discrimination (11%), avoidance (10%), or being treated in a bored way (15%) was among the negative experiences that participants reported as aspects of their HIV test visits. Denison et al. (2017) conducted qualitative in-depth interviews with 24 university students in New Zealand and found that stigma, the social views that underpin stigma, and the financial cost of sexually transmitted infection test hinder access to sexually transmitted infection testing. A quantitative online study with 1,100 young people through an Internet-based research platform in Australia also revealed sexually transmitted infection-related stigma, chiefly among females, as a social determinant of sexually transmitted infection resource use. The complex nature of the individual and social barriers and the need for comprehensive strategies to mitigate the barriers were also discussed (Adam et al., 2011).

Furthermore, qualitative interviews with 45 Canadian men between the ages of 15 and 25 years substantiate how gender and the associated desire to maintain a form of social dominance cause young people to ignore sexually transmitted infection services. The social context in which young men – in particular those of lower socioeconomic and

educational status – exist makes it a taboo for them to discuss sexual health issues, thereby hindering efforts to include them in access to sexually transmitted infection resources (Shoveller et al., 2010). The findings from in-depth, semi-structured interviews with 38 Canadian men and 14 women between the ages of 15 and 24 years also indicates the extent to which the intersections of gender, socio-economic status, and sexual identity impact the use of sexual health-related face-to-face encounters in the clinical setting (Shoveller et al., 2012).

Integrating social factors into any sexually transmitted infection-related public health program or policy is critical to its success (Somayaji et al., 2017). For example, Wong et al. (2012) suggest a socio-environmental approach that tackles socioeconomic marginalization as the strategy to promote sexual health among socio-economically disadvantaged young women who live in racialized conditions that hinder access to sexual health resources.

The socio-economic determinants of the use of healthcare resources also have geographical dimensions and counterparts. Fields and Briggs (2001) discovered that both socio-economic and locational factors influenced the use of healthcare services in Northamptonshire, UK. A weak but significant positive, nonlinear relationship was established between perceptions of accessibility and frequency of use. They also noted the complex and geographically varying nature of the interactions that influence utilization and recommended that healthcare planning valued and mirrored this

interconnected geography. Also, considering that social, economic, and cultural factors differ from one place to another, social determinants enable researchers to adapt studies to the local health needs of specific places (World Health Organization, 1986).

Goldenberg et al. (2008b) studied sexually transmitted infections by conducting interviews with 25 youth (15–24 years) and 14 service providers in a resource extraction community, Fort St. John, which is located in Northeastern British Columbia, Canada. They discovered that low-income status – through stigmatization of sexually transmitted infection testing, social norms such as hyper-masculinity; sexism, and apathy toward self-care; and negative labeling of females who access sexually transmitted infection resources (such as testing) – hindered the use of sexually transmitted infection resources. They also showed how social barriers operate through a spatial lens to hinder access to services by clarifying the extent to which “place-based stereotypes” (p. 723) and “geographic barriers” (p. 723) stalled youth access. Similarly, in a qualitative Canadian (Vancouver, Quesnel, Prince George, and Richmond in British Columbia) study (Shoveller et al., 2009) with 70 youth (15–24 years) and 22 service providers, “place” and “physical space” were identified with “gender” and “culture” as the socio-cultural forces that work hand-in-hand with structural factors to influence youth access to sexually transmitted infection testing services.

Recognizing the above-mentioned determinants of healthcare access can aid policymakers in determining the complex socioeconomic and contextual environments

within which access to healthcare resources is obstructed. This understanding is a key to the design and implementation of more useful and comprehensive intervention programs (Dean and Fenton, 2010).

## **2.4 Social Media and Sexual Activities**

The continuous increase<sup>24</sup> in internet and social media usage has resulted in the increased use of online dating services for romantic and sexual relations. At the same time, the rates of reported sexually risky sexual behaviors are on the rise among users of internet-based platforms (Buhi et al., 2013; Couch and Liamputtong, 2008). Whereas traditional online dating (on websites and in chatrooms) contributed to sexually related online (Döring, 2009), its impact on sexual activities among users is not comparable to that of contemporary location-based (Global Positioning System-enabled) smartphone dating apps (Tinder, Skout, Grindr and Jack'd), since the latter are usually free of charge, geographically unrestricted, and convenient (Choi et al., 2016). These functionalities of modern smartphones facilitate and are associated with sexual behaviors among youth, particularly those who are overly impulsive<sup>25</sup> and less prone to delaying sexual pleasures

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<sup>24</sup>On average, internet users spend 144 minutes per day on social media. Also, the number of social network users worldwide increased from 2.86 billion in 2017 to 3.6 billion in 2020, and is anticipated to reach 4.41 billion by 2025 (Tankovska, 2021).

<sup>25</sup> Impulsiveness and the desire to engage in sexual risk behaviours is one of the main traits of youth because the actions of youth are predominantly controlled by a section of the brain called amygdala, which controls emotional and reactive behaviours (American Academy of Child and Adolescent Psychiatry, 2016).

(Birthrong and Lutzman, 2014; Reyns, Henson, and Fisher, 2014). Among others, the use of social media dating applications has been found to:

- enhance social and sexual networks through the connectivity they offer, thereby making it easier for users to quickly find sexual partners, even across geographic distances, thereby potentially increasing the rate of partner change (Couch and Liamputtong, 2008);
- increase the potential for users to engage in sexual contacts and have impulsive sex with people they barely knew (Tomaszewska and Schuster, 2019);
- be related to likelihood for users to have engaged in “risky sexual behaviors” (p. 1) such as having multiple sexual partners (Shapiro et al., 2017; Choi et al., 2016);
- be strongly related with unprotected sex (Choi et al., 2016; Sawyer et al. (2018);

Further, since “sexting”<sup>26</sup> poses no direct risk for the transmission of sexually transmitted infections, it is considered by some youth and public health experts as a safer alternative to sexual activities (Katzman, 2010; Lenhart et al., 2010). However, it has also been regarded as an aspect of social media use that is significantly associated with sexual

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<sup>26</sup> Sexting is the sending and or receiving of sexual videos, messages, and pictures through technology such as webcams, cell phones, and email.

risk activities. The association between sexting, unprotected sex, and sexual behaviors such as concurrent and more past-year sexual partners has been documented (Rice et al., 2012; Ybarra and Mitchell, 2014).

#### **2.4.1 Implications of Social Media for Geography of Health**

The ever-increasing number of social media users has helped produced enormous user-generated quantities of data about opinions, experiences, and norms around health-related matters. Considering that most social media platforms and venues, including social media dating applications, have location detection (Global Positioning System) capabilities, their potential usefulness to geographic health research and location-based interventions is wide-ranging. For instance, user-generated data are useful for locating where particular health conditions are frequently reported, thereby enhancing geospatial intelligence. In addition, georeferenced social media responses may inform the implementation and passive evaluation of targeted health intervention activities (Schoutman et al., 2016).

The significance of digital epidemiology<sup>27</sup> to improving public health surveillance systems and to developing predictive models has also been emphasized due to the ability for social media venues, personal devices, and wearable devices to generate real-time

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<sup>27</sup> Digital epidemiology uses data that was generated outside the public health system, *i.e. with data that was not generated with the primary purpose of doing epidemiology*. The original growth of digital epidemiology was largely fueled by the rapidly increasing amounts of data generated on the internet, in particular via social media” (Salathé, 2018, p. 2).

locational data, which is useful to improving upon health and healthcare (National Academy of Sciences, 2016). Likewise, as Campagna (2016) has indicated, Social Media Geographic Information offers significant analytical capabilities when it is combined with other spatial datasets, including spatial and temporal analyses of user interests; spatial statistics (e.g. hotspot analysis) of user preferences; multimedia content analysis on texts, images, video, or audio (example tag clouds, sentiment analysis); user behavioral analysis; and a combination of the preceding analytical methods (e.g. spatial-temporal textual analysis).

Geotagged social media data have proven to be very useful in human mobility research, which is imperative to public health (Wesolowski et al., 2015). Mobility studies sometimes encompass the analysis of spatio-temporal distribution and activity patterns of people (Yang et al., 2019). The sentiments and themes associated with social media messages have also been analyzed as a way of gaining insight into the possible implications of social media messages on health behaviors (Krauss et al., 2017) to inform targeted preventive messages (Cavazos-Rehg et al., 2016).

Disease tracking and prediction systems that depend on social media data have also been shown to be faster than traditional ones, which depend on sentinel healthcare practices for officially collected public health data (Khedo et al., 2020; Lee et al., 2013), and whilst the amount of noise due to general conversations on platforms such as Twitter could constitute challenges to researchers (Masri et al., 2019), a geographical analysis of

data (e.g. georeferenced tweets and images) with valid locational information enables researchers to map and predict the spread and burden of the diseases and other health-related matters (Lee et al., 2013; Quercia et al., 2015). Issues related to incorrect tweets' locations and selection biases due to the unrepresentative (not representative of the general public in terms of age, gender and socioeconomic status) nature of tweets have also been identified (Tulloch et al., 2019).

Like any other type of Big Data (large volume of data), the potential challenges associated with using social media data are not any different from those challenges outlined in the last paragraph of Section 2.3: management of large and extensive databases to separate signal from noise; irregularities (missing or imprecise geographic locations, spatiotemporal heterogeneity, limited representativeness) in social media data; cost of storing data and its availability; improvement upon natural language processing; implementation of security protocols for biomedical databases; communication of uncertainties; design of data validation and organization protocols; development of guidelines for privacy, consent, and data ownership and stewardship; and standardization of different datasets/data sources, and transforming them into directly actionable information (National Academy of Sciences, 2016; Miller and Goodchild, 2015; Schootman et al., 2016).

## **2.5 Summary of the Approach Used**

Based on the outlined importance of space / place to health as well as the usefulness of geography in health research, the social determinants of health and their spatial dimensions were analyzed. More specifically, the determinants were spatially analyzed in relation to socioeconomic and demographic census data at the community level using ArcMap (Environmental Systems Research Institute, 2016). By so doing, the determinants that were unique to the communities were revealed. The key questions that guided the researcher were the following: Are there any spatial aspects to the barriers that initially appear to be solely social in nature? What happens to the social barriers when they are ‘passed through’ a spatial lens? Where applicable, how do the social barriers get lessened or intensified after they pass through the spatial lens?

## Chapter 3: Methodology and Theoretical Framework

This chapter focuses on the study setting, research design, and the theoretical framework that guided data collection and analysis, which include environmental scan; qualitative approach (interview development, interview participant recruitment, and interview data analysis); quantitative approach (survey development, survey participant recruitment, statistical and spatial analysis of survey data; Social Ecological Model; ethical considerations; and study rigor and triangulation.

### 3.1 Study Setting

This research was conducted with youth in the southwest quadrant of Calgary (see Appendix E and Appendix F), Alberta. Currently, wards 6, 8, 11, and 13 have their centroids in Southwest Calgary. In 2020, the total population of the quadrant was 495,075<sup>28</sup>, with 26,266 females and 27,184 males within the 15-24 age<sup>29</sup> cohorts. The quadrant is delineated from Southeast Calgary by the Macleod Trail, which is the main road that runs north and south. On the west edge of Southwest Calgary is the Tsuu T'ina First Nation, which is more than 280 square kilometers in size. The quadrant is home to Fish Creek Provincial Park, the largest urban park in Canada, Grey Eagle Casino and Bingo, Spruce Meadows international horse sports facility, seven golf courses, eight shopping centers, four public aquatic centers, Glenmore Reservoir, and Heritage Park

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<sup>28</sup> Retrieved from [http://www.ahw.gov.ab.ca/IHDA\\_Retrieval/redirectToURL.do?cat=5&subCat=63](http://www.ahw.gov.ab.ca/IHDA_Retrieval/redirectToURL.do?cat=5&subCat=63)

<sup>29</sup> 25,477 were 15-19 years (mature minors); 27,973 were 20-24 years (young adults).

Historical Village. These facilities and others attract many tourists from within and outside Calgary (Calgary Herald, 2012). The quadrant is home to the Rockyview General Hospital as well as sexual health facilities such as Sheldon M. Chumir Health Centre and Centre for Sexuality (formerly called Calgary Sexual Health Centre).

The wards and communities in southwest Calgary have divergent socioeconomic characteristics, as evidenced by the comparisons made among the wards and communities. Such comparisons were useful in painting a clear picture of the heterogeneity of southwest Calgary. For instance, although the richest (average annual household income of at least \$200,000) neighborhoods in Calgary are found in southwest Calgary (Narcity, 2016; Murray, 2020), the 2015 median household incomes (before tax) for Wards 6 (\$124,453), 13 (\$110,640), and 14 (\$121,359) were greater than the citywide amount (\$97,329). The 2015 median household incomes (before tax) for Wards 8 (\$81,011) and 11 (\$88,496) were also lower. Also, 31% of households in Beltline spend 30% or more of their total income on shelter in 2016 as compared to 0% in Bayview, which is a rich area (The City of Calgary, 2019)<sup>30</sup>.

The presence of diverse ethnic groups was also helpful in establishing the degree to which varying cultural values and beliefs might be influencing access to preventive

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<sup>30</sup> [https://www.calgary.ca/content/dam/www/csps/cns/documents/community\\_social\\_statistics/community-profiles/bayview.pdf](https://www.calgary.ca/content/dam/www/csps/cns/documents/community_social_statistics/community-profiles/bayview.pdf)

resources for chlamydia among youth. Between 7%-14%<sup>31</sup> of people in private households speak at least one non-official language – Tagalog (Pilipino, Filipino), Arabic, Spanish, Mandarin, Cantonese, Russian, Korean, and other multiple languages. Also, 30% of the people in private households in Beltline (Ward 8 and Ward 11) were immigrants whereas Scarboro (Ward 8) had only 13% immigrants. Last but not least, Scarboro had 88% of owner-occupied households as opposed to 35% for Beltline (The City of Calgary, 2019).

Although Fort McMurray and Edmonton were also potential study sites, they were not focused on, partly because Fort McMurray was not recording high incidence rates as a result of layoff-induced emigration, failed oil sand projects, and the wildfire that occurred just before the study period, all of which had led to a reduction in the number of priority populations among camp workers (McDermott, 2017). Furthermore, Edmonton and Fort McMurray did not attract as many young people and immigrants (from other countries) as Calgary - in 2016, between 20% and 38% of Southwest Calgary residents were immigrants (The City of Calgary, 2019).

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<sup>31</sup> The distributions of the people in private households that speak non-official languages include: 14% for Ward 6, 12% for Ward 8, 10% for Ward 11, and 20% for Ward 13.

### 3.2 Research Design and Methods

Contextual and compositional factors work together to reinforce the complexity of health risks/outcomes. Consequently, a synergy among public health researchers, research methods, and intervention strategies is needed if effective and multifaceted solutions are sought. This complexity is also indicative of the need for more fine-scale and community-based studies that are extensively carried out with target populations (World Health Organization, 2017; McGillivray, 2017).

The researcher sought to apply diverse and appropriate analytical approaches (qualitative, quantitative, and spatial) to mitigate an actual problem (the incidence of sexually transmitted infections), so this case study was guided/influenced by a pragmatist interpretive lens (Creswell and Poth, 2019). More specifically, the methodology followed an exploratory sequential mixed-methods (qualitative-quantitative)<sup>32</sup> design since the spatial elements of the social determinants of chlamydia resource use among youth are understudied in Southwest Calgary. Before any data collection could occur,

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<sup>32</sup> The first stage was qualitative, whose main component was the interview, which allowed the researcher to gain insight into the barriers. The second stage was quantitative, which involved the design of a survey that was useful for statistically analyzing the themes (barriers) that emerged from the qualitative interviews. Since many survey respondents provided their locational information, survey responses were further analyzed spatially.

administrative approvals were obtained from the ethics boards of Carleton University (Project # 109040) and the University of Alberta (Pro00083519)<sup>33</sup>.

Quantitative (including geospatial) data collection and analysis were preceded by a preliminary qualitative data collection and analysis. As a way of discovering the nature of the barriers to access to preventive resources, the researcher conducted semi-structured in-depth interviews with youth and service providers during the qualitative stage. Qualitative data were analyzed using standard thematic analysis. Next, the evidence from the qualitative interviews was fused into the design of a cross-sectional survey that was used to collect quantitative data from youth (Creswell, 2014).

Since quantitative, qualitative, and spatial methods have their respective inherent weaknesses, this design permitted the strengths of either method to compensate for the weaknesses of the other. More specifically, this design can contribute additional and comprehensive insight into access to chlamydia prevention resources among youth in Southwest Calgary which either qualitative or quantitative methods alone would not add (Creswell, 2014).

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<sup>33</sup> The ethics approval from the University of Alberta was obtained because the study was conducted in Calgary, Alberta. Additionally, the approval by the University of Alberta ethics board was a requirement for the release of sexual health data by Alberta Health Service which ended up not being released.

### 3.2.1 Environmental Scan

The environmental scan provided a more precise idea of how sexual health services are organized in the city of Calgary. More specifically, it provided an in-depth knowledge of the Calgary-wide preventive resources for sexually transmitted infections and which (resources) were openly accessible to youth during the duration of the study. The scan also guided the design of data collection tools and also informed data analysis.

In Calgary and the rest of Alberta, the high rates of sexually transmitted infections call for risk assessment and screening for sexually transmitted infections during routine medical appointments (Government of Alberta, 2018) at any of the 450 primary care clinics (Alberta Primary Care Networks, 2020). More comprehensive preventive services (education, counselling, testing options) are offered in settings that are openly available to youth: Alberta Health Sexual and Reproductive Health - Clinical Services, Alberta Health Services' Sexual and Reproductive Health (Education), Alberta Health Services' Sexual Health Social Media pages, Centre for Sexuality, and The Alex Community Health Center. The websites of the organizations were consulted to ascertain the nature of their services, including the electronic resources that were accessible to youth. Staff members were also consulted when the information on the website was unclear. As much as possible, the researcher sought to establish the following:

- i) Aim, focus (chlamydia only or other curable sexually transmitted infections included), and purpose of the program;

- ii) Cost of service to users;
- iii) Service and wait times;
- iv) Sexual health information delivery mode and number of sessions;
- v) Types of health professionals involved;
- vi) Efforts required by a participant to access the program.

### **3.2.1.1 Description of Resources for Youth**

#### **3.2.1.1.1 Walk-in or Family Doctor**

Walk-in clinics are in almost every community, and possession of an Alberta Health Care card is the only prerequisite for using these resources. Services are free of charge, and they mainly include testing for (at a lab elsewhere) and treatment (antibiotic treatment of the infected person and their sexual partner) of sexually transmitted infections.

#### **3.2.1.1.2 Alberta Health Services' Sexual and Reproductive Health (Education)<sup>34</sup>**

This resource is located in the Sheldon M. Chumir Health Centre. Services provided include sexual health education workshops, resource materials, and telephone consultations. They play a crucial role in the prevention of sexually transmitted infections

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<sup>34</sup> For more information, visit:  
<https://www.albertahealthservices.ca/findhealth/Service.aspx?id=1688&serviceAtFacilityID=1040152#contentStart>

by offering group education sessions for students, school staff, parents, community groups, health care workers, and service providers. Topics covered are tailored to the needs of users, and can include *how, where, and when to access sexual health resources; sexual health decision-making strategies; strategies for productive parent-children sexual health conversation; reproductive health; safer sex; and the nature of sexually transmitted infections*. They can also provide information on trends in sexual health, inclusive practice, and community-based projects. They provide interpreter/translation services as part of their services, and service providers include community educators, registered nurses, and sexual and reproductive health specialists. They charge no fees for education sessions that are offered within the Calgary Zone. The hours of operation are Mondays to Fridays, 8:00 am to 4:15 pm, and there are no wait times for consultations.

### **3.2.1.1.3 Alberta Health Services' Sexual and Reproductive Health - Clinical Services<sup>35</sup>**

The Sexual and Reproductive Health (Clinical Services) provide “youth-friendly, non-judgmental and confidential sexual and reproductive health services” such as sexually transmitted infection testing and treatment, birth control information, pregnancy tests, and pregnancy options. Service providers may include doctors, nurse practitioners, and registered nurses. To be eligible, users must be between 12 and 29 years of age, or they must be an older individual who: has no Alberta Health Care card; cannot afford

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<sup>35</sup> For more information, visit: <https://www.albertahealthservices.ca/findhealth/Service.aspx?id=1671>

birth control; needs services that cannot be met elsewhere; or needs a translator or special services. Patients may self-refer or be referred by a healthcare provider.

Interpreter/translation services are available at all locations, and no Alberta Health Care card, appointment, or identity is required.

Service locations include East Calgary Health Centre (Southeast quadrant), Okotoks Health and Wellness Centre (outside Calgary), Sheldon M. Chumir Health Centre (Southwest quadrant - Downtown), South Calgary Health Centre (Southeast quadrant), and Sunridge Professional Building (Northeast quadrant). Service availability times differ depending on the location:

- Sheldon M. Chumir Health Centre: Monday-Thursday (1:00 pm to 5:15 pm) and Friday-Saturday (12:00 pm to 3:30 pm).
- Sunridge Professional Building: Monday-Thursday (1:00 pm to 5:15 pm) and Friday-Saturday (12:00 pm to 3:30 pm).
- East Calgary Health Centre: Tuesday and Thursday, from 12:30 pm to 5:00 pm.
- South Calgary Health Centre: Monday (1:00 pm to 5:15 pm), Tuesday (4:00 pm to 7:30 pm), and Friday (12:00 pm to 3:30 pm).

The *Sexual & Reproductive Health* website<sup>36</sup> of Alberta Health Services also contains valuable material on service zones, health information and resources, and other sexual

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<sup>36</sup> <https://www.albertahealthservices.ca/services/page13737.aspx>

health-related websites. The Teaching Sexual Health<sup>37</sup> initiative supports teachers, educators, and parents in teaching sexual health to children and youth. Information on existing Alberta Health Services Social Media sites<sup>38</sup> is also available on the *Sexual & Reproductive Health* website.

Furthermore, the Social Media sites that were available at the time of the study were:

- Twitter
  - [@ahs\\_hphc](#) - Healthy Parents, Healthy Children
  - [@AHSexualHealth](#) - Calgary Zone Sexual & Reproductive Health
  - [@teachsexhealth](#) - Teaching Sexual Health by Alberta Health Services
- Facebook
  - <https://www.facebook.com/AHSexhealth/>
  - <https://www.facebook.com/HealthyParentsHealthyChildren/>
  - <https://www.facebook.com/teachsexhealth/>
- Instagram
  - <https://www.instagram.com/ahsexualhealth/>
- YouTube
  - <https://www.youtube.com/user/teachingsexualhealth>

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<sup>37</sup> According to information presented on the [teachingsexualhealth.ca](http://teachingsexualhealth.ca) (2021) website, the sexual health education curriculum of Alberta emphasizes both abstinence and safe sex and is structured according to the age and developmental milestone of learners (grade 4 and beyond).

<sup>38</sup> The Alberta Health Services social media sites are for general information purposes only.

#### **3.2.1.1.4 The Alex Community Health Center – Youth Health Centre<sup>39</sup>**

One of the services provided by the Youth Health Centre is safe and supportive testing for sexually transmitted infections for youth between 12 and 24 years. Service providers may include doctors, nurses, and support workers. Services are free and available on a drop-in basis - Monday to Friday, from 12:00 p.m. to 6:00 p.m. The center is accessible through the Calgary Light Rail Transit, and self-referrals are permitted. Additionally, the center has a Youth Health Bus that visits high schools to provide sexually transmitted infection testing & treatment services and other youth-relevant health services.

#### **3.2.1.1.5 Centre for Sexuality<sup>40</sup>**

This community-based organization focuses on the normalization of sexual health in Alberta. It is one of the best-known sexual health organization for offering free in-depth education and other preventive services. They partner up with Alberta Health Services to provide standard sexually transmitted infection testing on Tuesdays from 3 pm to 7 pm. Both appointments and walk-ins are offered for this service. Appointment slots are at 3:00, 4:00, and 5:00 p.m. and office hours are Monday to Thursday from 9:00 a.m. to 5:00 p.m., and Friday from 9:00 a.m. to 4:00 p.m. They also have online tools for sexual health inquiries and appointment-/educator-booking tools.

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<sup>39</sup> For more information, visit: <https://www.thealex.ca/youth-health-centre/>

<sup>40</sup> <https://www.centreforsexuality.ca/about-us/>

The programs and workshops they offer include short-term sexual health counseling, testing services for sexually transmitted infections, school-based education, and community-based education. Counseling or one-on-one education sessions are also free, and they cover topics such as sexually transmitted infections, consent in relationships, decision making and communication, puberty, and sexuality. Although a single-session counseling approach is used, additional sessions may be permitted. Counseling sessions last for an hour, and support services are delivered during regular office hours. Counseling sessions are face-to-face as well as by phone or email. They also provide sexual health information in junior and senior high schools.

### **3.2.2 Qualitative Approach**

The preliminary qualitative stage helped incorporate context into the study. The primary aim was to explore the social constructs that affect access to preventive resources for sexually transmitted infection resources, and analyze those social constructs and their spatial elements, where applicable. Only primary data were collected during this stage.

#### **3.2.2.1 Study Population and Sampling**

Youth and service providers were selected for semi-structured interviews. To be eligible to participate, youth were expected to be between 15 and 24 years old, be a

resident of Southwest Calgary, and be English-speaking (grade six level)<sup>41</sup>. The proposed initial pragmatic sample size was 32 youth (16 males and 16 females) and eight service providers. However, the actual sample size after the data and thematic saturation<sup>42</sup> (Saunders, 2018) was twenty-three (23)<sup>43</sup> - 11 females and 12 males – youth. Of these 23 youth, there were 6 sexually active males, 6 sexually inactive males, 4 sexually active females, and 7 sexually inactive females. More importantly, since social barriers could vary according to the culture of each participant, a purposive sample of racialized and non-racialized<sup>44</sup> participants was recruited. The researcher did not focus solely on sexually active youth since it was anticipated that recommendations would apply to all sections of youth (Frohlich and Potvin, 2010). See Appendix S for the demographic profile of interviewed youth.

Service providers included sexual health experts (counselors, physicians, and educators) who worked with youth. Interviews were also conducted with 4 service providers<sup>45</sup>. One of them was a medical clinic staff member who specialized in family medicine, general reproductive services, contraceptive, and sexual health. The other three were public health staff who designed sexual health programs and also educated youth on

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<sup>41</sup> This is because the survey was written in English at a grade six reading level.

<sup>42</sup> When “new data tend to be redundant of data already collected. In interviews, when the researcher begins to hear the same comments again and again, data saturation is being reached...” (Grady, 1998, p. 26).

<sup>43</sup> Twenty-five participants were recruited initially, but 2 responses were excluded later because, contrary to what they had indicated before the interview, they did not reside in Southwest Calgary.

<sup>44</sup> Potential participants self-identified as either racialized or non-racialized before being recruited (Statistics Canada, 2017).

<sup>45</sup> 4 service providers were interviewed, but responses of one were excluded before the qualitative analysis stage.

sexual health matters. They had been working as healthcare professionals for an average of 11 years, and none of them had worked with youth for less than 5 years.

Since the qualitative stage sought to reveal the richness of data rather than their generalizability (Creswell, 2007), two (snowball and convenience), non-probability sampling methods were used to recruit youth. These sampling techniques were appropriate since the researcher anticipated some resistance from some youth due to the stigma that is usually associated with sexually transmitted infections (Haan, 2009). Youth were recruited through their peers and also at their hangouts. Moreover, since some of the initial interviewees, who were from high- and mid-income neighborhoods, had asked their friends to participate in the study, the researcher recruited other interviewees from around Westbrook Station, which is situated in Rosscarrock, a low- to mid-income neighborhood. This was an additional step towards avoiding skewed (only from residents of “high-income” neighborhoods) responses.

Furthermore, the convenience sampling method was used to recruit youth from the Chinook Mall, which is a centrally placed area where youth from all over Calgary, including the communities in the southwest quadrant, and of diverse socioeconomic backgrounds visited to engage in various activities. This helped capture data that reflected the socioeconomic reality of the study area. Last, the purposive sampling method was used to identify and select 4 service providers who can explain the barriers being explored, given the limited resources available (Patton, 2002).

### **3.2.2.2 Interview Development**

Before interviews, participants were asked to complete a short socio-demographic survey that asked participants to provide information on their gender, age group, racial status, sexual history, relationship status, postal code, highest level education, and years living in Calgary. The opinions of participants were sought on whether or not one had to be sexually active to use a preventive resource.

The knowledge gained through the environmental scan and the Social Ecological Model both guided the researcher in the design of the semi-structured interview schedules (Appendix H.1 and H.2). The feedback (on the comprehensibility and appropriateness of interview questions) received from the test participants was incorporated into the final interview schedule. The structure of the interview questions was also modified based on the first interview. They were helpful in the formulation of interview questions that related to familiarity with as well as access to chlamydia preventive resources, thereby allowing participants to articulate the various personal-, interpersonal-, organizational-, and community-level preventive resource access barriers that they either perceived or had experienced. Besides, in situations where interviewees (or sometimes the interviewers) were overly deviating from the core components of the interview and the research, being conscious of the Social Ecological Model reminded and aided both the researcher and the

female research assistant<sup>46</sup> to redirect the interview back on track. Sensitive and personal questions such as those that sought the outcome of a test were not asked.

The perspectives of health counselors, health educators, and medical doctors on the opportunities and challenges that come with the delivery of sexual health services to youth were also sought. Interviews were secured with staff at Alberta Health Services Sexual and Reproductive Health Clinic, a walk-in clinic, and from the Centre for Sexuality. By the time the third service provider was interviewed, thematic saturation had been attained. Nevertheless, the fourth service provider from Alberta Health Services was interviewed since Alberta Health Services is a key player in the design of policies that affect sexual health service delivery in Alberta.

All interviews with male youth and service providers were carried out in person and on the phone by the principal researcher while a female research assistant interviewed female youth. Interview data were recorded with a digital audio device when permitted by participants. In situations where participants did not wish to be audio-recorded, the researcher or research assistant wrote out responses in a field notebook. Once more, participants who preferred not to talk but were still interested in participating were allowed to provide written responses to the interview question either on paper or through email.

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<sup>46</sup> The research assistant had a Master's degree.

Interviews with youth lasted approximately 30 minutes while those with service providers lasted 60 minutes. An open-ended interview schedule was developed to guide interviews, although the researcher or participants could go beyond what was indicated on the schedule. To avoid biases such as those that were due to the attachment of participants to the study community, interview schedules were piloted with three youth from the other quadrants of Calgary before they were administered to youth in the study site.

Lastly, all potential interviewees (both youth and service providers) were told (on the consent form) about an honorarium (\$5 Tim Horton's gift card) before the interviews. Those who would participate either fully or partially were still entitled to the honorarium.

### **3.2.2.3 Interview Data Analysis**

To inform subsequent interviews, data analysis started as soon as data became available. Data were analyzed using standard thematic analysis (inductive approach) since there was a desire to identify, analyze, and interpret interesting and rich patterns of meaning within the qualitative interview data ("Thematic analysis", 2021). Once the principal researcher transcribed interviews verbatim and personal identifiers were removed, transcripts were checked against audio recordings for accuracy. Interviewees were not allowed to review their responses before analysis. Transcribed data, field notes, and written responses were organized and prepared for analysis. Data were subsequently

read through one more time, coded both manually and electronically in NVivo<sup>47</sup> (“NVivo”, 2021), and categorized under major themes that emerged from interview transcripts. Themes were also organized in frequency tables to give readers a quick overview of the frequency of mention of each theme. Finally, the quotes that corresponded to and supported the themes were extracted and latent and manifest meanings were established based on emerging patterns (Creswell, 2009). All comments made by participants were considered for inclusion, even when they were made by only one participant. However, those direct quotes that were deemed the “most descriptive or explanatory of the researcher’s conceptual interpretation of the data” (Roller, 2017, para. 2) were included. Lastly, the themes generated from this stage also informed the design of the subsequent quantitative survey instrument.

### **3.2.3 Quantitative Approach**

Based on the themes from the qualitative stage, the information gathered during the environmental scan, and the literature review, including the Social Ecological Model, the researcher designed a survey that was primarily aimed at quantifying and examining the barriers associated with access to preventive resources for chlamydia. The history of use/non-use of resources among youth and their opinions about preventive services were

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<sup>47</sup> By combining manual strategies with NVivo, a comprehensive identification and understanding of the themes were achieved since the software “caught” the things the researcher missed and vice versa.

also examined. Only primary quantitative data, including locational information, was collected.

### **3.2.3.1 Survey Development**

The design of the final survey occurred after the questionnaires had been pilot tested with 4 youth. Test participants had offered their feedback on the comprehensiveness, readability, and length of completion time of the pilot survey. The survey was written in English at a grade six reading level. To confirm its readability, the Flesch Kincaid Grade Level<sup>48</sup> statistic test in Microsoft Word was used. The researcher made additional edits to the questionnaires after the thesis committee reviewed them.

The survey was divided into five sections. The first section of the survey was used to obtain socio-demographic data that described the general characteristics of the interviewees. Depending on how comfortable they were, respondents were asked to provide the names of the communities they resided in as well as their full postal codes or the Forward Sortation Area (first three digits), which would later allow spatial analyses of survey responses. The second section sought to ascertain preventive resource use among youth, whereas the third section sought to establish the preventive resource access-related barriers that youth either perceived or experienced. The fourth and fifth sections were devoted to the opinions of youth on the influence of social media dating applications on

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<sup>48</sup> [https://en.wikipedia.org/wiki/Flesch%E2%80%93Kincaid\\_readability\\_tests](https://en.wikipedia.org/wiki/Flesch%E2%80%93Kincaid_readability_tests)

sexual health and recommendations of youth on the possible steps that could be taken to improve upon access to preventive services.

Skip logic<sup>49</sup> was used to ensure that participants were getting questions based on previous responses. Using a Likert scale<sup>50</sup>, youth were also asked to rate: ease of using and accessing resources, where applicable; helpfulness of resources accessed, where applicable; the extent to which, in their opinion, social media influenced sexual risk activities; the extent to which social media influenced their knowledge and access to preventive resources; and their level of satisfaction with efforts by the Alberta Health Services in providing sexual health services to youth.

Surveys were made available to youth electronically (through Qualtrics Online Survey Platform<sup>51</sup>) and manually (print versions that were later transferred into Qualtrics). The link to the electronic version was shared through Facebook whilst the printed version was distributed in person. Surveys were participant-administered. It took a maximum of 13 minutes to complete the survey, and participants could go forwards and backward to edit responses as deemed convenient. Where participants had viewpoints that were not included in the list of responses, they had an option to either fill their response in an “Other” field or provide no response to denote “No Barrier” (Appendix I).

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<sup>49</sup> <https://www.surveymonkey.com/mp/tour/skiplogic/>

<sup>50</sup> <https://www.surveymonkey.com/mp/likert-scale/>

<sup>51</sup> <https://www.qualtrics.com/core-xm/survey-software/>

### 3.2.3.2 Study Population and Sampling

The population for the final surveys included youth who: were between 15 and 24 years old, were residents of southwest Calgary, and could read and understand English (grade 6 level). The sample size calculator on the SurveyMonkey website<sup>52</sup> was used to calculate the sample size (382), which was based on the total population (52,722) of all youth in the southwest quadrant in 2017. The confidence level and margin of error are 95% and 5%, respectively.

The quantitative survey was piloted after an initial informal pre-test (Statistics Canada, 2002) among three youth who were recruited through convenience sampling (Haan, 2009) at community gatherings. For the final survey (Appendix I), a convenience sample of willing youth was used. Youth were recruited in person at the Chinook Mall and transit stations in the southwest. Youth who met the inclusion criteria were also targeted for participation through Facebook ads (see Limitations section for challenges faced with using Facebook), which contained the link to the online survey and ran for approximately four months (April-August, 2019).

After the initial contact with the sampled youth, they were asked to speak to potential participants to contact the researcher if they were interested. At other times, sampled youth were asked to share the online survey link with their peers. During the in-

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<sup>52</sup> <https://www.surveymonkey.com/mp/sample-size-calculator/>

person recruitment, youth who were willing to participate but could not make time to complete the survey at that moment in time were invited to participate later through an email address that they had voluntarily provided after the researcher had explained the purpose of the study to them.

This snowball technique was again used to recruit youth who were part of community organizations<sup>53</sup>. Before having the link to the online version of the survey shared with potential participants, the researcher discussed the study, including its purpose and rationale, with the leaders of those organizations. A conscious effort was made to request that participants refer or share the link with a diverse group of people. The aim was to avoid the risk of over-recruiting new participants from a single subgroup. No further information was collected as a way of offsetting the *same subgroup* effect because participants did not come to me after they were recruited; they just filled the Qualtrics survey. Lastly, all potential takers of the quantitative surveys were told beforehand (on the consent form/page) that they could win (25% chance to win) a token of appreciation (one of four \$25 Tim Horton's gift cards).

### **3.2.3.3 Survey Data Analysis**

The primary analytical strategy for the nominal quantitative data collected was descriptive statistics (frequencies and percentages). Statistical data analysis was

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<sup>53</sup> Names of organizations not provided because they were identifiable information.

performed using the Statistical Package for Social Sciences<sup>54</sup> software. The following steps were taken:

- i. Entered all paper-based survey responses into Qualtrics online survey.
- ii. Exported data from Qualtrics online survey in Excel<sup>55</sup> format.
- iii. Deleted all unwanted columns such as dates and times of entry as well as incorrect location data that are automatically set by Qualtrics online survey to protect the identity of survey participants.
- iv. Created additional subcategories for each variable based on “Other” text entries.
- v. Populated “Community” field with community names based on postal code information provided.
- vi. Imported Excel spreadsheets into Statistical Package for Social Sciences and assigned codes to subcategories.
- vii. Extracted frequency tables based on all variables. This is useful for establishing how the sub-categories of each variable (demographic variables, barriers, knowledge of preventive resources, opinions about social media and its influence on sexual risk activities, and recommendations) compared with one another.

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<sup>54</sup> <https://en.wikipedia.org/wiki/SPSS>

<sup>55</sup> [https://en.wikipedia.org/wiki/Microsoft\\_Excel](https://en.wikipedia.org/wiki/Microsoft_Excel)

- viii. Built contingency tables to ascertain the interrelationships among the variables mentioned in the previous paragraph.
- ix. Fisher's exact ("Fisher's exact test", 2021) and Phi coefficients ("Phi coefficient", 2021) were calculated in Statistical Package for Social Sciences to establish if there was any association between resource use and the demographic variables (age, gender, years lived in Calgary, and racial identity) with binary nominal groupings.

#### **3.2.3.4 Spatial Analysis**

Since participants provided their community names and postal codes, quantitative data were also exported into a mapping environment to be visualized and analyzed. By mapping and analyzing the survey data, vital geographical trends that statistical analyses alone could not reveal were shown. The overarching aim was to determine if the barriers to access to resources were spatially associated with specific socioeconomic and neighborhood-level characteristics such as Median Household Incomes, Unemployment Rate, Educational Attainment, and Social Conservativeness of Community, Proximity to Health Facilities, and Proximity to Public Transit.

##### **3.2.3.4.1 Sample Size**

The spatial unit of mapping and analysis was the neighborhoods whose centroids fell within Southwest Calgary boundary. To enable a spatial analysis of survey data,

youth were asked to provide the names of their communities and/or their valid postal codes when they were completing the surveys. Where postal codes were provided without community names, the Canada Post “Find a Postal Code” tool<sup>56</sup> was used to find the communities associated with each postal code.

Although the overall sample size for the quantitative survey was 382, responses by 90.3% (n=345<sup>57</sup>) of the 382 survey participants were spatially analyzed. Those responses that were excluded had neither a valid community name nor a valid postal code that could enable the researcher to find missing community names. The 345 participants whose responses were spatially analyzed respectively lived in sixty (60) of the seventy-nine (79) residential communities within the southwest quadrant of Calgary. The maximum count of participants per community was twenty-five (25), and the minimum was one (1).

Walk-in or family (and campus) doctors were excluded from the spatial analysis since the researcher was more interested in facilities that both the qualitative interviews and quantitative surveys revealed as being well-known and used among youth<sup>58</sup>. Furthermore, although the *www.albertafindadoctor.ca* website could have helped, the resources available hindered easy access to an up-to-date database of the list of clinics

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<sup>56</sup> <https://www.canadapost-postescanada.ca/info/mc/personal/postalcode/fpc.jsf>

<sup>57</sup> See Appendix K for demographics (age, sex, and ethnicity) of youth whose responses were analyzed spatially.

<sup>58</sup> Although excluded from this study, walk-in or family (and campus) doctors should be exploited in the future.

and their addresses. When youth were asked to identify all the resources in Calgary that they knew about, Centre for Sexuality, Sheldon M. Chumir Centre, and The Alex Youth Health Centre were the 3 principal ones mentioned, so survey responses were spatially analysed in relation to these three facilities.

#### **3.2.3.4.2 Data**

Mapped primary data included community and/or postal code information, resource non-use, and the barriers that were gathered through the surveys. Concerning the barriers to access, only the most important<sup>59</sup> community-level and Calgary-specific subcategories were mapped due to the possibly overwhelming number of variable subcategories that could otherwise be visualized.

Secondary datasets included the 2016 federal population census (unemployment rate, highest educational attainment, and median household income) data for Southwest Calgary - received through the City of Calgary. These variables were included because they have the potential to influence health inequalities (Krieger et al., 2003). The following datasets were downloaded from Open Calgary (<https://data.calgary.ca>): the location of train stations, community boundaries, and associated community codes, quadrants, wards, hydrological features, and sexual healthcare facilities.

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<sup>59</sup> For the purpose of the spatial analysis, community-level and Calgary-specific barriers were considered significant if it was mentioned by at least 25% of the overall survey participants (382) before the elimination of the responses without valid locational information.

### 3.2.3.4.3 Thematic Mapping and Geovisualization

Thematic mapping, geovisualization<sup>60</sup>, and spatial analysis helped establish whether barriers and non-use were consistently distinct for locations with particular socioeconomic or neighborhood-specific traits. Before data could be visualized and any spatial analysis conducted, the following steps were performed:

- i. Each record from the survey responses was attributed with the community codes corresponding to where the respondents lived, and the resulting table was imported to an ArcGIS geodatabase.
- ii. Each response subcategory regarding non-use of resources (e.g. "Too much silence") was selected from the attribute table created above and then summarized for each community in the region.
- iii. Appropriate symbology (choropleth and graduated symbols) was chosen based on the field that contained the count of each variable subcategory per community.
- iv. Graduated symbols were superimposed on choropleth maps to facilitate a clearer visualization and analysis of the relationships among variables. Each subcategory of the variables from the survey was mapped against the socioeconomic variables and/or, where appropriate, against other subgroups of other variables to reveal such relationships. The Natural

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<sup>60</sup> <http://webhelp.esri.com/arcgisSDEsktop/9.1/index.cfm?TopicName=ArcGIS%20geovisualization>

Breaks (Jenks) and Natural Breaks-based manual classification methods were used (Environmental Systems Research Institute, n.d.).

### **3.2.4 Social-Ecological Model**

All the five levels (intrapersonal/personal, interpersonal, institutional or organizational, community, and public policy) of the Social-Ecological Model (McLeroy et al., 1988) guided data collection. However, reported barriers could be categorized under only four (personal, interpersonal, community, and institutional/organizational) out of the five levels. By adapting the Social-Ecological Model and applying it to the barriers to youth access to preventive resources, it was possible to discover, describe, and organize the barriers that exist at each level. More importantly, collaboration among the barriers was found despite them belonging to different levels (Marcell et al., 2017). For instance, the impact of interpersonal stigma on sexually transmitted infection-relevant knowledge and the impact of relationships on youths' attitudes towards prevention services (Williams et al., 2007) were analyzed.

Moreover, the model was useful to this study in that it assisted in defining the multiplicity of place-based and compositional factors that influenced access to chlamydia resources among youth. Its all-encompassing nature was helpful to unearthing the barriers that existed along and within the upstream-downstream public health spectrum (Andress, 2017), thereby providing an avenue to recommend interventions that were tailored to the

multiple levels at which the determinants of access operated (Schölmerich and Kawachi, 2016). The Social-Ecological Model has been applied by researchers who aimed at:

- Exploring perceptions of the determinants of access to sexual and reproductive health care (Marcell et al., 2017);
- Identifying the barriers to sexual and reproductive health service access (Gombachika et al., 2012; Jahangir et al., 2020);
- Developing a more situated understanding of stigma and discrimination that affect access to health services (Woodgate et al., 2017); and
- Explaining the barriers to contraception use and access (Lys et al., 2019).

### **3.2.5 Ethics, Confidentiality, and Data Management**

All data collection began after the ethics review boards of Carleton University (Project # 109040) and the University of Alberta (Pro00083519) had approved the study. Participants' (youth and providers) consents (verbal or signed) were sought before data collection. Interview participants could both withdraw from the study whenever they wished and have their data excluded from being analyzed. Conversely, while survey participants could also skip specific questions or even wholly opt out when they so desired, it was impossible to identify and eliminate their responses once they were submitted.

Moreover, the research assistant was asked to sign a non-disclosure agreement. All electronic and print documents were safely kept on a password-protected computer and a locked filing cabinet in the researcher's house.

Finally, a plain language report would be disseminated to community organizations and stakeholders, including the councillors of Wards 6, 8, 11, and 13. A technical report would also be submitted to providers and policymakers, including those at the City of Calgary and Alberta Health Services for further consideration.

### **3.2.6 Study Rigor and Triangulation**

The use of a mixed-methods design (Creswell, 2014) and the comparison of the information from the environmental scan, semi-structured interviews, and the survey questionnaires all lent validity and rigor to the study (Guion, 2011) by ensuring that the strengths of one method cushioned the weaknesses of the others.

Additionally, the researcher ensured that the central research question and the research objectives were focused and that the proposed phases (qualitative-quantitative-spatial) of the study were meticulously adhered to. Furthermore, to ensure that inferences being drawn were reliable, the researcher discussed and confirmed his interpretation of anonymized interview and survey data with a professional (one nurse). Interview data were also shared with the thesis committee to confirm if the research objectives were being met.

Peer debriefing or analytic triangulation is “the process whereby a researcher calls upon a disinterested peer—a peer who is not involved in the research project—to aid in probing the researcher’s thinking around all or parts of the research process” (Given, 2008, p. 604). The step was also taken to enhance the reliability of the study methods, results, and data analyses. Collecting data at different times of the day and with different groups of participants also introduced strength and consistency to the study. Moreover, during the interviews, participants had the freedom to express themselves in whatever form or shape they wanted so long as they were not deviating from the purpose of the study.

Interviewers also made conscious efforts to ask follow-up questions to confirm responses when they were not very sure of the possible meanings and interpretations. Also, during the interview, much attention was paid to the context within which data were being collected. More importantly, the researcher used manual and electronic (audio recorders, Statistical Package for Social Sciences, Excel, and NVivo) processes and tools to ensure that data collection, transcription, and coding were valid and reliable.

Since participants would be entered into a draw at the end of the survey, the researcher, by enabling the “Prevent Ballot Box Stuffing” option in Qualtrics, ensured the reliability of survey responses by preventing online takers from taking it more than once. As long as respondents access the survey via the anonymous link (the URL used to take the survey), this option is effective in helping keep them from taking a survey multiple

times. It does so by placing a cookie on survey takers' browsers when they submit a response. The next time the respondent clicks on the survey link, Qualtrics will then see the cookie and will consequently not permit them to take it again<sup>61</sup>.

Last, from the inception of the study to the design, data collection, and data interpretation, the researcher consistently reflected on his own biases that stemmed from his suspicions, beliefs, interests, previous sexual health research experience, and existing sexual health literature and how they could affect the overall quality of the study. Being cognizant of such prejudices helped the researcher to move beyond what initially appeared to be so “obvious” and “known” and interpret data in an in-depth and comprehensive fashion. Besides, to minimize researcher bias, questionnaires were both reviewed by the thesis committee and pretested with youth.

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<sup>61</sup> One limitation of this mechanism: simply using a different device might get around it.

## **Chapter 4: Analytical Results and Discussion**

This chapter presents the qualitative, quantitative, and spatial analytical results of this research. These results focus on the social and geographical factors involved in the hindering of access to preventive resources for chlamydia (at personal, interpersonal, organizational, and community-levels), which in turn underpinned and contributed to the incidence of infections among youth. Perceived minimal susceptibility among youth; stigma; distance decay; conscious or deliberate siting of facilities; and the nature of sexual health resources are also discussed. The chapter concludes with a discussion of the challenges encountered in the field, in addition to the limitations and the strengths of the study.

### **4.1 Qualitative Findings Based on Thematic Analysis of Interview Data**

The majority (90%) of sexually active youth interviewees reported never using any preventive resources for chlamydia. Based on this finding, the determinants of access to preventive resources are reported in this section. Moreover, the opinions of youth on the influences of social media dating application on youth sexual activities are reported in this sub-section. Youths' feedback regarding targeted testing reminders<sup>62</sup> on social media dating applications is also discussed.

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<sup>62</sup>Get-tested (before or after sexual activity) reminders that are directed towards users of dating applications who confirm to meet up.

#### **4.1.1 Barriers in Accessing Preventive Resources**

The barriers to accessing preventive resources for chlamydia that were reported by interview participants (youth and service providers<sup>63</sup>) were organized according to a four-level (personal, interpersonal, organizational, and community) Social-Ecological Model. Themes that emerged included perceived irrelevance of resources, potential feeling of uneasiness, lack of knowledge about sexually transmitted infections and associated resources, stigma, general silence about sexually transmitted infections, nature of online information, restrictive clinic hours, intimidating and youth-unfriendly healthcare spaces, vague education curriculum outcomes, the expanse of Calgary, inefficient Calgary transit system, unfriendly Calgary weather conditions, and social conservative values.

##### **4.1.1.1 Personal Barriers**

Personal barriers were grouped into three main themes: *perceived irrelevance*, *potential feelings of uneasiness*, and *minimal knowledge*<sup>64</sup>.

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<sup>63</sup> Where applicable, in this and subsequent sections, the opinions of both youth and/or service providers were reported because a comprehensive understanding of the barriers was sought (Goldenberg et al., 2008b; Carter et al., 2014).

<sup>64</sup> See Appendix R1 for a breakdown of the qualitative themes that emerged for all the four levels of the Social Ecological Model which are presented.

#### 4.1.1.1.1 Perceived Irrelevance

Most (82.6%) interviewed youth agreed that preventive resources were as equally relevant to sexually active youth as they were to sexually inactive youth. Sexual inactivity was a possible reason for preventive resource non-use. For example, MR4 mentions, “If I were sexually active, I wouldn’t need much to take advantage of these services. I personally haven’t seen much about it cause [coz] I haven’t had to go to one.” He also notes that since Calgary was “a sexually active place, and it’s better to be safe than sorry when it comes to things like STDs”.

A subset of sexually active youth equally saw preventive services as irrelevant when they had only one sexual partner. Commenting on what influenced her willingness to use preventive services, FR1 noted, “I think things like current sexual activity. For me, I am not having sex with multiple partners, so I wouldn’t think that I would need to access that information right away”.

In addition, FR3 divulged that some sexually active youth would simply ignore sexually transmitted infection prevention resources when they believed that an infection was not fatal:

I have had so many people tell me that “as far as it is not HIV/AIDS, or as far as it is a sexually transmitted infection, as far as it is curable, then I am good.” They

don't want to go and seek some of these resources. They don't want to get tested or screened.

SP3 narrated that she seized every opportunity to talk about sexual health issues with her young patients because “they are not gonna ask. They are gonna pretend they don't need to know.”

#### **4.1.1.1.2 Potential Feeling of Uneasiness**

Potential feelings of uneasiness also hindered the readiness of certain youth to access preventive services, especially if those resources were found in medical settings. SP3 noted that she initiated conversations about sexually transmitted infections and their associated resources to her young patients since “it is embarrassing for teens to admit they need healthcare” (FR11). MR3 mentioned that he would opt for online resources, where applicable, since he would not have to interact with “someone” about his sexual health matters.

Resources were also refused in settings where youth did not feel they were part of the community. For instance, FR1, a resident of Glenbrook, wondered if “there is a place that feels like [...] you could go to actually [access sexual health services] where you would feel comfortable like you are part of the community.”

It was speculated that youth from affluent neighborhoods rejected services found in neighborhoods with conditions dissimilar to where they lived. Such differences in

neighborhood characteristics created safety concerns, which made affluent youth uncomfortable accessing resources in downtown Calgary. FR2, a resident of Aspen Woods<sup>65</sup>, reported:

Yeah, now I think about it, one of the clinics is downtown, so maybe being there might not be a “safe environment” for people from Southwest Calgary who are used to a certain level of comfort [who] may not be as willing to go downtown (FR2).

Sometimes, the uneasiness was due to the sensitive nature of sexually transmitted infection issues. FR3 explained the need to promote “comfortability because a lot of people are really not comfortable with discussing private, confidential issues like that like their sexual health.”

Some youth also commented on how the fear of stigma made it difficult for them to access resources that were not online. Since there was “always a risk of backlash from individuals” (FR8), youth who attempted to access preventive resources “may feel judged, [or] could be scared or ashamed” (MR10).

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<sup>65</sup> Eighty percent of private households made at least \$100,000 in 2015 and \$199,759 was the Median total income in 2015. See profile of community on the City of Calgary website.

#### 4.1.1.1.3 Minimal Knowledge

The low level of knowledge about “any sexually transmitted infection resources, not even online” (MR6) or even “the existence of such resources” (MR11) was a barrier. Since MR7 knew less about the free nature of services, he cheerfully explained that he “currently has a part-time job, so [he] can get money to access services”, although such services were in fact free of charge.

FR5 had correspondingly minimal knowledge of sexually transmitted infections-specific preventive resources other than the testing services in public health clinics:

Honestly, I don't know too much about it. I don't know exactly where, whether sexually transmitted infection clinics exist in Calgary, but they do some prevention treatment that is public health for chlamydia. I do know about, for females, we can get a Pap smear swab done to test for any sexually transmitted infection, and I guess you can also get the screening done through your doctor's office for a sexually transmitted infection as well.

Moreover, some youth were unaware that chlamydia was one of the sexually transmitted infections that they could seek help for at existing sexually transmitted infection facilities. For instance, MR12 shared that apart from chlamydia, he knew about the preventive resources for all the other sexually transmitted infections.

In addition, while youth knew about testing and treatment services, they knew less about other preventive resources. FR6, who worked in a healthcare setting, noted: “I am not aware of any prevention resources. I have been [re]searching about it because some of our patients come to our clinic and get tested, especially when they don’t know what they have gotten after intercourse.” However, MR8 explained that although he did not know where resources were, he could always go online to search for information, including the location of facilities.

FR5 explained that not knowing they were at risk for or had contracted chlamydia was due to their reluctance to use preventive resources:

I think it is the need for it [that influences my decision to use]. You don’t normally think you have it because it is asymptomatic. So just not knowing that you have it is probably a barrier in itself because you don’t know. You are not really aware of the potential that you have it, so you don’t wanna go seek out any sort of treating or any sort of sexually transmitted infection clinic. But I do know that some of my friends do go out and seek out Sexually Transmitted Infection screening. I think it just, kind of, knowing that you potentially could have it. I think something that might be beneficial is to maybe do some education on chlamydia for people to be like, “oh, I might have it and might not know”, and then they would go and get checked.

Service providers equally indicated that some clients “don’t actually even know that there is something you could be at risk for” (SP2), “lack awareness of what [chlamydia infection] looks like” (SP1), or believe in “myths around that there has to be symptoms” (SP1), and may consequently refuse preventive resources. Lastly, SP3 saw the late presentation of chlamydia as a challenge because “the disease is not symptomatic, so some people are not even aware that they have chlamydia and the time that they had it. They are not aware of how many sexual partners they had [before they contracted chlamydia]”.

#### **4.1.1.2 Interpersonal Barriers**

*Stigma* was the only interpersonal theme that was reported by interviewees.

##### **4.1.1.2.1 Stigma**

Social bonds facilitated discussions about sexually transmitted infections and sexual health, thus encouraging youth from varying socioeconomic backgrounds to discuss and consider preventive resources and strategies. For instance, SP1 explains that when youth feel more connected in school and when they have friends [from their neighborhood who] they hang out and relate [with] well, then regardless of their socioeconomic backgrounds, they are probably more likely to have conversations around sexually transmitted infections and be able to support each other through getting tested or getting access to condoms (SP1).

Stigma was exacerbated when the people in the immediate social circles of youth quickly spread the news about sensitive issues with little or no consideration of the possible implications on youth. FR6 indicated two significant barriers: people's opinions around resources and the possibility of it being broadcast on social media that she was using sexual health resources.

In a related comment, SP1 unveiled the nature and seriousness of stigma, referring to the perpetrators of stigma, as well as where instances of stigmatization had taken place. She also pinpointed the impact of dishonest conversations about sexually transmitted infections on stigma:

I think there is stigma around sexuality in general, and sexually transmitted infections are a component of that. And then also just in their social groups online there is a lot of lack of honest discussion about sexually transmitted infections and maybe more jokes like evasion as opposed to honest conversation [...] I also think schools are a big site for shame around conversations as well as people's homes [...] I think for sure it [social media] is [a place where stigma takes place]. Like I mentioned, I think a shame strategy is taking health topic and turning it into a joke or something that kind of trivializes that topic [...] I think stigma is a huge challenge when just discussing sexually transmitted infections [like] chlamydia, with youth. So just some of the shame that comes with those conversations [...].

FR5 also indicated how the level of trust in relationships could either sustain or mitigate the effects of stigma on the use of preventive resources:

I think if you are dealing with sexually transmitted infections, there is a stigma around it, so it depends on how open and honest you are with your parents, your partner or whoever, your siblings, your family, your friends, that could be barriers and encouragement as well because people are influenced by who they put their trust in or confide in. No one really wants to get judged [like] “oh, you could have it or you’ve been sleeping around” or whatever that may be.

Related to the above quote, when youth found themselves among people who were social conservative and judgmental, they felt hesitant to use preventive services, primarily when those resources were not online. MR11 referred to the “potential cultural shame about such [sexually transmitted infection -related] resources in conservative communities”; while MR9 explained that his parents were strict and would easily judge him for using sexually transmitted infection prevention resources, in particular if they found out that he was sexually active. Both MR11 and MR9 self-identified as racialized individuals.

### **4.1.1.3 Organizational Barriers**

Relevant themes that emerged included *silence about sexually transmitted infections, nature of online information, mode of operation and nature of facilities, and vague education curriculum outcomes.*

#### **4.1.1.3.1 Silence about Sexually Transmitted Infections**

Overall, certain youth attributed the lack of information about preventive services to the intentional and unintentional silence of primary care and public health organizations about sexually transmitted infections. On the one hand, service providers sometimes erroneously assumed that existing sexually transmitted infection information dissemination strategies were sufficiently effective to equip youth with information about preventive resources when, in reality, they were not. For example, FR1 pinpointed the issues associated with overly placing education materials at the doctor's office without bearing in mind that youth did not frequently visit the doctor's office, if at all:

When I go to the doctor's, I see pamphlets for sexually transmitted infections, and they are there like "oh you can access the information," but only the people who go there really regularly to the doctor will be able to see that there is other information [...] The only last time I remember hearing about sexually transmitted infections and even chlamydia was in high school [...] Where do [you] hear about this information?

MR3 was concerned that service providers erroneously presumed that youth automatically knew about services:

They don't really try to advertise like "If you have a problem or something, you can always come here". I think they just assume that we all know that it's there since we all have the free healthcare, but they don't specifically touch base on the STDs and stuff like that.

Some youth also explained that silence had also permeated non-healthcare institutions such as high schools and places of work. For example, FR4 lamented, "I didn't know much about sexually transmitted infections until university, I just figured them as something really scary. I wish there was more information offered in high school." MR3, also a university student, agreed with FR4 that the universities create awareness about chlamydia. However, he shared a different opinion regarding the role of the workplace in promoting sexual health:

I think mostly the school because the school tries to be proactive, ensure you prevent these things but not so much at the workplace, [it] doesn't have information about it [chlamydia], much information, awareness programs.

Certain youth believed that Alberta Health Services was short-sighted in its undertakings. For example, MR3 clarified that even though Calgary had the capacity to

increase access to preventive resources; healthcare providers were not proactive enough to maximize those opportunities:

If they [AHS] just were proactive about it and kind of like instead of saying that “the resources are here, whenever you need them” we have to inform people about the issues or the problem beforehand so that they don’t have to deal with it when it comes. So I think Calgary can easily do that with just how we are built. With all the advertisement all over the place, I think Calgary is built well for that [promoting access to resources] but they just haven’t used that to their ability.

Likewise, FR5 said that, other than on the university campus, she did not see an appreciable level of urgency about sexual health awareness creation in Calgary:

In Calgary as a whole, I don’t see too much. I think on the university campuses people are becoming more aware of issues because that is a target population in the first place. But outside the university, I don’t really see too much urgency or awareness being raised about any sort of sexual health topic. I guess it is almost like, to me it [resources] is nonexistent.

#### **4.1.1.3.2 Nature of Online Information**

The internet could potentially be a source of vital information on sexually transmitted infection prevention. MR3 referred to the convenience the internet could afford:

I think it's more convenient honestly to use the online [resources]. I think it's more efficient to go in person to ask any questions you have with the doctor and just to show your face... I think online; most people would do online just because they don't have to interact with someone about it.

On the other hand, the ease of stumbling upon misleading information on the internet was identified as a barrier by FR3:

The only reason I can think of is because we live in an age where everything is easily accessible on the internet, most people would be more inclined to go on the internet and just search up things like this [sexually transmitted infections] rather than going to a healthcare facility and getting proper information for some of these [sexually transmitted infection prevention resources] because not everything on the internet is 100% certified or guaranteed [...] many of these things [information] available on the internet, whether it's false or it's true.

SP2 did not dispute the probable unreliability of some online information, and expressed difficulty in finding accurate youth-appropriate online information that was free of shame-based messages:

And I would say the other thing you often hear from youth is just the challenge of like finding easily [emphasized] accessible and accurate information online.

Where [online] do you actually go to find the information about sexually

transmitted infections that [source of information] you know are reliable [emphasized], that aren't full of stigma and shame, condemnatory, and you know are accurate [...] and I would say things like AHS [website], there [are] layers and layers of pages that you have to get through before you get to the information you're looking for [...] I would say in general, going back to [the] conversation about stigma, that [http://sexgerms.com/] is a website we wouldn't refer [youth] to [...] we feel the [information on the http://sexgerms.com/ website] is highly shame-based.

#### **4.1.1.3.3 Mode of Operation and Nature of Facilities**

During the interviews, youth did not comment on the nature of facilities and its impact on access, however, 2 out of the 3 service providers offered some insight into how restrictive hours of operation of sexually transmitted infections clinics exacerbated the impacts of long travel times on access; thereby discouraging some of the youth they worked with from using resources that were not online:

The other challenge is even if you are motivated to take a bus after school, clinic hours are so restrictive [...] yeah [emphasized]. I think honestly it [restrictive clinic hours] is one of the easiest barriers to solve that [comes up when] I have conversations with people all the time. Because I think also when you think about the first sort of time accessing a clinic, the motivation and the courage that it takes

to do that, and then you roll up and it is closed, what are the chances that you are going to come back? (SP2).

SP1 further explained that their clients refused to use conventional healthcare services since those centers could be intimidating in terms of their general setup and due to the attitudes of some of the clinic staff:

I would add that the South Urgent Center, the format of that clinic, I think, can feel quite intimidating or confusing to youth because there is a general intake area [...] I have done tours of the clinic and have found that students would have to speak to the general intake person who could be pretty abrasive too. In those very administrative hospital-type settings, urgent care settings, intake can be sort of abrupt and abrasive... and that could be really challenging to walk into this huge area and have to find the person to talk to, who funnels you to the next kind of step [...] so it [urgent care/hospital type setting] is not a great format in terms of access to sexual health services [...] and it's a big [emphasized] building, it is huge so that is also challenging, coz they wouldn't know where to go.

SP2 expressed an opinion similar to the preceding one by SP1 by mentioning that family doctors and walk-in clinics were not the places that youth felt safe “so the secondary option of “I am sorry that there is no clinic close to you; go to your family doctor” is not really a reasonable solution”.

#### **4.1.1.3.4 Vague Education Curriculum Outcomes**

The sexual health curriculum being delivered in public schools was considered incongruent and ambiguous:

So, I think about even in our education system, information about sexually transmitted infections in terms of the Alberta Education curriculum outcomes are very vague, and certainly the same content is not being delivered in catholic schools for example (SP2).

#### **4.1.1.4 Community Barriers**

The community determinants articulated by interview participants included *Calgary as a place, weather conditions, traditional values, and distance and transportation system.*

##### **4.1.1.4.1 Calgary, including Southwest Calgary**

The very nature of Calgary, including Southwest Calgary, was stated as a hindrance to access. In particular, the vastness of Calgary emerged as a barrier to targeted intervention strategies, specifically among communities with significant sexual health challenges. FR1 wondered if, with Calgary being “so big”, information about prevention was “being known specifically in communities where those kinds of [sexual] things [go on]”. She added, “Even the Southwest is really large, so I don't really know if there is a

place that feels like it is well-go that you could go to actually [access services]”.

Correspondingly, SP2 thought, “the way youth clinics are dispersed across the city leaves some significant areas where there is no services”.

In addition, the vastness of Calgary sometimes made it difficult for people “to get around. In particular, health centers tend to be out of the way, especially if you rely on transit to get around” (FR7). SP1 and SP2 revealed how the scattered placement of youth resources across Calgary due to the largeness of the city inversely impacted access. More specifically, SP1 explained:

When I work with students in the Southwest unless they are located up [around] the high school that neighbors the South Urgent Care Center, where the youth sexual reproductive center is for testing, we don’t see that a ton of students are actually that geographically close to that center or maybe expressing interest in traveling to that [center]. That sort of a barrier that there is one clinic that is in the deep, deep Southwest [of Calgary] and the next one is the Sheldon Chumir and that [Sheldon Chumir] can be a busier clinic. So, in terms of physical access, the Southwest is a very large area, so it could be challenging to navigate.

MR4 clarified that the need to use preventive resources stemmed from the fact that “Calgary as a place is a sexually active place and it’s better to be safe than sorry when it comes to things like sexually transmitted infections”.

#### **4.1.1.4.2 Weather Conditions**

Moreover, SP3 was “pretty sure” that the weather played a role in influencing the use of resources since “during the winter months, people are not willing to travel”. The weather in Calgary had the potential of making some youth, particularly those who commuted by public transit, unwilling to access preventive resources, especially during winter:

For me, I just don't like it when it snows like right now. But when the sun becomes hot again and all the snow melts the next day. That's [what] Calgary always does to us and then right the next day it will be cold again and all the water will turn into black ice, and then some people will go out and then fall. Even buses, the big buses here in Calgary are slipping on the ice [...] The weather might affect how you feel like too lazy, it's too dangerous too since you don't have one [sexually transmitted infection] and you want to know if you have the bacteria or something [...] you might be frustrated because it is too far if some people live here [Southwest] and the facility is like 30 minutes from here, then you have to go to the train then bus or something (MR2).

#### **4.1.1.4.3 Traditional Values and Ethnic Background**

A subdivision of youth was not very excited about using preventive resources since their places of residence did not augur well for comfortable and unobstructed

conversations about sexual health. For instance, Southwest Calgary, which was considered to be “conservative” (MR11), lacked the general sense of diversity and attraction that incited conversations about sexual health. FR4 recounted how much easier it was for her to discuss sexual health issues in Northeast Calgary than in Southwest Calgary because of her race:

It [sexual health] was more talked about in the NE before I moved to the South. Being in a neighborhood (N.E.) where I find people closer to my culture made it easy for us to speak about sexual health issues freely. This was definitely a reason why I decided to use the existing resources. In the South, racial differences impede discussion of sexual health, so nothing brings to mind the need to use the resources; this was the opposite case in the NE, where I used to reside.

SP2 offered additional insight into why racialized youth might not access sexual health services in certain healthcare setting:

If you are a youth from an ethno-cultural community, do you see yourself represented in that clinic and are you probably gonna go there? I am gonna wager probably not. Even accessibility of resources in other languages are things that I think put up barriers unnecessarily.

#### 4.1.1.4.4 Distance and Transportation System

FR5 revealed the impact of distance on access to preventive resources among youth who own no vehicles:

For people who don't have vehicles, that could be a barrier. The good thing is that there is the train line and people can go to downtown if they need to. However, the Sheldon Chumir is not close to the train line, so I guess that is a barrier. I think it is good if you have a vehicle, if you have access.

Both SP1 and MR11 explained that when commuting involved many hours of busing, it could be a waste of time, specifically if resources were distant from youth. This was mentioned as being especially true for youth who were not financially secure, since they could not afford to sacrifice their work hours to access sexually transmitted infection preventive resources.

SP2 further indicated that having services at a central place facilitated traveling among both youth and service providers, principally when the nature of services dictated providers commuting to locations where youth could be found:

It's for sure conscious that we stay central [...] for our staying central, close to a train line, was something that was very attractive to us just for client access reasons [...] Recognizing that there is only a few of our services that people access from our office, and everything else we do is meeting youth where they [are].

Further, SP3 clarified that since most youth would want to access preventive services after school, the long commute times and the hours of operation of sexual health providers would mean that providers would close before youth arrived. Finally, FR3 highlighted that if she were “to pick something, one of the reasons which might actually hinder southwest people from accessing resources might be transportation, location, getting to some of these resources.”

#### **4.1.2 Social Media, Sexually Transmitted Infections, and Targeted Testing**

##### **Reminders**

Youth opinions on the possible relationship (or absence of it) between social media dating application usage and risky sexual activities are reported below. Youths’ views of targeted testing reminders on the dating applications are also recounted here<sup>66</sup>.

##### **4.1.2.1 No Influence of Social Media**

MR3 explained that the use or non-use of social media did not matter as much as the level of knowledge that youth had about sexually transmitted infections. He further explained that since the level of proactivity of youth and how informed they were about keeping safe “determined” whether or not they ended up engaging in a sexual activity, he made sure that he was always carrying a condom on him regardless of how he talked to a

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<sup>66</sup> See Appendix R2 for opinions on the influence of social media on sexual activities and views on targeted testing reminders

person. Although FR6 thought social media influenced the tendency for youth to engage in risky sexual activities, she expressed an idea that was similar to MR3: “Sometimes, [due to the use of social media] I think about it [engaging in sexual activities]. But, when you have the knowledge, every day, that makes me think twice.”

Commenting on the influence of social media dating apps on sexual behaviors, SP1 was “always apprehensive about only suggesting that these platforms are negative”. She explained that there was “a myth too that dating apps facilitate high-risk behavior”, since people engaged with those platforms in varying ways such as making friends and finding lifelong “partners in their community where otherwise it would be challenging.”

SP2 articulated an opinion that was parallel to SP1’s. She did not think that she had an anecdote to illustrate that there was a higher chance that youth who met up with people in other ways engaged less in risky sexual acts than youth who met up through social media. She clarified also that blaming social media for sexual risk behaviors among youth was nothing but an act of systemic expediency, since the youth she worked with did not meet up through dating apps:

I would say it’s [blaming social media for high incidence of sexually transmitted infections] a really easy scapegoat. I think it is really easy thing to blame without looking at what some of the systemic barriers are around education and access to services and I think a larger challenge of not giving youth enough credit around being able to sort of make decisions around their behaviors. I would also say that

particularly, a lot of the rhetoric around this has been around, particularly, like dating apps. And I would say, particularly under-17 crowd that we see like they are not actually hunting. They are meeting each other at school or through friends or other means. So, I also think, for me, that is not a helpful statement and I don't think it reflects the realities of the [young] people that we work with [...] I wouldn't say that there is outright acceptance that if you are on that [dating] site, you don't negotiate safe sex.

#### **4.1.2.2 Social Media Have Influence**

FR7 thought that the use of social media dating application sustained a hookup<sup>67</sup> culture among youth: “Oh, absolutely. Social media makes it much easier for people my age to “hook up” ... meet up for the express purpose of sex. Some might say that's the only reason a lot of us use these apps.”

MR2 blamed the ease of access to sexually provocative content among youth on the weak social media filtering and verification systems, which make it effortless for youth to lie about their true identities:

I am very sure because people nowadays are addictive [sexually] because you can just easily post something on social media. If you have like naked two-piece

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<sup>67</sup> “Casual sexual behaviors ranging from kissing to intercourse with a partner in which there is no current relationship commitment and no expected future relationship commitment” (Lewis et al., p. 2). Hookup, as used in this study, also involves any form of sexual activity other than sexual intercourse.

bikinis or something, they can just view it easily. There is no something to block it and age restriction; they can just change the actual date to sign in. Coz most people, like my friends, they are just changing their age. If they require 21 they just adjust the date [...] and they [owners of apps] will not know since there no ID, picture requirement or something. They can just change their names so that no one can identify them and then they would just usually go there and then just go meet some people and talk to people and potentially go [engage in sexual activities] (MR2).

MR10 agreed that social media influenced sexual risk behaviors “because we’re open to a lot more things such as porn”. Furthermore, youth clarified that since “students have hormones” (MR9), even minimal exposure to sexual content had the tendency to trigger the immediate or eventual need for sexual one-offs, which were facilitated by dating apps. According to FR4, “most people there [social media dating platforms] seem to be looking for relationships that have quick intimacy. If someone is not very educated on sexually transmitted infections, it could have serious consequences very quickly”. Social media dating, according to MR6, was “cheap since it is easy and quick to find, talk to, and woo girls for sexual encounters”. FR2 also substantiated how social media dating apps incited one-offs by narrating a friend’s experience:

Well, just from things I’ve heard from my friends about their reason for them using dating apps, I would that it encourages risky behaviors when it comes to

dating [...] One of my friends pulled a story of how she traveled to meet new people and used Tinder, I think that it was, met a guy, and then just, I don't know, had sex with the guy. Just a one-off [happened once]. I guess that was how she used an app, so yeah; I would say that it encourages risky behavior.

Likewise, MR11 had "known many people who do not check partners on online dating apps and have repeated unprotected sex".

FR1 blamed dating apps for sexual risk behaviors, since the owners of the apps made no appreciable efforts to educate its users on the risks of hookups:

I should think "yes" [social media can influence risky sexual behaviors] in the sense that [...] especially when I was 18 [years]. I kind of think that those apps don't really tell you, like it's not warning you about risks that you take like risks that come with you being sexually active [...] "Oh, hook up" [...] There is nothing to tell you that "oh you are happy now, hook up, but this is the thing that you should make sure you are being careful" [...] it just talks in this way that is just fun, [but it is] not there isn't like real consequences.

Further, social media was identified as a place where phenomena that had the potential to incite sexual behaviors, such as peer pressure and the need for attention, were rampant. The pressure to fit into society and be cool on social media induced youth to open up to many things, including sexual risk activities:

Most of our generation at the moment social media is the way of seeking attention. So, the more they are on social media the more the people that is engaging on social media. I think that is the one way they can feel that “oh there is someone that’s gonna give me attention”. The more the people that feel lonely, the more they can get attention. People are opening up. Social media is easy access to anything [...] to money, to sex, to company (FR6).

Another substantial impact of social media was revealed in how it reduced communication, locational, and age barriers. For instance, MR3 did not think that social media had any influence on sexual behavior. Nonetheless, he highlighted that he used it to meet new people at school. He also divulged that social media made it easier for people to interact since “you don’t have to go to where people are to talk with them. Now you can do it from home.”

According to FR5, one of the consequences of this barrier reduction is the tendency for youth to end up having sexual intercourse with strangers and with many people:

Oh, yeah, 100%, I think people can meet anybody and you have a higher risk with more sexual partners. Anybody can be anywhere. The only thing is that if you are using it [social media] and you are meeting people you don’t know, then that is very risky thing [...] I think it is potentially risky if people are deciding to sleep with that person with no knowledge of what their history is.

FR8 further disclosed that when “you often have no ties to the individual [you meet through social media] you feel more open to “exciting” experiences” like having sex without protection Besides, the alleviation of communication barriers made it “easier to find girls on social media. In-person, you are shy.” (MR7)

Even though SP1 strongly disagreed with the view that social media was responsible for sexual risk activities, she did not deny that social media dating apps reduced social and geographical barriers to dating:

I think people have always found ways to have sex with people. In the areas of who approximates them whether that’s in physical location or age or whatever, maybe the [dating] app can reduce some barriers in terms of nervousness or shame or anxiety about starting conversations [...].

The views expressed by SP3 about the influence of social media on sexual behaviors summarized and paralleled those expressed by other youth. She underscored that the comparative anonymity of activities and people; the proliferation of uncensored sexual activities and conversations; the increased normalization of casual sex; and the desire to attain social media virality could make it easy for youth to get wooed into deeds and relationships that potentially exposed them to sexual activities that could negatively impact their health:

Social media definitely influences how young people are relating today. Because of the relative anonymity of social media, and besides that people are interacting with young people. Even though it is supposed to be an interaction that is very superficial, young people are not really necessarily building very good relationships. From many young people that I have interacted with the influence of social media that I have observed is that there are sexual activities going on online like sexting and partners are saying things like that [sexting-related things]. So some people apparently now will do a group text, people will meet up at locations and have casual sex [...] Because of the availability of the information and different types of socializing that social media has brought about, casual sex has become sort of more acceptable and more common. People are not really in a relationship, and they are having multiple partners and therefore spreading [the infection]. So, I think social media definitely plays a part and I think in that group of adolescence, they are very heavily interested in social media circles. The other thing that social media can do is virality. So, when a trend, when something starts to spread, whether it is some piece of information [...] it is very easy for it to spread like the virus through a group of friends who are friends by social media. So, whether it is sexting virus or it's a sex party virus [...] all those things can easily become normal they are popular on social media.

MR8 added “social media is full of stuff like sexual jokes or sexual sites that don’t encourage youth to stay sexually safe”.

#### **4.1.2.3 Views on Targeted Testing Reminders**

Participants were asked to share their views about reminders that specifically asked them to get tested for a sexually transmitted infection immediately after they had confirmed to hook up with someone via a dating app (see Appendix R3).

MR4 felt “like that [targeted testing reminders] should be an ad on everything because we need to stop the spread of STDs”. MR13 also saw targeted testing reminders as “necessary to prevent [a sexually transmitted infection] and help others stay protected”.

FR7 stated that the haste to engage in a sexual activity can preclude thoughts about sexual safety; consequently, targeted testing reminders could serve as helpful reminders:

I think that’s a great idea, honestly. A lot of people tend to rush into sex and hookups without thinking about their safety or potential consequences. I think ads [targeted testing reminders] could help remind youth that the resources are there and that they have the responsibility to look after themselves and their partners.

While FR3 conceded that not everybody would be comfortable with targeted testing reminders, she “personally would definitely be up for it like ‘yeah, yeah sexual

health ads' [said with much zeal]". She cited the rare existence of testing reminders on dating sites and the potential for youth to forget about the most important issues about sexual safety as the primary justification for targeted testing reminders:

Especially since nowadays we hardly see sexual health ads on some of these dating sites, I feel like that is actually a very good incentive to remind people after a hookup like "oh, go get tested and things like that" because in that way I feel like it opens up the conversation of being comfortable with discussing with your hookup person or future sexual partner about discussing your sexual history. That way both of you can get tested or go for screening. Because more often than not people get lost with trying to find a dating buddy [partner] and they forget about core issues like this like making sure that both of you are tested or you're screened before engaging in any sexual activities. So, I think reminders like this are very, very key just so people are aware that "okay, yes you are meeting somebody but there are also important things you should do before you do get sexually involved with them". So, I think it is good. It is a very good reminder.

Awareness creation was deemed vital mostly because most youth were not aware of the risks in being sexually active. FR6 stated that if she saw a targeted testing reminder, she would eventually try to get herself and her potential partner tested for a sexually transmitted infection, especially if they had just started having a deeper relationship that could lead to premarital sex.

Furthermore, MR9 expressed the sense of satisfaction that knowledge of the sexual history of a potential partner would afford him: “I would feel fine knowing that, at least it will provide useful information for the users. I would feel fine because I would ask her first if she had anything wrong with her.”

SP2 also saw having targeted testing reminders as an efficient public health strategy. However, she cautioned that advertisements should be framed and delivered in a manner that would make them neither upsetting nor redundant:

I think public health promotion [...] there is no reason why reminding people to get tested is a bad thing. I think it's [...] a super effective strategy to ensure that people see that message repeated as many times as possible [...] I think for me it's about how [...] how the message is delivered, that is what is the most important. Having a message is key [...] but I think it's the delivery of it that is important. I think if it [reminders] is every single time the redundancy of that will get to anybody... but I think if there is other ways throughout that tool that [...] there could be subtle reminders like we use banners [...] running across the bottom [...] “Reminder: there is testing on Wednesday night [...]” But of course, as a youth you are constantly being targeted telling you “Don't do these things” but it is more about the delivery.

FR2 was enthusiastic about the idea of having reminders on social media, since social media providers induced sexual behaviors without paying attention to how users

could equally stay healthy, although she cautioned against the tendency for targeted testing reminders to be invasive:

[Expressing excitement] I think that would be good. I think the more awareness there is, the more healthy that we will all be as a society, especially with the example I gave just earlier, social media dating apps do encourage risky sexual behavior but I guess it is important for people to understand how to be safe when they are engaging in those processes. That [targeted testing reminders] might be a bit personal, thinking about it.

FR5 was similarly positive about the idea of having reminders on dating apps. Nevertheless, she thought that targeted testing reminders could be too presumptuous since some youth did not necessarily always end up hooking up sexually. She also thought that the shock that targeted testing reminders presented to users might actually annoy and demoralize them:

I don't know how much the shock factor [that aims at inciting people to use resources] would work for people. Sometimes it could backfire [...]. On cigarette packages, they put the risk of smoking right on the packages, so that could be a reminder to some people. I think it could deter people from using those kinds of apps [...] people who use Tinder, they probably won't want those kinds of ads [testing reminders] on their apps. I would be for it, but I don't know how effective it would be because I think people would either go to know whatever or they

would feel [pause] guilty? And then I think it's a really big assumption especially because some people do use it [dating app] and they don't necessarily hook up with people. Lots of people do [hook up], but it is an assumption to get the ad out there.

Correspondingly, FR1 further clarified that the stigma already associated with the use of sexual health resources further underpinned the awkwardness of targeted messages, even though she thought an untargeted reminder would be all right:

I think that [targeted testing reminders] would be really good. Because, especially for a mainstream application, with a bunch of people will be using it so it wouldn't seem weird [...] I think part of the reason why maybe it's hard to access resources is because of shame. 'You've hooked up and you wanna get checked?' You are worried like 'oh that's awkward' [...] whereas if that became a norm, everyone is seeing that on the app then it wouldn't be as awkward anymore. It would just be like that's the thing you are supposed to do.

Lastly, whereas MR6 had no opinion since he did not use social media dating apps, MR12 was entirely against the idea of having targeted testing reminders because "that [decision to use preventive services] should be my choice. I should make that decision for myself I [would] feel awkward."

## 4.2 Quantitative Findings Based on Statistical Analysis of Data

Results from the statistical analysis of survey data are presented in this section. In particular, the demographic profile of survey participants, the determinants of access to preventive resources, and the opinions of youth on the influences of social media on risky sexual activities are reported. The thoughts of youth on targeted testing reminders on social media dating applications are also conveyed.

### 4.2.1 Qualtrics Survey Demographics

**Table 1: Demographic profile of research participants in Southwest Calgary**

Variables	Categories	Frequency	Percentage
Gender	Female	359	94.0
	Male	23	6.0
Age Group	15-19 years	147	38.5
	20-24 years	235	61.5
Racialized	No	285	74.6
	Yes	97	25.4
Relationship Status	Common-law	32	8.4
	Complicated	9	2.4
	Dating	169	44.2
	Engaged	1	0.3
	Married	7	1.8
	Separated	1	0.3
	Single	163	42.7
Level of Education	Completed a	84	22.0

Variables	Categories	Frequency	Percentage
	University or College Degree		
	Completed Junior High school	70	18.3
	Completed Senior High school	211	55.2
	Completed Trade Certificate or Apprenticeship	17	4.5
Years Lived in Calgary	< 1 year	23	6.0
	> 1 year	359	94.0

As shown in Table 1, of the 382 who participated in the survey, 359 (94%) were females, and only 23 (6%) were males. A greater number of (n=235, 61.5%) survey participants were aged between 20-24 years. Only a few (n=97, 25.4%) survey participants were racialized<sup>68</sup>. In terms of their relationship statuses, most youth were either dating (n=169, 44.2%) or single (n=163, 42.7%), and fewer than 8% of youth were married. Most (n=211, 55.2%) participants had only completed senior high school, although 22% (n=84) were college graduates. Most (n=359, 94%) survey participants had lived in Calgary for more than one year.

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<sup>68</sup> Forty-three (40 females and 3 males) were between 15-19 years whereas 54 (47 females and 7 males) were between 20-24 years.

## 4.2.2 Statistical Analysis of Survey Data

### 4.2.2.1 Use or non-use of preventive resources

This section focuses on the use or non-use of all preventive resources, including testing, among participants. Also briefly mentioned are variables that have the potential to impact access to resources. As shown in Table 2, most (n=305, 79.8%) survey participants reported having heard about preventive resources from at least one primary or secondary information access point. Specifically, the source from which most survey participants first heard about preventive resources was their teachers (n=123, 32.2%), followed by peers (n=48, 12.6%) and internet search (n=43, 11.3%). Family Doctors were identified by only 5.2% (n=20).

**Table 2: First Source of Preventive Sexual Health Resource Information**

<b>First Information Source</b>	<b>Frequency</b>	<b>Percent</b>
Teacher	123	32.20%
Peers	48	12.57%
Internet search	43	11.26%
Family	31	8.12%
Social media	24	6.28%
Family Doctor	20	5.24%
Other - Service Provider	7	1.83%
Television ad	3	0.79%
Other - Employer	2	0.52%
Mail flyer	1	0.26%
Other - University	1	0.26%
Radio ad	1	0.26%
Other - Book	1	0.26%
Do not remember	25	6.54%

<b>First Information Source</b>	<b>Frequency</b>	<b>Percent</b>
No Response	52	13.61%
<b>Grand Total</b>	<b>382</b>	<b>100%</b>

A higher proportion of youth in the 15-19 age cohort (n=53, 36.1%) identified teachers as the first source of information as compared with the proportion of those in the 20-24-year age cohort (n=70, 29.8%) (Appendix M1 and M2). In addition, the proportion of junior high school graduates (n=29, 41.4%) who identified teachers as the first source of information was higher compared with the proportion of university (n=27, 32.1%), senior high (n=61, 28.9%), or trade college graduates (n=6, 35.3%) (Appendix N)

The Center for Sexuality was the most mentioned (n=233, 32.3%) resource by survey participants. However, the resources that were available through Alberta Health Services had a 51.4% (n=351) mention rate (Table 3). Participants who had completed senior high school accounted for 390 of the 722 times that existing sexual health resources were mentioned (Appendix O ). Nevertheless, the resource mention rate for those who had completed trade certificate or apprenticeship (1: 0.567) program was slightly greater than those who had completed senior high school (1: 0.541).

**Table 3: Frequency of mention of sexual health resources**

<b>Sexual Health Resource</b>	<b>Times Mentioned</b>	<b>%</b>
Calgary Sexual Health Center	233	32.3
Calgary STI Clinic (Sheldon Chumir Health Centre)	181	25.1
Alberta Health Services Sexual and Reproductive Health website	114	15.8
The Alex Community Health Center	110	15.2

Sexual Health Resource	Times Mentioned	%
Alberta Health Services Social Media pages	56	7.8
Mosaic Women's Clinic	28	3.9

Of the total sample, there were more *non-users* (n=223, 58.4%) of resources than *users*<sup>69</sup> (n=158, 41.4%). More than half (n=105, 66.5%) of users revealed that access to sexual health resources was a fairly easy and straightforward process (Table 4).

**Table 4: Ease of preventive resource use and history of preventive resource use**

Ever Used a Preventive Resource		Ever Used any Preventive Resource(s)			Total
		No	Yes	No response	
Very easy and straightforward process	Count	0	33	0	33
	% within Ever Used	0.0%	20.9%	0.0%	8.6%
Fairly easy and straightforward process	Count	0	105	0	105
	% within Ever Used	0.0%	66.5%	0.0%	27.50%
Very difficult and complicated process	Count	0	3	0	3
	% within Ever Used	0.0%	1.9%	0.0%	0.8%
Fairly difficult and complicated process	Count	0	12	0	12
	% within Ever Used	0.0%	7.6%	0.0%	3.1%
Not applicable	Count	223	0	0	223
	% within Ever Used	100%	0.0%	0.0%	58.4%

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<sup>69</sup>“*Users*” are youth who, during the time of the study, had previously used a preventive resource, including testing, whereas “*non-users*” refers to youth who, during the time of the study, had never used any preventive resource, including testing.

Ever Used a Preventive Resource		Ever Used any Preventive Resource(s)		Total	
No response	Count	0	5	1	6
	% within Ever Used	0.0%	3.2%	100%	1.6%
Total	Count	223	158	1	382
	% within Ever Used	100%	100%	100%	100%

Also, as shown in Table 5, non-use exceeded use among female and male survey participants alike. The proportion of male non-users was 73.9% of the total male survey takers, whereas the proportion of female non-users was 57.4%. The result of the Fisher's exact test revealed a weakly negative relationship<sup>70</sup> ( $p=.09$ ,  $n=382$ , 90% CI,  $\Phi=-.08$ ) between gender and preventive resource use. Therefore, we reject the null hypothesis, "Resource use is independent of gender". Being male meant a slightly less resource use than females.

**Table 5: Preventive resource use by gender**

	Ever Used Preventive Resource	Count of Responses	% Within Gender
Female	No	206	57.4
	No response	1	0.3
	Yes	152	42.3
	Total	359	100
Male	No	17	73.9
	Yes	6	26.1
	Total	23	100

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<sup>70</sup> The relationship between resource use and gender is only significant at 90% confidence interval but this suggests that this relationship is worth looking at in future research with larger samples.

In addition, resource non-use was higher among mature minors than it was among young adults. More specifically, the proportion of 15-19-year olds who had never used any preventive resource was 64.6% whereas the proportion of young adults who had never used any resource was 54.5% (Table 6). The result of the Fisher’s exact test revealed a weakly positive relationship ( $p=.02$ ,  $n=382$ , 95% CI,  $Phi=.11$ ) between age and preventive resource use. Therefore, we reject the null hypothesis, “Resource Use is independent of Age”. Being a young adult meant a slightly more resource use than mature minors.

**Table 6: Preventive resource use by age**

			Age of Participant		Total
			15-19 years	20-24 years	
Ever Used a Preventive Resource	No	Count	95	128	223
		% within Age of Participant	64.6%	54.5%	58.4%
	No comment	Count	1	0	1
		% within Age of Participant	0.7%	0.0%	0.3%
	Yes	Count	51	107	158
		% within Age of Participant	34.7%	45.5%	41.4%
Total		Count	147	235	382

The proportion of racialized and non-racialized youth who had never used any preventive resource was 59.8% and 57.9% respectively (Table 7). Moreover, 59.8% ( $n=52$ ) of racialized females had never used any preventive resource as compared to 56.6% ( $n=154$ ) of non-racialized females. On the contrary, 60% ( $n=6$ ) of racialized males had never used any preventive resource as compared to 84.6% ( $n=11$ ) of non-racialized

males (Appendix P). The result of the Fisher’s exact test revealed no relationship ( $p=.44$ ,  $n=382$ , 90% CI) between racial identity and preventive resource use. Therefore, we fail to reject the null hypothesis, “Resource Use is independent of Racial Identity”.

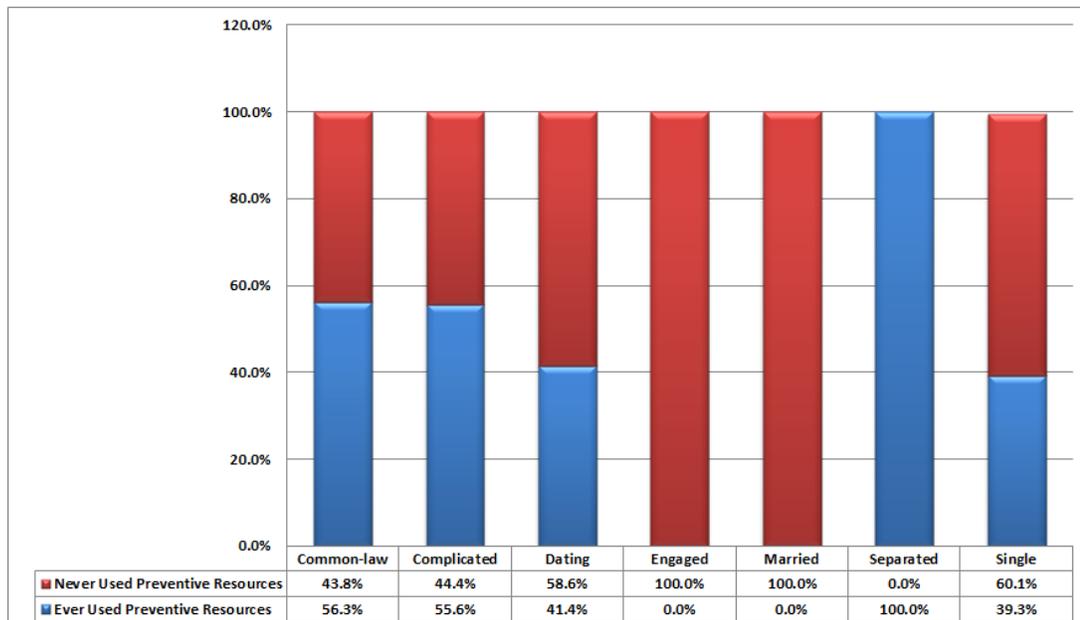
**Table 7: Preventive resource use by racial identity**

<b>Ever Used a Preventive Resource</b>	<b>Count of Non-Racialized Youth (% within non-racialized)</b>	<b>Count of Racialized Youth (% within racialized)</b>	<b>Total</b>
No	165 (57.9%)	58 (59.8%)	223
Yes	119 (41.8%)	39 (40.2%)	158
No comment	1 (0.4%)	0 (0%)	1
Total	285	97	382

The proportion of “single” youth that had never used any preventive resource was 60.1%; 58.6% of youth in “dating” relationships had never used any preventive resources. None of the very few married or engaged youth<sup>71</sup> had ever used any preventive resource (Figure 1).

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<sup>71</sup> Married:  $n=7$ , 100%; engaged:  $n=1$ , 100%.



**Figure 1: Proportion of individual relationship statuses that had/had not used preventive resources before**

The proportion of senior high school graduates who had never used any preventive resource was 61.1%, closely followed by the proportion (58.3%) of those who had completed a university or college degree (Table 8).

**Table 8: Preventive resource use by educational attainment**

			Level of Education				Total
			Completed a University or College Degree	Completed Junior High school	Completed Senior High school	Completed Trade Certificate or Apprenticeship	
Ever Used any Preventive Resource(s)	No		49	37	129	8	223
		% within Level of Education	58.3%	52.9%	61.1%	47.1%	
	No comment		0	0	1	0	1
		% within Level of Education	0.0%	0.0%	0.5%	0.0%	
	Yes		35	33	81	9	158
		% within Level of Education	41.7%	47.1%	38.4%	52.9%	
Total			84	70	211	17	382

As seen in (Table 9), the proportion of participants who had lived in Calgary for less than a year and never used any resource (n=18, 78.3%) was higher as compared to the proportion of those who had lived in Calgary for more than a year and never used any resource (n=205, 57.1%). The result of the Fisher’s exact test revealed a weakly positive relationship ( $p=.01$ ,  $n=382$ , 95% CI,  $\Phi=-.12$ ) between length of residence and preventive resource use. Therefore, we reject the null hypothesis, “Resource Use is independent of Length of residence”. A longer residence in Calgary meant a slightly more resource use than a shorter residence in Calgary.

**Table 9: Preventive resource use by years lived in Calgary**

			Years Lived in Calgary		Total
			Less than 1 year	More than 1 year	
Ever Used any Preventive Resource(s)	No	Count	18	205	223
		% within Years Lived in Calgary	78.3%	57.1%	58.4%
	No Comment	Count	1	0	1
		% within Years Lived in Calgary	4.3%	0.0%	0.3%
	Yes	Count	4	154	158
		% within Years Lived in Calgary	17.4%	42.9%	41.4%
Total		Count	23	359	382

#### **4.2.2.2 Barriers to Access to Preventive Services**

This section presents results from the Inter-level (comparison of the levels of the Social-Ecological Model based on the total frequency at which their sub-variables were mentioned) and Intra-level (comparison of the sub-variables within each of the four levels of the Social-Ecological Model) assessment of the determinants.

##### **4.2.2.2.1 Inter-Level Comparisons of Determinants**

To gain insight into how the levels of the Social-Ecological Model (personal, interpersonal, community, and organizational) compared with each other in terms of the socioeconomic and spatial determinants, survey (administered through Qualtrics) participants were asked – without reference to any particular level – to specify the three

principal barriers to access that they perceived or had experienced. The levels of the Social-Ecological Model at which the barriers to access were most pervasive were revealed.

As seen in Table 10, “Stigma around sexually transmitted infections” accounted for 24.9% (n=236) of responses. The next most significant barrier pertained to the intimidating nature of healthcare spaces (n=157, 16.5%). The third (n=100, 10.5%) most-mentioned barrier pertained to the potential feelings of uneasiness associated with accessing resources. Neither financial barriers nor the nature of sexual health education in schools had appreciable influence on access (n=1, 0.1% for both variables).

**Table 10: Inter-level comparisons of determinants of access**

<b>Barriers</b>	<b>Related Social-Ecological Model Level</b>	<b>Frequency</b>	<b>Percentage</b>
Stigma around sexually transmitted infections	Interpersonal	236	24.9
Intimidating healthcare spaces	Organizational	157	16.5
Anxiety	Personal	100	10.5
Believe I will not contract sexually transmitted infections	Personal	88	9.3
Restrictive hours of operation	Organizational	69	7.3
Do not hear a lot, so less influenced	Organizational	58	6.1
Healthcare not youth-focused	Organizational	56	5.9
Transportation System unreliable	Community	52	5.5
Minimal knowledge of sexually transmitted infections and resources	Personal	51	5.4
Facilities Too far	Community	48	5.1
Unreliable online resources	Organizational	20	2.1
The weather in Calgary	Community	12	1.3

<b>Barriers</b>	<b>Related Social-Ecological Model Level</b>	<b>Frequency</b>	<b>Percentage</b>
Financial Barrier	Personal	1	0.1
Fear-based health education	Organizational	1	0.1
Total		949	100

#### **4.2.2.2.2 Intra-Level Comparison of Determinants of Access**

This section reports on and compares barriers that are more specific to each of the four levels of the Social-Ecological Model (personal, interpersonal, community, and organizational). The fear of being judged was the most (n=98, 25.7%) cited personal-level determinant of access among the 382 participants. The second most cited barrier by youth, irrespective of the median household income status of the communities in which they resided, was limited access to financial resources (n=78, 20.4%). Furthermore, 15.7% (n=60) of participants would not access resources since they felt uncomfortable using sexual health resources (Table 11).

**Table 11: Personal-level barriers to access to preventive resources**

<b>Barriers</b>	<b>Frequency</b>	<b>Percent</b>
Fear of being judged	98	25.7
Limited access to financial resources needed to be able to use resources	78	20.4
Feeling uncomfortable using sexual health resources	60	15.7
No barrier	56	14.7
Not knowing how and where to access resources	49	12.8
Belief that I cannot contract a sexually transmitted infection	19	5.0
Not being aware that I could be at risk of contracting a sexually transmitted infection	19	5.0
Heat of the moment	1	0.3

<b>Barriers</b>	<b>Frequency</b>	<b>Percent</b>
Occupied with work	1	0.3
Transportation issues	1	0.3
Total	382	100

At the interpersonal level, the tendency for family members of youth to judge them (call them promiscuous) was most alluded to as a barrier (n=143, 37.4%). The fact that no family members or friends talked about sexual health issues was the second most mentioned barrier (n=73, 19.1%). Nineteen percent of youth were hindered by no barriers (Table 12).

**Table 12: Interpersonal-level barriers to access to preventive resources**

<b>Barriers</b>	<b>Frequency</b>	<b>Percent</b>
Family members will judge me	143	37.4
If my partner does not trust me	63	16.5
If no family member or friend talks about sexual health issues	73	19.1
No barrier	74	19.4
Stigma	1	0.3
Trustworthy partner	1	0.3
Other - Being judged by healthcare providers	1	0.3
Family members and providers will judge me and think I am promiscuous	1	0.3
One partner that is tested	1	0.3
Shame strategies by my friends	24	6.3
Total	382	100

The organizational-level determinant that was alluded to the most by survey participants was the silence around sexually transmitted infections (n=142, 37.2%). Mention was also made of the fact that sexual health clinics had restrictive hours of

operation (n=74, 19.4%) and were also not youth-friendly (n=67, 17.5%) (Table 13).

Further, a little under 50% (43.5%, n=10) of youth who had lived in Calgary for less than 1 year referred to the silence on the part of sexual health providers as a barrier as compared to the 37% (n=132) of those who had lived in Calgary for more than one year.

**Table 13: Organizational-level barriers to access to preventive resources**

Barriers	Frequency	Percent
There is too much silence about sexually transmitted infections <sup>72</sup>	142	37.2
Restrictive sexual health clinic or hospital hours of operation	74	19.4
Sexual health clinics and services are not youth-friendly	67	17.5
No barrier	60	15.7
Sexual health policies and programs are discriminatory <sup>73</sup>	14	3.7
Less influential preventive campaigns by Alberta Health Services	11	2.9
Online information by Alberta Health Services is shame-based	11	2.9
Embarrassing nature of services	1	0.3
Judgement from health providers	1	0.3
Long wait times	1	0.3
Total	382	100

The most indicated community-specific geographical barrier was, “As far as I know, there are no resources around where I live” (33.8 %, n=129). Moreover, participants who did not know if there were any resources around where they lived were recorded as the highest percentage of non-users (36.8%, n=82). This was followed by “It

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<sup>72</sup> Silence on the part of public health organizations is what is being reported here.

<sup>73</sup> The specific variable(s) (age, sex, etc.) upon which discrimination is based upon was not specified in the question.

takes too much time to travel to service providers” (n=100, 26.2%) (Table 14). 36.8% (n=32) of racialized females alluded to the “As far as I know, there are no resources around where I live” barrier as compared to 33.5% (n=91) of non-racialized females who reported the same barrier. Also, 30% (n=3) of racialized males alluded to the “As far as I know, there are no resources around where I live” barrier as compared with the 23.1% of non-racialized males (Appendix Q).

**Table 14: Community-level barriers to access to preventive resources**

<b>Barriers</b>	<b>Frequency</b>	<b>Percent</b>
As far as I know, there are no resources around where I live	129	33.8
It takes too much time to travel to service providers	100	26.2
No barrier	78	20.4
Facilities are too close to my neighborhood thereby potentially hindering privacy	44	11.5
It is not closer to any means of affordable transportation	29	7.6
Can just read about it online	1	0.3
Resources aren't very private	1	0.3
Total	382	100

Moreover, when participants were asked to identify what they generally thought were the main Calgary-specific barriers (while keeping Southwest Calgary in mind), 27.2% (n=104) of them recalled that social conservativeness of the community hindered frequent talks about sexual health issues. In addition, the participants who revealed the social conservativeness of Calgary as a barrier accounted for 30% (n=67) of non-users. The next determinant had to do with resources being too far apart (n=62, 16.2%) (Table 15).

**Table 15: Calgary-specific barriers to access**

<b>Barriers</b>	<b>Frequency</b>	<b>Percent</b>
Conservative community, so they don't talk about sexual health issues frequently	104	27.2
Difficulty traveling during winter	57	14.9
Facilities are not close to train line and bus stops	53	13.9
No barrier	57	14.9
All of these (conservativeness, travelling hurdles in winter, facilities far from transit stops)	3	0.8
I am unfamiliar with the area	1	0.3
Lack of awareness	1	0.3
Long wait times	2	0.5
No idea	1	0.3
Not sure where facilities are	1	0.3
Stigma	1	0.3
Racial differences prevent conversations about sexual health	11	2.9
Services and facilities are too far apart	62	16.2
Unreliable public modes of transportation	28	7.3
Total	382	100

#### **4.2.2.3 Comparison of Barriers within Social Variables**

A summary of the relationships among the social variables in Table 1 and the main personal-, interpersonal-, organizational-, and community-level barriers are described in this section. The percentages within the social variables are indicated here, and are not based on the overall sample size of 382, but rather on the frequencies of the variables in Table 1.

#### 4.2.2.3.1 Gender Differences

**Table 16: Principal barriers within gender**

	<b>Barrier</b>	<b>Female</b>		<b>Male</b>	
Personal-Level	Fear of Being Judged	94	26.2%	4	17.4%
Interpersonal-Level	Family would Think I am Promiscuous	140	39%	3	13%
Organizational-Level	Silence about Sexually Transmitted Infections	136	37.9%	6	26.1%
Community-Level	Absence of Resources around Neighborhood	123	34.3%	6	26.1%

As revealed in Table 16, the proportion of females who alluded to the principal barriers surpassed the proportion of males who reported the same determinants. For instance, the “fear of being judged” was reported by a higher proportion of female (n=94, 26.2%). Also, a greater proportion of females (n=140, 39%) were more likely than males to be deterred from accessing resources because their family members would think that they were promiscuous.

#### 4.2.2.3.2 Age Differences

**Table 17: Principal barriers within age cohorts**

	<b>Barrier</b>	<b>15-19 Years</b>		<b>20-24 Years</b>	
Personal-Level	Fear of Being Judged	41	27.9%	57	24.3%
Interpersonal-Level	Family would Think I am Promiscuous	66	44.9%	77	32.8%
Organizational-Level	Silence about Sexually Transmitted Infections	56	38.1%	86	36.6%
Community-Level	Absence of Resources around Neighborhood	52	35.4%	77	32.8%

As revealed in Table 17, the “fear of being judged” was reported by a higher proportion of teenagers (n=41, 27.9%). Also, a greater proportion of teenagers (n=66, 44.9%) were more likely than young adults to be deterred from accessing resources because their family members would think that they were promiscuous. Furthermore, the silence about sexually transmitted infections was more likely to hinder teenagers (n=56, 38.1%) than young adults. Finally, the proportion of teenagers who cited the absence of resources around their neighborhoods as a barrier was 35.4% (n=52) as compared to 32.8% (n=77) for young adults.

#### 4.2.2.3.3 Racial Differences

**Table 18: Principal barriers within racial identity**

	<b>Barrier</b>	<b>Non-racialized</b>		<b>Racialized</b>	
Personal-Level	Fear of Being Judged	77	27%	21	21.6%
Interpersonal-Level	Family would Think I am Promiscuous	109	38.2%	34	35.1%
Organizational-Level	Silence about Sexually Transmitted Infections	104	36.5%	38	39.2%
Community-Level	Absence of Resources around Neighborhood	94	33%	35	36.1%

Twenty-seven percent (n=77) of non-racialized youth reported “Fear of being judged” as a barrier as compared to 21.6% (n=21) of racialized youth. Similarly, the proportion of non-racialized (n=109, 38.2%) who feared that their family members would think they were promiscuous was just a bit higher than the proportion of racialized youth who reported the same barrier. The proportion of racialized youth (n=38, 39.2%) who reported silence around sexually transmitted infections was slightly higher than the proportion of non-racialized who reported the same barrier. Finally, the proportion of racialized youth (n=35, 36.1%) who mentioned the absence of resources around their neighborhood was faintly higher than the proportion of non-racialized who reported the same barrier (Table 18).

#### 4.2.2.3.4 Relationship Status Differences

**Table 19: Most significant barriers within relationship status**

		<b>Fear of Being Judged</b>	<b>Family would Think I am Promiscuous</b>	<b>Silence about Sexually Transmitted Infections</b>	<b>Absence of Resources around Neighborhood</b>
Single	Value	49	60	104	54
	%	30.1	36.8	36.5	33.1
Dating	Value	42	70	59	53
	%	24.9	41.4	34.9	31.4
Complicated <sup>74</sup>	Value	0	4	5	5
	%	0	44	55.6	55.6
Common-Law	Value	7	7	10	14
	%	21.9	21.9	31.3	43.8
Engaged	Value	0	0	0	0
	%	0	0	0	0
Married	Value	0	1	0	3
	%	0	14.3	0	42.9
Separated	Value	0	1	0	0
	%	0	100	0	0

As indicated in Table 19, the most significant barriers differed within the various levels of relationship statuses. The proportion of single youth (n=49, 30.1%) who reported “Fear of being judged” as a barrier was higher as compared to the proportion of those in other types of relationships who reported the same barrier. Further, the proportion of youth in “complicated” relationships (n=4, 44.4%) who feared that their family members would think they were promiscuous was higher as compared to the

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<sup>74</sup> Partners are not sure what they want, or of the future of the relationship.

proportion of most of those the other types of relationships who reported the same barrier; the only person in a “separated” relationship who participated in the survey also feared that their family would think that they were promiscuous. The proportion of participants in “complicated” relationships (n=5, 55.6%) who reported silence around sexually transmitted infections was greater as compared to the proportion of most of those in the other types of relationships who reported the same barrier. Although they were not many, none of the engaged, married, or separated youth saw silence as a barrier. Finally, the proportion of participants in “complicated” relationships (n=5, 55.6%) who mentioned the absence of resources around their neighborhood was greater as compared to the proportion of those in other types of relationships who reported the same barrier.

#### 4.2.2.3.5 Highest Level of Education Differences

**Table 20: Percentage of most significant barriers within level of education**

Barrier	Junior High		Senior High		University /College		Trade/ Apprenticeship	
	Value	%	Value	%	Value	%	Value	%
Fear of Being Judged	20	28.6	57	27	19	22.6	2	11.8
Family would Think I am Promiscuous	31	44.3	77	36.5	31	36.9	4	23.5
Silence around Sexually Transmitted Infections	22	31.4	86	40.8	28	33.3	6	35.3
Absence of Resources around Neighborhood	22	31.4	73	34.6	27	32.1	7	41.2

As indicated in Table 20, the most significant barriers differed within the various levels of education. The proportion of junior high school graduates (n=20, 28.6%) who reported “Fear of being judged” as a barrier was higher as compared to the proportion of the other levels of education who reported the same barrier. Similarly, the proportion of junior high school graduates (n=31, 44.3%) who feared that their family members would think they were promiscuous was higher as compared to the proportion of the other levels of education who reported the same barrier. The proportion of senior high school graduates (n=86, 40.8%) who reported silence around sexually transmitted infections was greater as compared to the proportion of the other levels of education who reported the same barrier. Lastly, the proportion of a trade or apprenticeship program graduates (n=7, 41.2%) who mentioned the absence of resources around their neighborhood was greater as compared to the proportion of the other levels of education who reported the same barrier.

#### **4.2.2.4 Social Media and Sexual Activities**

This section reports on the views of youth regarding the possible links between the use of social media / dating applications and risky sexual activity. Many (n=170, 44.5%) survey participants were of the opinion that dating applications influenced sexual activities to a very great extent. Only 5 (1.3%) participants opined that social media did not impact sexual activities (Table 21).

**Table 21: Views of youth on the extent of influence of social media on sexual activities**

				<b>It has no influence at all</b>	<b>No response</b>	<b>To a minimal extent</b>	<b>To a moderate extent</b>	<b>To a very great extent</b>	<b>Total</b>
15-19 yrs.	Gender of Participant	Female	Count	1	22	9	49	52	133
			% within Gender of Participant	0.8%	16.5%	6.8%	36.8%	39.1%	100%
		Male	Count	0	4	3	2	5	14
			% within Gender	0.0%	28.6%	21.4%	14.3%	35.7%	100%
	Total	Count		1	26	12	51	57	147
		% within Gender		0.7%	17.7%	8.2%	34.7%	38.8%	100%
20-24 yrs.	Gender of Participant	Female	Count	4	26	18	69	109	226
			% within Gender	1.8%	11.5%	8.0%	30.5%	48.2%	100%
		Male	Count	0	4	0	1	4	9
			% within Gender	0.0%	44.4%	0.0%	11.1%	44.4%	100%
	Total	Count		4	30	18	70	113	235
		% within Gender		1.7%	12.8%	7.7%	29.8%	48.1%	100%
Total	Gender of Participant	Female	Count	5	48	27	118	161	359
			% within Gender	1.4%	13.4%	7.5%	32.9%	44.8%	100%
		Male	Count	0	8	3	3	9	23
			% within Gender	0.0%	34.8%	13.0%	13.0%	39.1%	100%
	Total	Count		5	56	30	121	170	382
		% within Gender		1.3%	14.7%	7.9%	31.7%	44.5%	100%

Further, 38.8% (n=57) of teenagers and 48.1% (n=113) of young adults indicated that social media influenced youth to engage in sexual activities. When asked to comment on how social media influenced risky sexual activities, the three major responses youth

gave included: “hooking up through social media is fast and unrestricted” (n=128, 33.5%); “hooking up with as many partners as they wish is easy” (n=93, 24.3%); and “the location features on some dating apps could make it easier for youth to arrange quick casual sexual encounters” (n=55, 14.4%) in that order (Figure 2).

			All of the above.	Apps don't tell youth the risk they could be at	Hooking up is fast and unrestricted	Hooking up with as many partners as they wish is easy	It exposes youth to sexually arousing content	It promotes sexual exploitation	Easy for people to hide their sexual health history	No Response	Speaking about safe sex with strangers	The location features, so easy to arrange quick casual sexual encounters	Youth can keep their sexual encounters private	Total
15-19 yrs	Female	Count			52	28	4			28		15	6	133
		% within Gender			39.1%	21.1%	3.0%			21.1%		11.3%	4.5%	100.0%
	Male	Count			3	5	0			4		2	0	14
		% within Gender			21.4%	35.7%	0.0%			28.6%		14.3%	0.0%	100.0%
		Count			55	33	4			32		17	6	147
		% within Gender			37.4%	22.4%	2.7%			21.8%		11.6%	4.1%	100.0%
20-24 yrs	Female	Count	1	1	72	58	2	1	3	37	1	37	13	226
		% within Gender	0.4%	0.4%	31.9%	25.7%	0.9%	0.4%	1.3%	16.4%	0.4%	16.4%	5.8%	100.0%
	Male	Count	0	0	1	2	0	0	0	4	0	1	1	9
		% within Gender	0.0%	0.0%	11.1%	22.2%	0.0%	0.0%	0.0%	44.4%	0.0%	11.1%	11.1%	100.0%
		Count	1	1	73	60	2	1	3	41	1	38	14	235
		% within Gender	0.4%	0.4%	31.1%	25.5%	0.9%	0.4%	1.3%	17.4%	0.4%	16.2%	6.0%	100.0%
Total	Female	Count	1	1	124	86	6	1	3	65	1	52	19	359
		% within Gender	0.3%	0.3%	34.5%	24.0%	1.7%	0.3%	0.8%	18.1%	0.3%	14.5%	5.3%	100.0%
	Male	Count	0	0	4	7	0	0	0	8	0	3	1	23
		% within Gender	0.0%	0.0%	17.4%	30.4%	0.0%	0.0%	0.0%	34.8%	0.0%	13.0%	4.3%	100.0%
		Count	1	1	128	93	6	1	3	73	1	55	20	382
		% within Gender	0.3%	0.3%	33.5%	24.3%	1.6%	0.3%	0.8%	19.1%	0.3%	14.4%	5.2%	100.0%

**Figure 2: Views of youth about how social media could influence risky sexual activities**

Even though survey participants admitted that social media also impacted their knowledge about preventive resources for sexually transmitted infections, a majority (n=152, 39.8%) of them declared that, unlike the extent to which social media induced

sexual activities, it only moderately impacted their knowledge about preventive resources. Twenty-four (6.3%) survey participants stated that social media had had no impact at all their knowledge about preventive resources (Table 22).

**Table 22: Views of youth about the extent of social media impact on knowledge about prevention**

<b>The extent of Social Media Impact on Knowledge about Prevention</b>	<b>Frequency</b>	<b>Percent</b>
No impact at all	24	6.3
No comment	55	14.3
To a minimal extent	30	7.9
To a moderate extent	152	39.8
To a very great extent	122	31.9
Total	382	100

Almost half (n=183, 47.9%) of all survey participants thought that it would be a great idea to send automatic sexually transmitted infection prevention-relevant reminders to users of dating apps after they had confirmed a hook-up, since people tend to forget quickly. In contrast, 22.8% (n=87) of survey participants were against automatic test reminders, which they viewed as invasive and falsely-assuming, since people who connect through social media dating apps do not always end up having sex (

Table 23).

**Table 23: Views of youth on automatic test reminder on dating applications**

				<b>It does not really matter to me</b>	<b>It would be a great idea since people tend to easily forget</b>	<b>It would be too invasive and falsely-assuming since people don't always end up having sex</b>	<b>No response</b>	<b>Total</b>
15-19 years	Gender	Female	Count	19	64	23	27	133
			% within Gender of Participant	14.3%	48.1%	17.3%	20.3%	100%
		Male	Count	3	2	5	4	14
			% within Gender	21.4%	14.3%	35.7%	28.6%	100%
	Total	Count	22	66	28	31	147	
		% within Gender	15.0%	44.9%	19.0%	21.1%	100%	
20-24 years	Gender	Female	Count	25	116	56	29	226
			% within Gender	11.1%	51.3%	24.8%	12.8%	100%
		Male	Count	1	1	3	4	9
			% within Gender	11.1%	11.1%	33.3%	44.4%	100%
	Total	Count	26	117	59	33	235	
		% within Gender	11.1%	49.8%	25.1%	14.0%	100%	
Total	Gender	Female	Count	44	180	79	56	359
			% within Gender	12.3%	50.1%	22.0%	15.6%	100%
		Male	Count	4	3	8	8	23
			% within Gender of Participant	17.4%	13.0%	34.8%	34.8%	100%
	Total	Count	48	183	87	64	382	
		% within Gender	12.6%	47.9%	22.8%	16.8%	100%	

### **4.3 Spatial Analysis of Survey and Administrative Data**

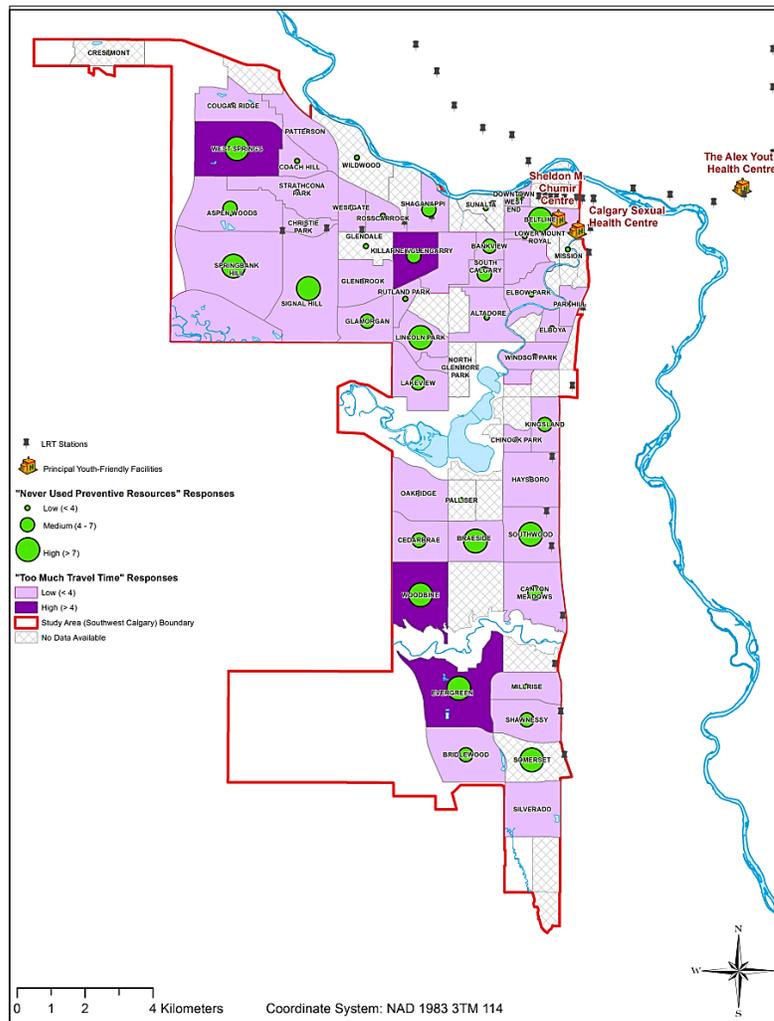
The spatial patterning of preventive resource non-use and its relationship to the location of the most mentioned resources (Centre for Sexuality, Sheldon M. Chumir Centre, and The Alex Youth Health Centre) are reported in this section. In addition, the spatial distribution of the most significant geographic barriers and the spatial relationship among those barriers and neighborhood-level characteristics are reported. Only those communities for which barriers and non-use of facilities were reported are presented.

#### **4.3.1 Spatial Distribution of Barriers per Community**

Excessive travel time was mostly reported as a barrier by youth who resided on the western segments of Southwest Calgary. High ( $> 4$ )<sup>75</sup> counts of “Too much travel time” responses were observed on the western portion of the north and the western border of the south. Two separate instances were also observed in the west-central portion of the north and the middle portion of the south. No high “Too much travel time” response was documented for any of the communities on the easterly segment (Figure 3).

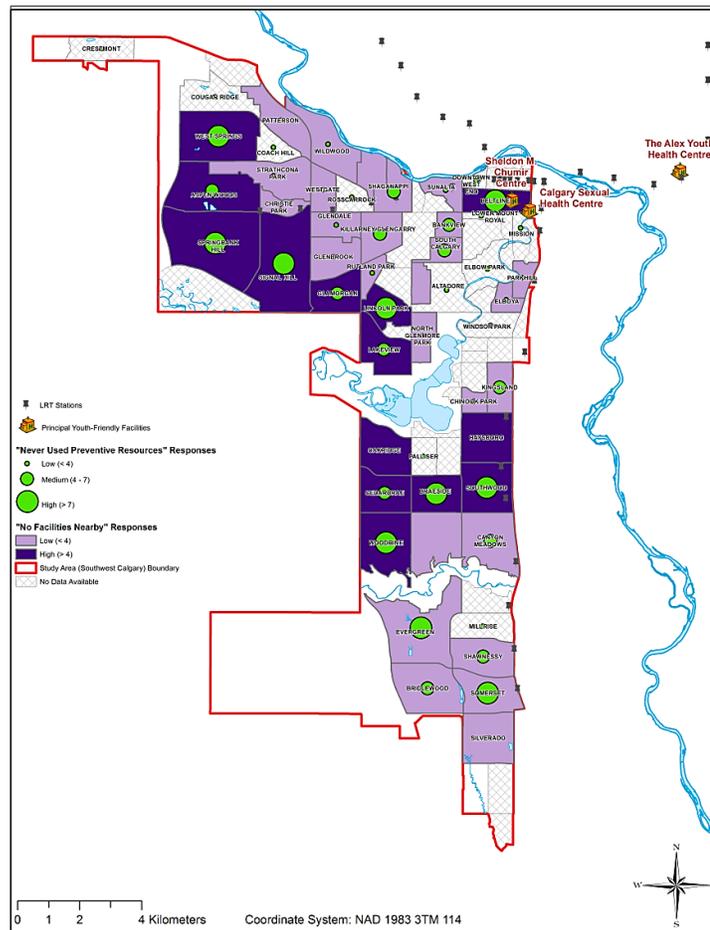
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<sup>75</sup> Unless otherwise indicated, these values are non-normalized (raw values) counts, since the count (not rate) of non-use per community and how much each community contributed to the total non-use reported are of interest here. Although fairly low numbers were produced after the variables were broken down by neighbourhoods, they are still helpful in showing that there were different resource access patterns. Class breaks were automatically determined using the Natural Breaks classification method in ArcGIS.



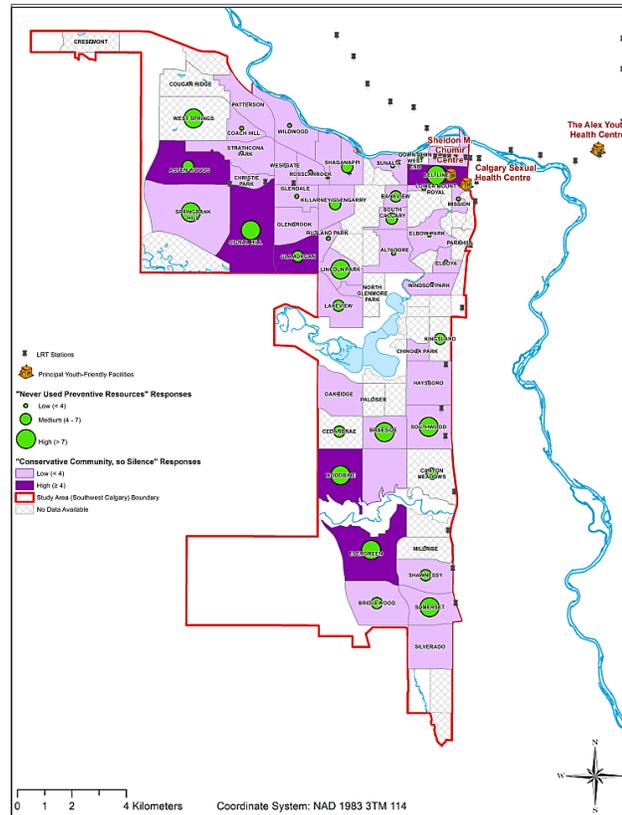
**Figure 3: Relationship between travel time and resource non-use**

Most (10 of 14) of the communities with high counts of “No facilities nearby” responses were observed in the western half of the study area, with most (5) of those (10) western cases concentrated in the northwest. Whereas only one (1) of the remaining four (4) high “No Facilities Nearby” responses was in the central portion, the other three (3) were observed on the eastern portion (Figure 4).



**Figure 4: Relationship between facility proximity and resource non-use**

More than half (66.7%) of the communities where “Conservative community, so silence”<sup>76</sup> was high ( $\geq 4$ ) also had high preventive resource non-use. Moreover, high “Conservative community, so silence” responses were mostly (4 of 6) observed in communities on the western parts of the study site ( Figure 5).



**Figure 5: Relationship between silence and resource non-use**

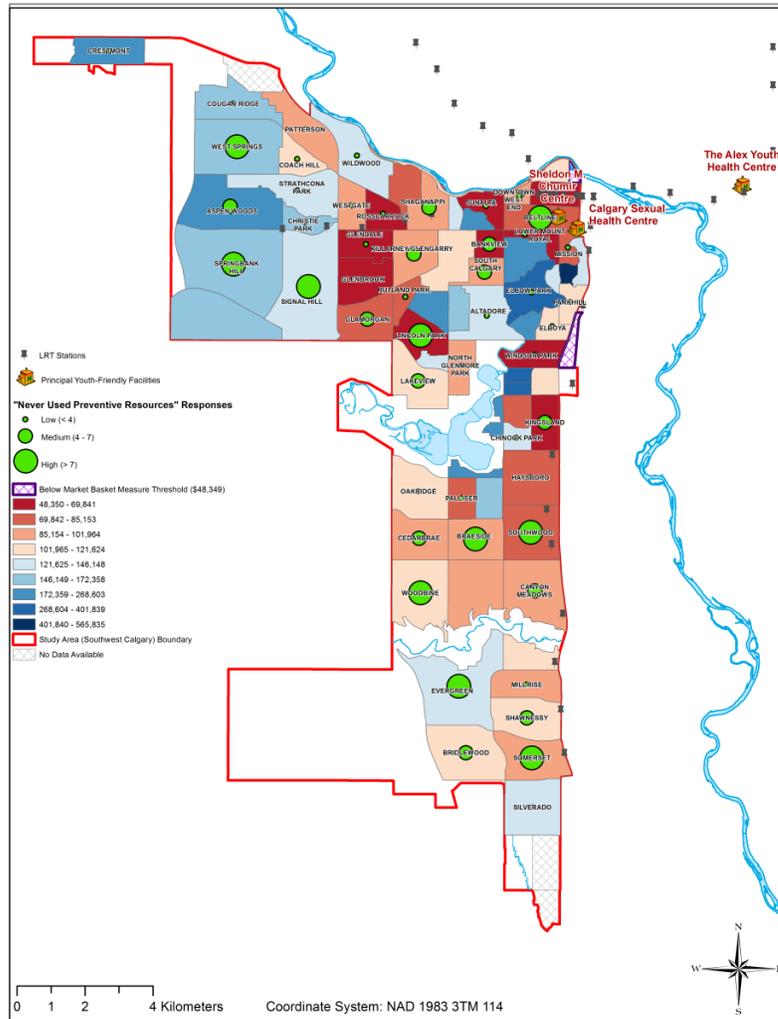
<sup>76</sup> See Appendix L for ethnic and economic profile of the communities with high “Conservative community, so silence” counts.

### **4.3.2 Spatial Analysis of Facility Non-Use and Social Determinants**

“Never Used Preventive Facility” (also non-use) denotes the count of youth who had never used any preventive facility. This variable was subdivided into three classes: high (>7 responses), medium (4-7 responses), and low (< 4). Five (5) of the ten (10) high counts of facility non-use were detected in communities on the western half of the study area - the northwest section accounted for three (3) of the five (5) high counts while the other two (2) were observed in Lincoln Park and Woodbine. Instances of reported high facility non-use were also spotted in three (3) communities in the eastern half and two (2) communities in the central portion of the southern half of the study area.

#### **4.3.2.1 Income Distribution and “Never Used Preventive Facility”**

Income insecurity was defined as a Median Household Income (based on 2016 census of Canada figures) that was less than \$48,349, the 2018 Market Basket Measure threshold for a four-person family in Calgary. Considering that the lowest Median Household Income was \$36,443, Manchester (\$36,722) was the only community below the poverty line. However, none of the 60 communities where resource non-use was reported had a median household income below \$48,349. Moreover, high resource non-use was recorded for relatively high-income (Springbank Hill, West Springs) and relatively low-income (Lincoln Park, Beltline, Southwood) neighborhoods alike. The spatial relationship between income and resource use was therefore arbitrary, thereby making it difficult to define a clear-cut association between them (Figure 6).



**Figure 6: Relationship between household income and resource non-use**

#### 4.3.2.2 Unemployment Rate and “Never Used Preventive Facility”

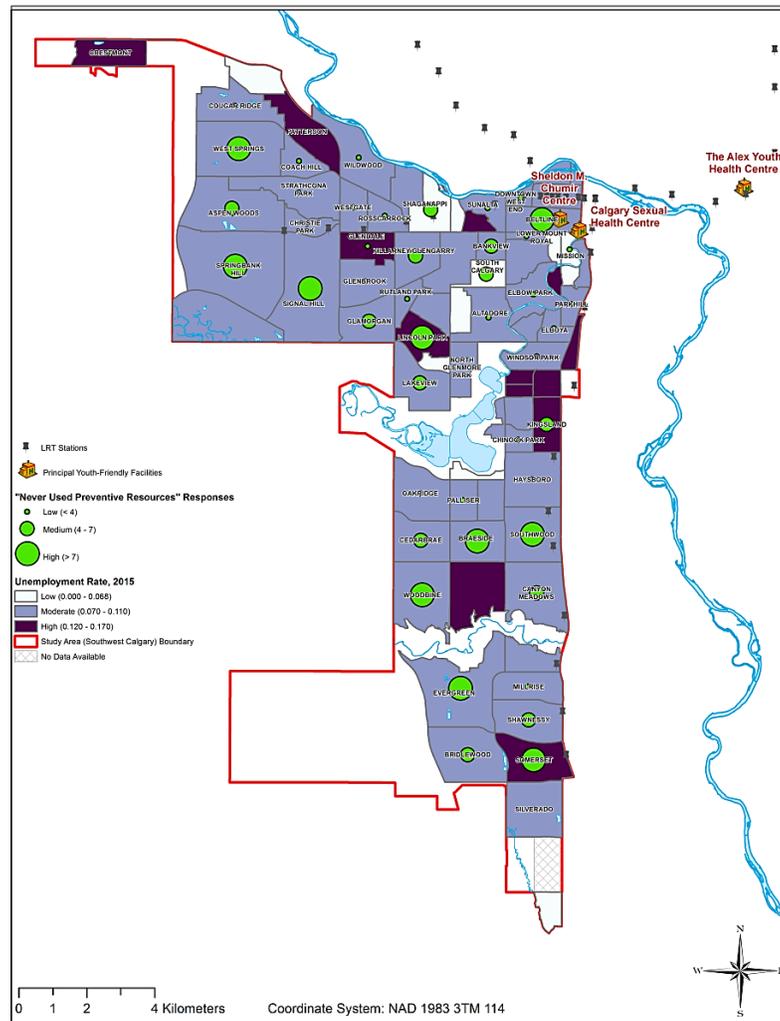
Based on the 2015<sup>77</sup> unemployment rate of 0.069<sup>78</sup>, unemployment was subdivided<sup>79</sup> into three (3) rate classes: low (0.000-0.068), moderate (0.070-0.110), and high (0.120-0.170). Most (8) of the (10) communities where the high non-use was reported had moderate unemployment rates. Lincoln Park and Somerset were the only two communities where a high unemployment rate intersected with the highest rate of “Never Used Preventive Facility”, although no instance of the highest rate of facility non-use was detected in any of the communities where the unemployment rate was low (Figure 7).

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<sup>77</sup> The 2015 national unemployment rate was used because the Calgary-wide unemployment rates data that were available during the data analysis were for 2015.

<sup>78</sup> <https://www.statista.com/statistics/578362/unemployment-rate-canada/>

<sup>79</sup> Based on a Natural Breaks-based (natural groupings inherent in the data) Manual classification method.

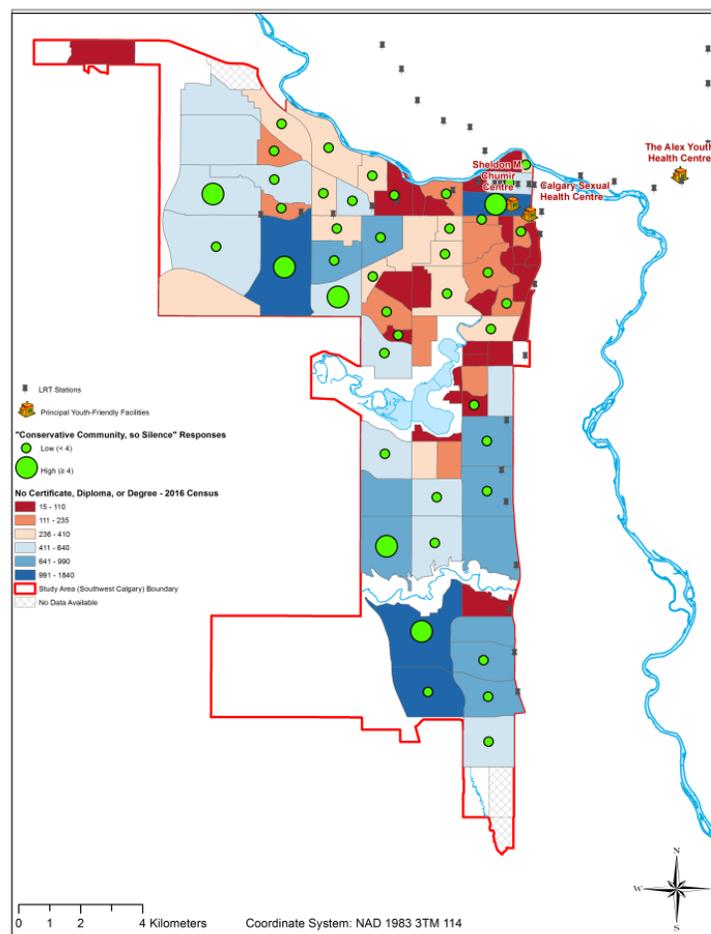


**Figure 7: Relationship between unemployment rate and resource non-use**

#### 4.3.2.3 Educational Attainment, Silence, and Non-Use

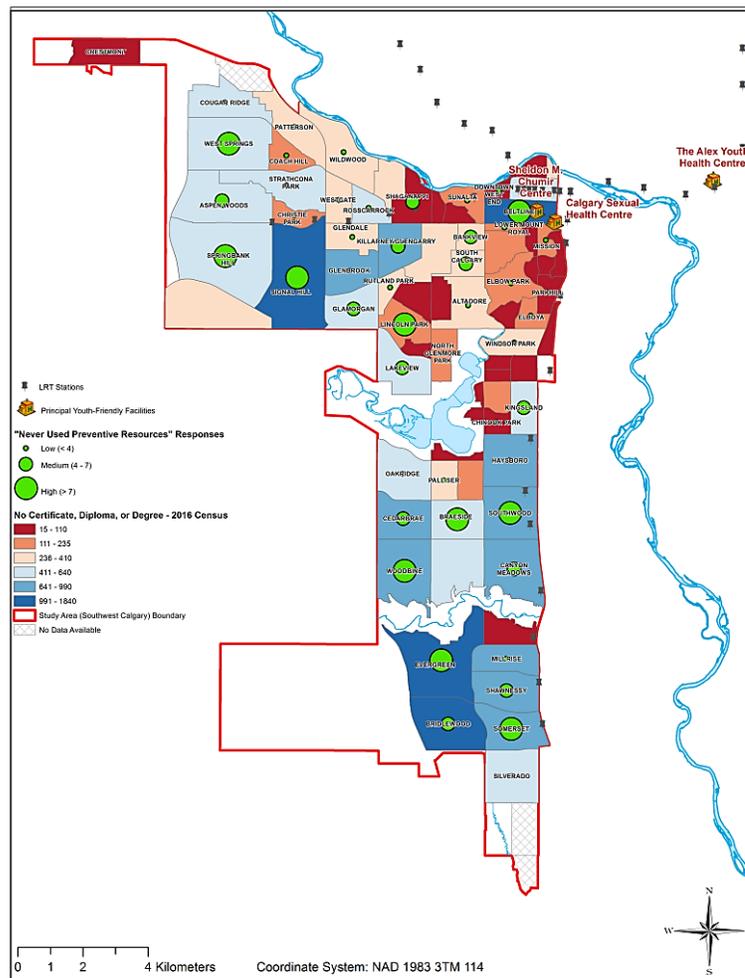
High (>4) occurrences of silence about sexually transmitted infections were observed in communities that had low educational attainments – areas with high records of “No Certificate, Diploma or Degree” (Based on the 2016 Canadian census data). Four

(4) of the six (6) communities where silence (reportedly due to traditionalist practices) was reported the most were also areas with low educational attainment. The other two (2) occurrences were observed in communities where low educational attainment (641 and above) was moderate. None of the communities with relatively high education attainment (that is 15-110 counts of *No Certificate, Diploma, or Degree*) had a high count of silence (Figure 8).



**Figure 8: Relationship between educational attainment and silence**

Likewise, it was observed that six (6) and three (3) out the ten (10) cases of high (>7) resource non-use were in communities that had the lowest and second-lowest educational attainment, respectively. Only one instance of the highest case of resource non-use was observed in the communities with a higher educational attainment (Figure 9).



**Figure 9: Relationship between educational attainment and resource non-use**

#### **4.3.2.4 Reported Spatial Barriers and “Never Used Preventive Facility”**

Overall, “No facilities nearby” was the barrier that overlapped the most with facility non-use since reported preventive resource non-use intersected spatially with “No facilities nearby” responses than it did with other place-based barriers. Eight (8) of the ten (10) counts of the highest “Never Used Preventive Facility” responses occurred in communities where “No facilities nearby” was similarly high (Figure 4).

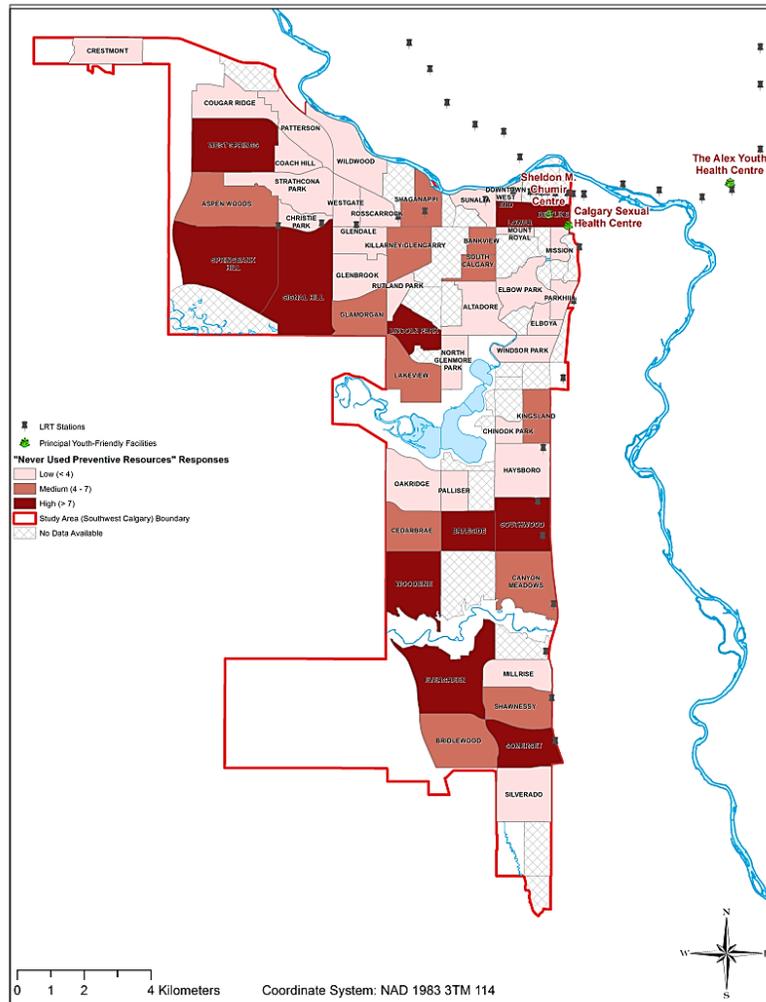
On the other hand, only three (3) of the ten (10) counts of the highest “Never Used Preventive Facility” responses occurred in communities where “Too much travel time” was high (Figure 3), and only four (4) of the (10) instances of the high “Never Used Preventive Facility” responses occurred in communities where silence was reported as a barrier (Figure 5).

#### **4.3.3 Youth-Friendly Facilities, Transit, and Communities with High Barriers**

Two (2) (Centre for Sexuality and Sheldon M. Chumir Centre) of the seven (7) sexually transmitted infection preventive facilities mentioned by youth intersected with Beltline, a community with comparatively low median household income (Figure 10).



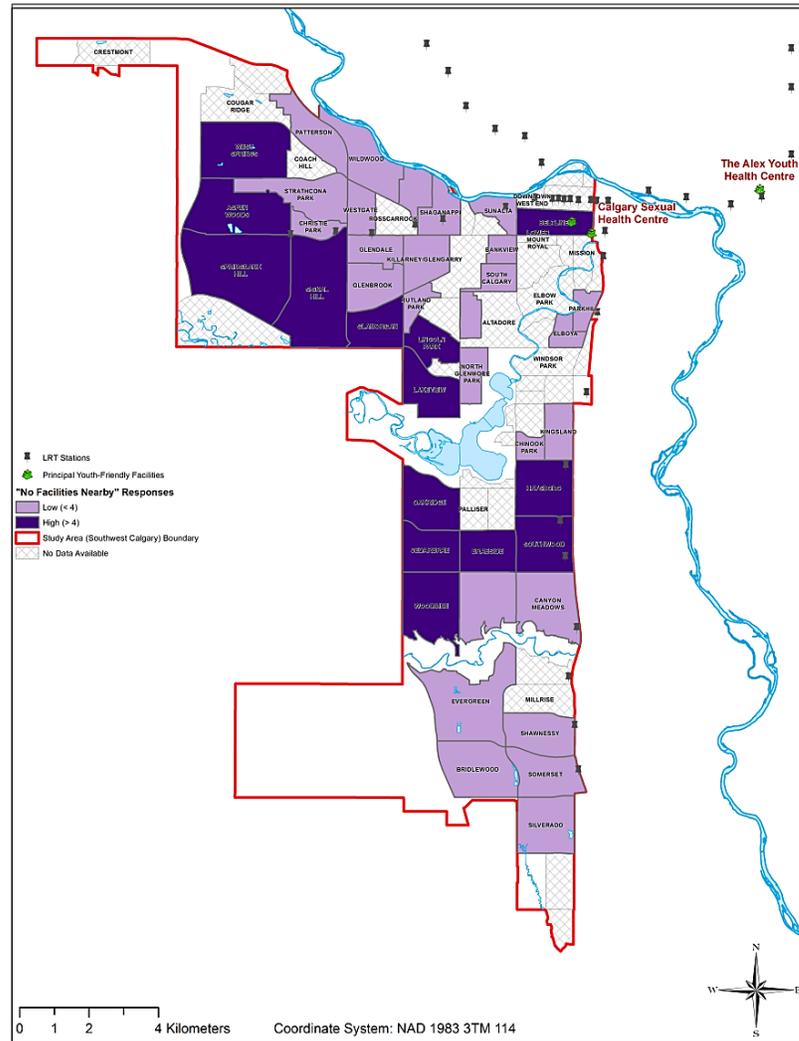
The preferred facilities (Centre for Sexuality, Sheldon M. Chumir Centre, and The Alex Youth Health Centre) were also situated within 1 km of an LRT station (Figure 11).



**Figure 11: Relationship between resource non-use and location of facilities**

Furthermore, as shown in Figure 12, most of the communities for which “No Facilities Nearby” responses were high were observed on the extreme opposite side (northwest and towards the southwest) of where the facilities were located. One notable

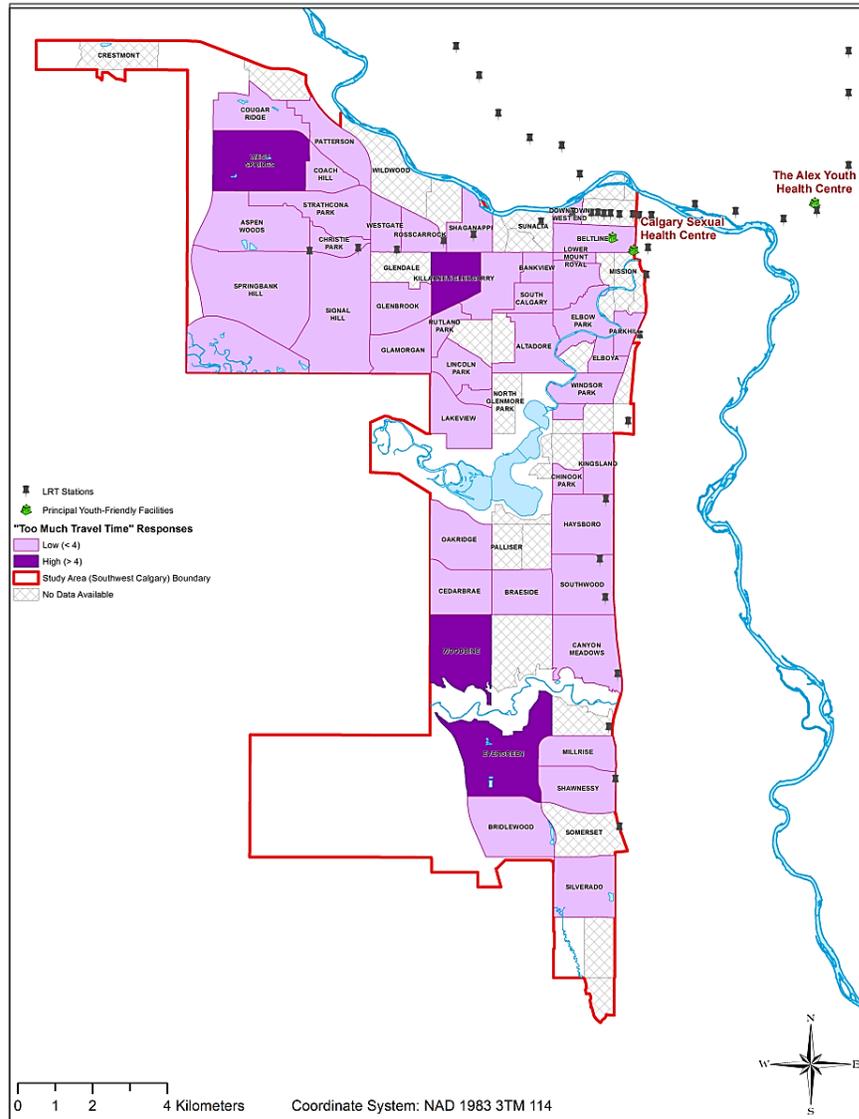
observation is that Beltline, a community in the northeastern portion, had a high “No Facilities Nearby” response, although two of the three facilities were within approximately 1.3 km<sup>80</sup> of its location.



**Figure 12: Location of sexual health facilities in relation to “no facilities nearby”**

<sup>80</sup> Unless otherwise mentioned, distances are based on Euclidean distance.

Similarly, apart from Killarney/Glengarry, all the other three high “Too Much Travel Time” communities were in the extreme northwest or towards the extreme south (Figure 13).



**Figure 13: Location of sexual health facilities in relation to travel time**

Furthermore, Table 24<sup>81</sup> shows the straight-line distances between any of the existing sexual health facilities and the communities where high counts of non-use intersected with high counts of one or both proximity-related barriers, “No Facilities Nearby” or “Too Much travel Time. Six (6) (Braeside, Southwood, Evergreen, Springbank Hill, West Springs, and Woodbine) of the nine (9) communities were at least 10 km (average distance) away from the preventive facilities.

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<sup>81</sup> The travel times were arrived at using the *Directions* tool in Google (<https://www.google.com/maps/dir///@39.949338,-75.1968216,18z/data=!4m2!4m1!3e3>). The current travel times were extracted in March 2021 and are subject to change. Transit travel times were used because it was assumed that most youth depend on public transit.

**Table 24: Distance between communities and facilities**

	Maximum Euclidean Distance (km) to Calgary Sexual Health Centre	Maximum Euclidean Distance (km) to Sheldon M. Chumir Centre	Maximum Euclidean Distance (km) to The Alex Youth Health Centre	Average Euclidean Distance to Facility (km)	Euclidean Distance (km) to Nearest Facility	Minimum Transit Travel Time (google maps) to Nearest Facility on Weekday	Minimum Transit Travel Time (google maps) to Nearest Facility on Weekend
Beltline	1.2	0.6	6	2.6	0.6	8 minutes	8 minutes
Braeside	9.8	9.9	13.1	10.9	9.8	31 minutes	49 minutes
Evergreen	14.1	14.2	17.1	15.1	14.1	53 minutes	60 minutes
Lincoln Park	5.7	5.5	10.5	7.2	5.5	39 minutes	31 minutes
Signal Hill	8.2	7.7	13.2	9.7	7.7	48 minutes	50 minutes
Southwood	9.2	9.5	12.1	10.3	9.2	29 minutes	29 minutes
Springbank Hill	10.3	9.7	15.2	11.7	9.7	50 minutes	50 minutes
West Springs	10.3	9.7	15	11.7	9.7	57 minutes	48 minutes
Woodbine	11.8	11.9	15.4	13.0	11.8	53 minutes	55 minutes

#### 4.4 Discussion

The study demonstrates that there are social barriers to accessing preventive sexual health services among youth and that these social barriers have spatial dimensions. If anything has become clear, it is the fact that knowledge of preventive resources has not always translated into the use of preventive resources by youth. It was also clear that some youth, including some sexually active ones, were not using preventive resources.

Possible explanations for this discrepancy are offered in the next few sub-sections.

Moreover, the findings from this study are not unreal as is also evidenced by the results from previous studies, which are referred to in the following sub-sections.

Overall, *Personal* barriers (perceived irrelevance of resources, potential feeling of uneasiness using resources, minimal knowledge of chlamydia, and limited knowledge of preventive resources for sexually transmitted infections); *Interpersonal* barriers (stigma); *Organizational* barriers (silence about sexually transmitted infections on the part of healthcare providers, misleading online information, restrictive hours of operation of sexually transmitted infections clinic, intimidating and youth-unfriendly walk-in clinic services, and vague sexual health education curriculum outcomes); and *Community* barriers (Weather conditions, traditional values, travel distance to facilities, and transportation system) have been well documented by both Canadian and non-Canadian researchers (e.g. Denison et al., 2017; Moore, 2013; Goldenberg et al., 2008b; Marcell et al., 2017; Lys et al., 2019; Woodgate et al., 2017 ; Gombachika et al., 2012 ; Masaro et al., 2012; Morris et al., 2014; Fleming et al., 2020).

A statistically significant relationship was found between age and history of preventive resource use. Specifically, mature minors reported a lower resource use than young adults and vice versa. Moore (2013) found that even when younger students were sexually active, they were less likely to access preventive resources, specifically chlamydia or gonorrhea testing. Also, although female participants outnumbered male

participants, the proportion of male non-users was greater than the proportion of female non-users. This was consistent with past research (Moore, 2013) on sexually transmitted infections. Similarly, Flicker et al. (2009) found male youth to be less likely to visit sexual health services.

Further, the proportion of participants who had lived in Calgary for less than a year and never used any resource was higher as compared to the proportion of those who had lived in Calgary for more than a year and never used any resource. Although organizational silence on sexual health was mentioned more by youth who had resided in Calgary for less than a year than it was mentioned by those who had resided in Calgary for more than a year, the nature of the interaction between the two variables and other external ones could be further explored in the future. Nonetheless, the impact of length of residence on sexual health resources use as well as the positive relationship between them is consistent with a finding from the Toronto Teen Survey (Flicker et al., 2009), which found the length of residence to be associated with the extent to which youth accessed and benefited from sexual health services.

Similar to other studies (Denison et al., 2017; Fleming, 2020, Moore, 2013), the findings suggest that certain youth pay minimal attention to preventive resources, including information about prevention, since they perceive<sup>82</sup> that they are minimally

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<sup>82</sup> According to Levesque (2011), “adolescents’ perceived sense of invulnerability relates to adolescents’ tendency to view themselves as unique (a tendency known as the “personal fable”); and that view of

susceptible (engage in “low-risk” sexual activities or are sexually inactive) to being infected by chlamydia or being seriously harmed by the bacteria, should they get infected. The perception of minimal vulnerability to sexually transmitted infections could be worse when spatial actors and interactions either downplay the significance of sexual health resources or succumb to place-evoked impediments. Disseminating comprehensive sexual health messages is more difficult and complicated in traditional settings than it is in progressive contexts (Lieber et al., 2009) due to the speculation that an external preventive dogma could cause youth to lose their sense of sexual innocence. The repercussion of such difficulties is that potential young users of preventive resources may find it difficult to access resources and engage in meaningful and open conversations that could adequately equip them to recognize and dispel their predisposition to chlamydia. The consequence of such limited sexual health knowledge is that youth might unknowingly underestimate their susceptibility to sexually transmitted infections. This situation points to the need to focus equally on both the social and physical attributes that shape a place (Scannell and Gifford, 2010a, b).

Stigma was the only interpersonal barrier identified by interviewees. Both the inter-level and intra-level survey responses revealed stigma as a significant barrier, although similarly to Denison et al. (2017), the stigma reported was perceived. The findings from this study support the notion that perceptions of stigma and the fear of

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uniqueness includes the belief of being uniquely immune to the consequences that might befall others” (p. 1489).

stigmatization can potentially obstruct access as was also reported by previous studies (Balfe et al., 2010; Coetzee et al., 2011; George and Lambert, 2015; MacLean, 2018). Similar to Denison et al. (2017), who found that stigma prevents people from seeking sexual health resources because it threatened their “social identities” (p. 10), study participants were afraid of being called devaluing names if they were seen using preventive resources for sexually transmitted infections. Contrary to Denise et al. (2017), females in this study were more concerned about being stigmatised than males. Moreover, stigma was more a concern among mature minors than it was a concern among young adults. The most noteworthy personal (fear of being judged) and interpersonal (family would brand participants as promiscuous) level barriers were articulated by a higher proportion of mature minors than young adults. Balfe et al. (2010) found that younger Irish participants had the greatest stigma-related concerns because of the high value they place on the relationships they forge, which is usually due to their desire to “continue to expand their relationship network” (Shumaker et al., 2009, p. 94).

In addition, to maintain their moral identities, social capital, and social bonds (Balfe et al., 2010), mature minors, because they care much about the opinions of others, may resort to trivializing and/or evading honest prevention-appropriate dialogues and resources, which they suspect can give their partners the grounds to accuse them of sleeping around. Ware et al. (2006) similarly discovered that social capital was so essential to HIV-positive participants (30-51-year age group) that they would habitually

do without their antiretroviral therapy to evade social stigma, which could erode their social bonds. While the study participants' demographic profiles differ between this study and that of Ware et al. (2006), their findings also confirm the extent to which social bonds can hinder sexual health. The role of social networks as sources of care and information for sexual and reproductive health has also been identified (Marcell et al., 2017); so if youth are worried that their families might condemn them, then they could be deprived of a valuable source of sexual health information.

On the other hand, the strong bonds that youth form can also enable them to overcome barriers to accessing preventive resources since the support they get from their peers can serve as a shock absorber against the barriers to access. Nonetheless, stigma may weaken these empowering social networks and obstruct the capacity of youth to conquer the barriers. In situations where youth are keen on taking their initiative to use preventive resources, they may end up becoming passive toward those resources once they begin to accept and internalize negative sexual health-related labels. The internalized stigma can even trigger youth not only to delay or ignore preventive resources but also to engage further in other sexual activities (MacLean, 2018; Steward et al., 2013). In addition, since societal values dictate and expect that youth remain sexually inactive (Geibel et al., 2017; Hill, 2010; Nyblade et al., 2009), sexually active mature minors, fear that their family doctors might inform their parents or guardians about their sexual

lifestyles<sup>83</sup> (Cuffe et al., 2016). For example, Morris et al. (2014) found that stigma was manifested through subtle judgmental tactics such as scare and emphases on blameworthiness by providers. The tendency to judge youth also clarifies why some healthcare providers may find it difficult to efficiently initiate and uphold meaningful sexual health conversations with youth and vice versa (Cunningham et al., 2002; Morris et al., 2014).

The findings indicate that traveling by public transit to access preventive services where stigma is minimal could be arduous for some transit-dependent adolescents from certain neighborhoods (Braeside, Evergreen, Signal Hill, Springbank Hill, West Springs, and Woodbine) since they have to travel for exactly or approximately 60 minutes to access the nearest youth-friendly preventive service. Such difficulty is further aggravated during the cold winter season, which is a counterincentive to using public transit among transit-dependent adolescents. Mitigating stigma amid these complex geographical interactions could be difficult since sexual health resource planners may find it difficult to determine if the youth will patronize *geographically convenient* preventive resources in a conservative setting<sup>84</sup> where the risk of stigma might be high or vice versa. This

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<sup>83</sup> This concern is merely speculative since, under the Alberta *Health Information Act*, minors can decline any request to have their information disclosed to their parents as long as they understand such a decision and its consequences.

<sup>84</sup> Social conservatism (family values, moral conservatism) and political factors (e.g. currently, 33 out of the 34 members of parliament from Alberta are conservatives) intertwine (Banack, 2016) to make Alberta the “Canada’s cradle of conservatism” (Wesley, 2011, p. 235). Since political values reflect people’s social contexts (Connors, 2019), the same is true for Southwest Calgary and the rest of Calgary where the majority of elected Members of Parliament and Members of the Legislative Assembly have historically

finding is consistent with findings from a previous Canadian (Fort St. John<sup>85</sup>, British Columbia) study that reports that common barriers (e.g. stigma) to sexual health resource use are exacerbated after interacting with geographical factors such as an unreliable transit system, inconveniently located resources, and unfavorable weather conditions (Goldenberg et al., 2008b).

The silence around sexually transmitted infections was the principal organizational-level (healthcare service-related) barrier identified by survey participants (37.2%). The implication of silence on the sexual health of youth in the United States has been observed by Fullilove et al. (2008) who warned, “if we are unable to engage in a national dialogue about the sexual health of our youths” (para. 10), the burden of sexually transmitted infections will continue to increase.

Moreover, conversations about sexual health in medical healthcare settings, which were among the least preferred resources identified by participants, occurred only when the opportunity presented itself; and even when those conversations occurred, they were usually too snappy and superficial to effect the desired behavioral changes – unless such brief behaviour change counselling sessions are offered by well-capacitated professionals (Murphy et al., 2016; De Vasconcelos et al., 2018)). This finding is consistent with

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been members of a conservative party. Silence due to conservatism was the most identified (27.2%) Calgary-specific barrier. Moreover, most (66.7%) of the communities where social conservatism was reported as a barrier intersected spatially with high preventive resource non-use.

<sup>85</sup> Unlike southwest Calgary, this study site was rural. Nonetheless, the findings help clarify the interaction between geographical and social barriers.

previous findings that there is silence in healthcare settings when healthcare providers lacked the time and specialized knowledge that was vital to effectively initiate holistic sexual-health conversations with youth (Masaro et al., 2012).

As identified by Goldenberg et al. (2008b) and Hull et al. (2017), limited service hours coupled with travel and waiting times hinder access to preventive resources primarily among high school students. When the resources accessed by youth convey sexual and reproductive health information, limited hours of operation may not be a substantial barrier since they can access such information at school or online. It is therefore not surprising that teachers (32.2%), peers (12.6%), and the internet (11.3%) were the most significant sources of sexual information for survey participants. In contrast, if youth require resources such as testing and sexual negotiation training, which take time and require specialized skill sets (Borawski et al., 2015), then the limited-hours barrier becomes noteworthy; since they may have to access off-campus sites that do not operate when youth are out of school. It is intriguing that due to the fear of stigma, guilt, and the possibility of being seen by peers, youth may turn down such expert services even if they were available in their schools.

Furthermore, stigma concerning sexually transmitted infections is a significant factor that underpins the uneasiness youth could feel if they decided to access existing resources, particularly for preventive services like testing, which require more than one face-to-face encounter with providers. The fear and the actual perpetration of stigma-

related activities in healthcare spaces is another explanation for why most (156) youth find these spaces intimidating. In addition, even the mere setup of the healthcare space deters youth from accessing services, thereby forcing most of them to utilize the few youth-friendly options, which end up becoming overcrowded, thereby negatively impacting wait times (Shoveller et al., 2009). In a United Kingdom study, Fleming et al. (2020) also found non-medical settings to be a mitigating factor against the stigma that is perceived by users of medical sexual health resources.

The finding that the neighborhood characteristics (including the socioeconomic profile) of the Downtown Calgary location (one of the principal sexual-health facilities) deters youth from accessing resources (in seemingly unsafe and uncomfortable environments) is consistent with findings from studies (e.g. Mohnen et al., 2019; Roux and Mair, 2010) that confirm the influence of neighborhood characteristics, such as levels of safety and violence and socioeconomic status on access to health-relevant resources. Nevertheless, since past users were not asked about their experience using services located downtown, it is difficult to establish the true nature and extent of these feelings of insecurity.

The survey data revealed that 66.5% of past users of preventive resources experienced little to no barrier to access. The information gathered through the environmental scan also supported the fact that access could be generally smooth, even for youth who did not have healthcare cards. Although most participants knew about

existing resources, they were possibly ill-informed about the true nature or sometimes the existence of the resources themselves (Cassidy et al. 2018). For instance, 20.4% of survey participants cited their limited access to financial resources as a barrier. In many instances, financial burdens have indeed hindered access to preventive resources (Denison et al., 2017). However, the fact that youth in Calgary indicated limited financial burden as a barrier proved that some youth are not well-informed about the nature (cost) of existing preventive services, which (costs) are covered by Alberta Health Services.

The finding that healthcare providers' lack of pre-emption is partly responsible for the silence about sexually transmitted infection is consistent with findings that some healthcare providers do not proactively speak about sexual health issues with their patients (Clegg et al., 2012), although they are encouraged to seize every opportunity to initiate and discuss prevention with patients, particularly those who might be at risk for a sexually transmitted infection (Public Health Agency of Canada, 2013). Nusbaum and Hamilton (2002) have also pointed out that when healthcare providers underestimate the sexual concerns of their patients, they are not able to communicate proactively with them.

Communities, where distance was identified as a noteworthy barrier to access, were found to be within at most six km (approximately one-hour walking distance) from a transit station from where youth could catch a train to facilities. The extensive distance between sexual health service access points and neighborhoods was also seen as a barrier, even among past users of preventive resources. Wang (2020) has noted, "the spatial

interaction between facilities (supply) and patients (demand) in a health-care market often conforms to the first law of geography<sup>86</sup> (distance decay)” (p. 9); and while people do not always access facilities in their communities (as evidenced by the case of Beltline where non-use was low despite its proximity to sexual health facilities), there is also evidence (Al-Mandhari et al., 2008) that proximity to a facility is an impetus to its use. For health services that require travel, the impact of distance on access to healthcare has been well documented (Cronk, 2015; Kelly et al., 2016); although depending on the subjective (patient answer-driven) or objective (based on measures) nature of their methods, researchers have not always agreed upon the effect of distance on access (Syed et al., 2013). Even in settings that bear no semblance to the Canadian context, the effect of distance on access is evident. For instance, Thongmixay et al. (2019) established that due to the extensiveness of the travel distance to facilities, youth in Lao People’s Democratic Republic would rather cross the border to access sexual and reproductive health services in Thailand. As discovered by Goldenberg et al. (2008b), the impact of geographic distance on access was probably because unfriendly winter conditions and existing transportation systems did not allow some busy youth to commute to service access points. Similarly, after systematically reviewing 61 articles on the prevalence of transportation barriers to health care, Syed et al. (2013) concluded “a patient may live in a wealthy suburb, own several cars, and have no problem accessing health care, even at a

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<sup>86</sup> The First Law of Geography or Tobler’s First Law of Geography: “everything is related to everything else, but near things are more related than distant things” (Tobler, 1970, in Waters, 2016).

distance. Conversely, a seemingly shorter distance for a patient who has to walk or cannot afford public transit may prove to be too far of a distance, and hence be identified as a barrier by the patient [...]” (p. 8). The interaction between distance, transportation, and socioeconomic status also accounted for the consciousness of the central locational placement of youth-friendly facilities in terms of proximity to train stations, and closeness to low-income neighborhoods to reduce the travel cost/distance, especially for impoverished youth (Mwachofi and Al-Assaf, 2011).

On the other hand, although the Beltline is closer (within less than 2 km) to preventive resources than any of the other communities in Southwest Calgary and had a median total household income (before tax) in 2015 of \$76,408 (The City of Calgary, 2021), it was one of the communities with high resource non-use. This “proximity defying” case proves that geographical nearness alone cannot assure resource use amid other barriers, including low educational level<sup>87</sup> (Glynn et al., 2004; Norbu et al., 2013) and silence<sup>88</sup> (Romanowski, 2016) in this particular instance. Whilst thirty-five percent (35%) of participants alluded to the remoteness of facilities possibly, an equal percentage of them referred to the nearness of resources as a barrier. The latter is consistent with the finding by Lee et al. (2010) that first-time attendees of public clinics for sexually

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<sup>87</sup> The number of people without any certificate, diploma, or degree for Beltline was the third-highest (1260) in Southwest Calgary after Evergreen (1840) and Signal Hill (1265).

<sup>88</sup> The highest (35.7%) organizational barrier was the silence around sexually transmitted infection; silence due to conservatism was equally reported as the highest (42.9%) Calgary-specific barrier. The silence could also be why 35% of participants were not aware of the sexual health resources in and around their neighborhood (Carroll et al., 2012; Cassidy et al., 2018).

transmitted infections in Hong Kong<sup>89</sup> distanced themselves from services that were linked to their communities of residence due to fear of stigma.

Many (44.5%) survey respondents believed that the use of social media dating applications influenced risky sexual activities among young users (Landry et al., 2017), an opinion that was equally expressed by Dr. Karen Grimsrud (in Warnica, 2016). Landry et al. (2017) also speak to the potential effects of social media dating applications use on youth:

Social media provides a context in which youth, who have a need for social acceptance and gratification and are still developing self-regulation skills, may find themselves vulnerable to pressures or unanticipated risk opportunities. Social media has the potential to expand and amplify existing peer relationships, which are well documented as influencing risk behaviors. Social media may also provide increased access to partners that are more experienced, leading to increased communication about sex because of the perceived privacy of social media. Thus, those who are more active on social media could partake in more risky behaviors because of a larger peer network influencing their attitudes and social norms (p. 6).

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<sup>89</sup> There may be so many other confounding variables that differ between the Beltline in Calgary and Hong Kong. Nonetheless, the study by Lee et al. (2010) is still important since it typifies how stigma forces people to choose distant sexual health resources over near ones.

Some participants explained that, unlike traditional dating websites, setting up sexual encounters with social media apps was fast, easy (reduces barriers to initiating sexual conversations, reduces physical barriers to communication, reduces age barriers to initial conversations), and above all, cheap (in terms of monetary cost and the cost of physically pursuing a sexual partner); thereby allowing youth to meet potential sexual partners anywhere and anytime with less effort (Choi et al. 2016; Belluz, 2017; Jo Sales, 2015). Also, social media dating apps reinforce the regularity of sexual conversations, which have been found to increase the tendency for youth to engage in sexual activities. For example, Landry et al. (2017) conducted a study with 555 Latino youth between 13 and 19 years. They found a statistically significant positive relationship between increased sexual risk behaviors and high-frequency short message service (SMS) over 16 months.

Furthermore, interview participants perceived social media app use as being associated with increased sexual activities because of functionalities like sexting<sup>90</sup>, including nude picture exchanges, which provoked “physical sexual risk taking” (Rice et al., 2012, p. 671). This fact applies more to sexually impulsive youth (described as “students [who] have hormones”. This sub-population is less likely to delay sexual pleasure) and depends on the location-sharing and geographic proximity capabilities of

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<sup>90</sup> To reiterate, Rice et al. (2012) found “sexting was statistically significantly associated with sexual activity and showed a near-significant trend with reports” (p. 671) of unprotected sex (i.e., not using a condom at last intercourse).

the apps to meet up with numerous people for one-offs, which are usually characterized as “fun” and involving less or inconsistent protection (Choi et al. 2016; Sawyer et al., 2018). Sawyer et al. (2018) likewise found that undergraduate students who scored higher for impulsive behaviors also reported using dating applications.

Dating app use was additionally perceived by some participants as being associated with sexual activities since it had the capability of facilitating and normalizing casual relationships, which often includes unprotected sex as one of its distinctive elements (Sawyer et al., 2018).

Moreover, social media are *where* youth were both exposed and open to pressures targeting longing for attention and social acceptance, consequently increasing their susceptibility to “unanticipated risk opportunities” (Landry et al., 2017, p. 6). Although youth experience similar pressures in offline environments, such influences are more profound on the social media dating platforms because cyberspaces tend to afford youth a more extensive social network (Landry et al., 2017), which has been identified as a predictor of sexual activities among youth (Asrese and Mekonnen, 2018). The impacts of peer influence, social media, and social norms on the attitudes of youth cannot go unnoticed. The increased social connectivity of youth increases their exposure to countless numbers of profiles, pictures, messages, videos, and other content, which feed into sexual attitudes (Krauss et al., 2017). Although unrelated to sexual health, the study by Litt et al. (2011) established that youth, influenced by Facebook profiles of older peers

to believe that alcohol use was normative, were highly prone to thoughts that predicted alcohol consumption.

No causality is implied despite the relationships between dating app use and sexual activities that (relationships) have been discussed in the previous paragraphs. Besides, it was not clear if sexual risk-takers take risks because they use dating apps or if the use of the dating apps is simply another way for them to reinforce their pre-existing sexual behaviors.

#### **4.5 Challenges Encountered**

During the recruitment of participants in public places, youth often hesitated to approach the researcher once they saw “sexual health research” in the call to participate message. During the initial stages of the in-person data collection, this hesitation hindered the preliminary overall progress of the interview and survey data collection process since youth would not even approach the researcher to further inquire about the topic. To counterbalance this situation, the researcher changed the “sexual health research” invitation on the recruitment placard to “health research” to better enhance study participation. Once youth approached the researcher, the confidential nature and the importance of the study were adequately explained to them. Also, the researcher reassured potential participants that he was genuinely undertaking academic research by showing them his student identity card and the letter from the Institutional Review Board of Carleton University and the University of Alberta.

During the in-person participant recruitment, young adults were more willing to participate than mature minors. It was difficult to determine the possible initial reactions of potential participants after they had seen the recruitment messages on social media. However, it is assumed that the informed consent form helped clarify the intents of the researcher to participants, thereby encouraging online participants to participate. Readers are therefore cautioned to bear this variance in mind as they consider the conclusions drawn.

Determining the best time to recruit youth in person was a challenge at the onset of the in-person data collection process since the researcher wanted to find youth when they would be available. Early mornings seemed ideal at first, but the number of potential participants at this time was very minimal since most of them were either in school or at work. To handle this, youth were recruited at different times (including mornings) on different days.

Furthermore, due to the sensitive nature of sexually transmitted infections and the quest to protect clients' privacy, many administrative bottlenecks were encountered, thus preventing Alberta Health Services from releasing the data on chlamydia incidence. Specifically, the non-release of the chlamydia incidence data by Alberta Health Services was despite ethics clearances by Carleton University and the University of Alberta had been obtained and submitted as part of the data request process. Data insufficiency (since some patients did not provide their postal code information) was cited by the data

providers as the main reason for not releasing the data. The data providers were also worried that patients might be exposed through their postal codes, even though the researcher explained that data masking (aggregation) by the providers or the researcher would help offset this problem. The decision affected the course of the study to the extent that the initial intention to spatially analyze administrative chlamydia incidence data in relation to survey data had to be adjusted. Spatial analysis was consequently based solely on spatial data that were reported by survey participants.

#### **4.6 Limitations**

The limited amount of time and other resources did not allow the study to be conducted with participants in all four quadrants of Calgary, thereby limiting the ability to extend key findings to the entire city of Calgary. However, considering that research participants were of varying socioeconomic backgrounds, which reflected the characteristics of youth in the other quadrants of Calgary, the findings provide examples of some of the barriers youth in Southwest Calgary face in accessing preventive sexual health resources.

As has already been pointed out, the sensitive nature of the topic, together with the limited amount of resources, had the potential to hamper access to the required number of participants, if, given the research timeline, the researcher and research assistant had resorted to singlehandedly recruiting each of the participants in person. This limitation necessitated the use of the snowball and convenient non-probability sampling

as well as Facebook recruitment strategies, which were not random and consequently restricted the generalizability of the study to youth in Southwest Calgary. Nonetheless, since youth who were recruited resided in various Southwest Calgary communities of varying socioeconomic profiles, the findings could still reliably inform sexual health planning for the entire quadrant. Also, Whitaker et al. (2017) have noted that despite the usefulness of Facebook as a recruitment tool, it “remains limited by Internet access and the overrepresentation” (p. 1) of certain populations, female participants in this particular instance. Besides, the researcher was charged some dollar amounts for recruiting through Facebook Ad.

Another study limitation had to do with the ability of tech-savvy online survey-takers to circumvent the Prevent Ballot Box Stuffing functionality, which aimed to prevent people from taking the survey multiple times. In an attempt to mitigate this limitation, the researcher closely monitored survey responses to limit the presentations of identical responses. Besides, the researcher advised all previous participants to refrain from retaking it and trusted that upon understanding the relevance of the study, participants would be honest enough to not retake the survey. Nevertheless, since the researcher did not entirely have control over those who may still have chosen to retake the surveys, survey responses need to be interpreted in light of this limitation.

Again, there was no way to verify the identities of survey participants who were recruited through Facebook. To handle this situation, the researcher asked participants to

answer some questions to confirm their eligibility before they could take the survey. This limitation was minimal during the in-person recruitment of survey participants since the researcher emphasized those prerequisites. Due to this verification process, there were few occasions where some willing youth were disallowed from taking the survey. Also, there were far more female survey participants than males, so the study should be interpreted in light of this difference. Moreover, the use of non-normalized data did not permit a deeper comparison among neighborhoods. Nevertheless, the contribution of each community to the total resource non-use reported was still helpful.

During the spatial analysis phase, the exclusion of the survey responses that were without accurate locational information deprived the researcher of the opportunity to extend the conclusions drawn from the spatial analysis to the entire study population. However, considering the findings from the spatial analysis on their merit in addition to the qualitative and other quantitative findings, the researcher was able to confidently make a case for the need to pay attention to the spatial context, in particular the location of current and future facilities.

Also, the conclusions based on the spatial analysis might have been different if family and campus doctors had been included, although they were not youths' preferred resources. Furthermore, interviews helped introduce and explain the contextual aspects of the barriers and how they interacted with each other. However, the researcher could and did not determine any cause and effect relationships among variables because the

resources available would not allow for a longitudinal study that would have been necessary to examine the complex interactions among barriers.

Finally, the inability of Alberta Health Services<sup>91</sup> to provide chlamydia incidence data was not only a challenge but also introduced a limitation where, in the absence of any objectively collected health outcome data, barriers could only be analyzed in relation to self-reported (use/non-use) data, which is one-sided. The surveys that followed after the interviews validated the information participants divulged during the interviews; however, supporting the self-reported data with incidence data from Alberta Health Services would have further strengthened the study (Creswell, 2014).

#### **4.7 Strengths**

The use of an exploratory sequential mixed-methods design was beneficial since the researcher was able to progress from one stage of the study to another without difficulty. In addition, combining qualitative interview data and quantitative survey data helped conduct a comprehensive (although not exhaustive) exploration of the determinants of access. The strengths of either method compensated for the weaknesses of the other.

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<sup>91</sup> Alberta Health Services mentioned that there was no capacity within their Sexually Transmitted Infection services to pull and aggregate the requested data set on the geographic distribution of positive chlamydia cases. They also mentioned that postal code, which is integral to geographical distribution, was also unavailable in approximately 15% of chlamydia cases, which would have been analyzed spatially.

Through the qualitative method employed, the researcher was able to cost-effectively explore the complex aspects of the barriers. Further, through the quantitative method, the researcher was able to confidently generalize findings from the survey to youth in the study area. It was helpful to see mutual interaction between both methods.

Also, the spatial analysis of the survey data was a definite strength since the researcher was able to put more “life” into the data and help readers see how the variables of interest or even themes were distributed geographically. Further, the exclusion of walk-in clinics gave the study more focus since the researcher was able to make conclusions based on the resources that mattered the most to youth.

Having such a 100% survey response rate strengthened the study since the researcher did not have to deal with non-response biases. The social media recruitment strategy was a strong aspect of the study since it was a way to expedite participant recruitment for the surveys, considering the time and other resource constraints. Finally, the Social-Ecological Model served as a guiding tool in the organization and interpretation of the determinants.

## **Chapter 5: Implications and Conclusion**

### **5.1 Summary of Study**

The study followed an exploratory sequential mixed-methods design. The researcher answered one overarching research question: “What are the social barriers, irrespective of whether they are perceived or experienced, to access chlamydia prevention resources among youth, 15-24 years old, in Southwest Calgary, and what are the spatial dimensions of these barriers?” A key aim was to determine if the youth in Southwest Calgary were deliberately ignoring preventive resources or if they were sincerely facing access barriers. It was hypothesized that the spatial elements of the social barriers to accessing preventive resources for chlamydia have been underexplored despite their relevance to public health. The Social-Ecological Model guided data collection. After a preliminary qualitative data collection and analysis, a quantitative survey was designed based on the findings from the qualitative stage. The primary qualitative community-based data were collected through semi-structured interviews with 23 (12 males and 11 females) youth and 4 service providers whereas quantitative community-based data were collected through a survey with 382 participants (359 females and 23 males).

The researcher met three main objectives. The first objective was to use a qualitative method to explore in-depth and critically analyze the spatial dimensions of the barriers to accessing preventive resources for sexually transmitted infections through the

lens of chlamydia among youth in Southwest Calgary. The key qualitative themes (barriers) were organized under headings that were based on the hierarchical levels of the Social-Ecological Model:

- a) Intrapersonal- or Personal-Level Barrier (perceived irrelevance of preventive resources, the potential feeling of uneasiness accessing resources, and ignorance);
- b) Interpersonal-Level Barrier (stigma);
- c) Organizational-Level Barriers (silence about sexually transmitted infections, nature of online information, mode of operation, and the nature of facilities).
- d) Community-Level Barriers (the vastness of Calgary and Southwest Calgary, cold weather conditions, and unreliable public transportation system)

Participants' opinions regarding the possible implications of using social media dating applications on sexual activities among youth were sought through in-depth interviews. While a few youth and service providers thought that the use of social media dating applications did not influence sexual activities, the majority thought it did. Furthermore, many (44.5%) survey participants thought that social media dating applications potentially contributed to sexual activities. Fewer than 2% of survey participants thought that social media did not influence sexual activities at all.

The “has influence” group declared that historically, people always found ways to hook up. Nevertheless, they mentioned that dating applications facilitated – by reducing the nervousness and anxiety – the initiation of sexual conversation, which would otherwise be more challenging for youth. Ease of access to sexually provocative content was also seen as partly responsible for inciting sexual activities. In addition, dating apps were blamed for inadequately warning/educating young users of the sexual health and other risks that they could be exposed to by using the apps<sup>92</sup>. The ease of hiding one’s identity, the tendency to engage in experimental sexual activities with strangers, the peer pressure on social media dating apps, and sexting and virality<sup>93</sup> were reported as aspects of social media dating app use that contributed to sexual activities. Similarly, survey participants indicated “*Hooking up through social media is fast and unrestricted*” (33.5%); “*Hooking up with as many partners as they wish is easy*” (24.3%); and “*The location features on some dating apps could make it easier for youth to arrange quick casual sexual encounters*” (14.4%) as the principal aspects of dating app use that influence sexual behavior.

The second objective was to quantitatively examine the barriers associated with access to preventive resources for chlamydia among youth, including resource use history

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<sup>92</sup> The roles of parents (teachers, caregivers, guardians) in providing sexual health education to youth are not being overlooked in this particular instance (Ashcraft and Murray, 2017). As well, young users of the apps need to take responsibility for their health and safety online

<sup>93</sup> The tendency of an image, video, or piece of information to be circulated rapidly and widely from one Internet user to another; the quality or fact of being viral.

(use/non-use of facilities). The themes from the qualitative stage were examined quantitatively. Most survey participants had heard about at least one preventive resource for chlamydia or other sexually transmitted infections, with the Center for Sexuality being the most popular one. The number of users was less than non-users, whereas more than half of the users reported that access was quite straightforward. The three main barriers to access pertained to the stigma around sexually transmitted infections, intimidating healthcare spaces, and the potential to feel uneasy accessing resources in that order.

However, when organized based on the hierarchical levels of the Social-Ecological Model, the most reported:

- a) Personal-Level Barrier was the fear of being stigmatized (Richardson et al., 2010);
- b) Interpersonal-Level Barrier was the tendency for family members to judge them (Denison et al., 2017);
- c) Organizational-Level Barrier was the silence around sexually transmitted infections (Masaro et al., 2012); and
- d) Community-specific Geographic Barrier was the non-existence of preventive resources nearby (Gombachika et al., 2012).

The third objective was to visualize and conduct a Geographic Information Systems-based analysis of the spatial patterning of preventive resources. “Too much

travel time”, “No facilities nearby”, and “Conservative community, so silence” were predominantly reported by youth in communities on the western limit. Similarly, most of the highest cases of resource non-use were observed on the western border. The silence about sexually transmitted infections and the non-use of resources were mostly seen in those communities with the lowest educational attainments.

## **5.2 Implications**

### **5.2.1 Theoretical Implications of the study**

1. No known study in Southwest Calgary has applied the Social-Ecological Model to examine the barriers to accessing sexual health resources among youth, so confirming the applicability of the model in this region helps broaden or justify the general understanding and acceptance of the model.
2. The study confirms the feasibility and applicability of combining traditional qualitative and quantitative methods with geospatial methods to investigate community health issues. The maps add layers of clarity to the data, thereby revealing patterns that were not easily noticeable during the qualitative and quantitative analysis of the data.
3. The concerns expressed by Alberta Health Services and its inability to release the data on chlamydia cases provide yet another indication of the privacy and data availability issues that could be faced by potential users of administrative sexual health data. Instead of solely depending on

organizations for data, the researcher learned the importance of trusting research participants to provide the data when secondary administrative data providers had refused to do so. The fact that participants provided their postal code information further underlines the importance of being upfront with potential research participants about the intended use of research data.

4. The findings from the study provide additional information to inform the ongoing dating app-sexual activity discourse in the health geography field. However, due to relatively little data on the issue (Gollom, 2016), in particular within the Calgary context, there is still an opportunity for health geographers to further examine activities on social media dating applications and their spatial correlation with sexual activities and incidence of sexually transmitted infections.

### **5.2.2 Practical Implications of the Study**

The findings bring the spatial dimensions of the social barriers into focus. It was revealed that once the social factors “pass through” a spatial lens or vice versa, they get either amplified or shrunk. For instance, whereas a non-stigmatizing healthcare space may have the potential to help alleviate the fears of youth regarding the general nature of service provision, an intimidating healthcare space, on the contrary, has the potential to deter new potential resource users and even discourages repeat users (Shoveller et al.,

2009; Asenso, 2012). This finding is useful since there is usually a tendency to dichotomize the social and spatial dimensions, thereby overlooking the spatial when discussing the social and vice versa. This finding underlines the need to examine social health policy issues through a spatial lens. Also, among other steps, healthcare spaces such as walk-ins should be more welcoming even as sexual health services are made less stigmatizing since these two steps could be critical to making access more comfortable for youth, irrespective of the type of facility to they access sexual health service through.

Another key finding was the effect of distance and remoteness of resources on access. It was helpful to note that non-use of resources and geographical barriers were consistently reported by the youth who lived in communities on the extreme western portion of the study area. This finding implies that although providers have tried to bring current youth-friendly facilities to a centrally located part of the city, there is a need for further research into the best place (in the southwest?) to locate another youth-friendly facility to reduce the travel distance for potential users. On the other hand, it was helpful to ascertain - based on the case of Beltline - that when social barriers are at work, geographic proximity may not always yield increased preventive resource utilization.

Sexually active youth had limited knowledge about preventive resources. Youth who had once used resources were also worried that there was too much silence about sexually transmitted infections. This finding is a clear indication of the need for stakeholders to be more proactive about sexually transmitted diseases. Also, since youth

and service providers alike alluded to the complicated nature of the Alberta Health Services reproductive health website, Alberta Health Services should endeavor to make it more youth-friendly. It also became clear that the physical space of the sexual and reproductive health clinic of Alberta Health Services was less youth-friendly than that of the Centre for Sexuality. This finding is a possible reason why the latter was more preferred and popular among youth. Based on this, the décor of healthcare spaces may have to be designed to make them more welcoming to youth (Shoveller et al., 2009).

The findings (*Hooking up through social media is fast and unrestricted; Hooking up with as many partners as they wish is easy; The location features on some dating apps could make it easier for youth to arrange quick casual sexual encounters*) on how the use of social media dating apps facilitates sexual activities among youth are contributions to the debate on whether social media dating apps are partly to blame for rising sexually transmitted infection rates (Wood, 2017; Carter, 2020; Belluz, 2017; Pascual, 2015). Even though this finding was based solely on the opinions of youth, they still show that social media dating applications influence risky sexual activities. Also, many (48.7%) youth were open to the idea of receiving automatic test reminders after they had confirmed a hook-up with someone.<sup>94</sup>

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<sup>94</sup> Although social media platforms may be promising in terms of the delivery of health promotion messages (Nadarzynski et al., 2019; Edney et al., 2018), the legal ramifications of targeted test reminders through dating apps may have to be further explored.

In addition, the findings indicate that youth are bolder in cyberspace since they can easily hide their identities there. Youth who had never used any resource still mentioned that they could still confidently search for information, including the location of facilities online. This finding shows the need to harness the potential of cyberspace to disseminate sexual health information and even offer testing services. However, since information on the internet can sometimes be misleading, youth will have to cautiously assess what they come across (Nguyen et al., 2019).

Finally, the Social-Ecological Model helped uncover the interconnected and multifaceted nature of the determinants of access, thereby justifying the importance of multilevel and inter-sectoral collaborative efforts and interventions to improve access. For instance, it is clear from the findings that the fear of being judged is reinforced by the stigmatizing nature of some healthcare spaces where they try to access services. For public health to address such a situation, it could be required to both assuage those fears by normalizing sexual health resources for youth as well as to make healthcare spaces more youth-friendly.

### 5.3 Recommendations

**Table 25: Summary of Principal Recommendations by Survey Participants**

<b>Principal Recommendations by Survey Participants</b>	<b>Total Number of Times Mentioned</b>
More youth-friendly resources	147
Increasing awareness ads on social media	121
Bringing more services into neighborhoods	118
Extending facility hours of operation	111
Centralized online information hub	102
Affordable and reliable public transportation	87
Community symposiums and workshops	70
Testing reminders on dating apps	66
Family-friendly sex education literature	48
<b>Total</b>	<b>870</b>

Although sexually transmitted infection testing and treatment are important steps, they do not necessarily have any bearing on access to preventive resources, which apply upstream public health strategies to address the complex and diverse pathways to infection. Based on the recommendations made by survey participants (Table 25) and interviewees (youth and service providers), all levels of provincial government and stakeholders should consider the following proposals for action:

- Intensify sexual health ads, workshops, and symposia on the media, particularly in cyberspace, to promote awareness about preventive resources, including non-disclosure agreements for sexual health resources.

- Bring additional youth-friendly preventive resources closer to the neighborhoods on the western portion of Southwest Calgary. Thongmixay et al. (2019) have argued that unless cognitive and psychosocial accessibility is ensured, unhindered geographical accessibility to sexual health resources might be highly difficult. Thus, the locations of such resources should be such that they reduce travel times even as they lessen the potential for stigma and other interpersonal and community barriers to access.
- Support public health research endeavors that employ geospatial methods to investigate the social determinants of health, since there are spatial dimensions to the social barriers to access.
- Extend facility hours and days of operation to accommodate the broad spectrum of youth.
- Encourage social media dating app owners to be more proactive about promoting sexual health by incorporating health-promoting features that could promote the safety of users.
- Make Calgary's public transportation system more affordable, efficient, and reliable (White, 2019), particularly in the winter.
- Last, since many youth learn more about sexually transmitted infections from their teacher than from any other source, the promotion of appropriate sex education in schools for sexually inactive and sexually active youth

(Brückner and Bearman, 2005) is worth pursuing by the provincial government.

#### **5.4 Conclusion**

The findings demonstrate that although youth in Southwest Calgary may sometimes underestimate the risks and effects of contracting chlamydia, most are hindered by social barriers that operate at the personal-, interpersonal-, organizational-, and community-level. Among others, stigma, intimidating healthcare spaces, and potential feelings of uneasiness accessing resources that require face-to-face interaction were the most noteworthy. The findings support the hypothesis that social determinants have spatial dimensions that interact with them to aggravate their influence on access to preventive services among youth. Consequently, to improve upon sexual health interventions for youth, interventions should pay particular attention to the social barriers without ignoring their deep-rooted and sometimes inconspicuous spatial dimensions.

Whereas the design of this study does not permit any assertion of causality or any broad generalizations, it provides insight into the levels at which the determinants of access function and interrelate with each other. Also, since there are similarities between preventive resources for chlamydia and other sexually transmitted infections, the findings from this study could equally guide policies and programs for other sexually transmitted diseases.

Therefore, the essential duty of all stakeholders is to consistently “recognize that places matter and the context in which behavior takes place is important both for understanding and for subsequent policy development (Moon, 2009, p. 42)”. More importantly, the reality and inevitability of geographic complexity (Wang, 2020) demand that public health professionals and locational experts maintain and strengthen ongoing collaborative efforts that are aimed at mitigating the barriers to accessing preventive sexual health resources.

## **5.5 Future Studies**

Since non-use was high in Beltline despite it being the community that was positioned the closest to facilities, it would be helpful to further examine why proximity did not protect against non-use of resources. Furthermore, since this study only sought the opinions of youth regarding the association between sexual activities and the use of dating applications, another study is needed to examine the impacts of social media dating applications on users’ sex lives over a period of time (Gollom, 2016). Thus, a study that analyzes the lived experiences of sexual behaviors as motivated through the use of social media dating applications among youth in Calgary is needed. Moreover, the connection between the length of residence and access to preventive resources among youth needs to be assessed.

It was interesting to hear phrases such as, “racial differences impede discussion of sexual health, so nothing brings to mind the need to use the resources; this was the

opposite case in the NE, where I used to reside” (FR4) as well as “if you are a youth from an ethnocultural community, do you see yourself represented in that clinic and are you probably gonna go there? I am gonna wager probably not” (SP2). This finding seems not to be farfetched since “racism has been increasingly recognized as an important driver of inequitable health outcomes for racialized Canadians” (Public Health Agency of Canada, 2020, p. 2). Nevertheless, considering that no statistically significant relationship was found between self-reported racial identity and resource non-use in this study, another study will be required to further explore the relationship between racial identity and preventive sexual health resource use/non-use among racialized youth.

It would be more beneficial to quantitatively and spatially examine and simulate how the various modes of transportation that are mostly used among youth compare with each other in impacting access to preventive sexual health services among youth in Calgary (Kaur Kahkh et al., 2019). Moreover, a study that applies qualitative, quantitative, and geospatial methods to identifying and assessing the geographical or environmental influencers of youths’ sexual behavior in Calgary is needed. Further, tied to more recent happenings would be an exploration of the extent to which COVID-19 equally overwhelmed and attracted the attention of public health at the expense of sexual health prevention. Finally, the design of this study did not allow for youth in all four quadrants of Calgary to share their lived experiences of the barriers. Thus, an

examination and comparison of the barriers to access among youth from all the four quadrants of Calgary would be more comprehensive.

## Appendices

### Appendix A

#### A.1 : Rates of reported sexually transmitted infections cases per 100,000 people in Canada, by sex and age group, 2008-2017 (Public Health Agency of Canada, 2019)

Rates of reported chlamydia cases per 100,000 MALES, by age group in Canada, 2008-2017

Year	Rate per 100,000 males							
	Overall	<15 years	15-19 years	20-24 years	25-29 years	30-39 years	40-59 years	60+ years
2008	168.9	2.4	366.0	895.4	536.6	206.2	45.5	4.2
2009	176.1	2.5	401.9	924.1	562.2	210.9	47.1	4.9
2010	190.4	2.4	422.2	992.3	609.1	238.8	50.6	6.3
2011	203.7	2.2	446.7	1,078.4	651.9	252.9	56.1	6.0
2012	215.3	2.4	466.4	1,090.6	714.3	277.2	62.1	6.3
2013	221.3	2.3	455.4	1,095.6	744.0	300.4	66.8	7.7
2014	231.2	1.4	460.7	1,135.8	777.9	324.7	72.9	9.2
2015	249.9	1.9	503.7	1,207.8	838.8	362.6	83.2	10.2
2016	261.9	1.9	521.9	1,249.5	866.1	393.2	94.1	10.8
2017	276.5	2.3	562.3	1,287.8	918.0	420.0	102.0	12.5

Rates of reported chlamydia cases per 100,000 FEMALES, by age group in Canada, 2008-2017

Year	Rate per 100,000 females							
	Overall	<15 years	15-19 years	20-24 years	25-29 years	30-39 years	40-59 years	60+ years
2008	326.8	19.2	1,659.8	1,812.1	764.8	241.4	34.5	1.4
2009	341.0	20.9	1,729.2	1,874.5	788.2	262.0	40.1	2.2
2010	364.6	20.7	1,803.8	2,018.2	853.5	288.1	47.4	2.3
2011	384.6	21.8	1,879.8	2,150.1	896.7	317.9	50.6	3.0

<b>2012</b>	389.3	19.6	1,850.7	2,198.4	953.9	338.0	55.4	3.1
<b>2013</b>	377.3	20.7	1,789.3	2,158.6	956.6	333.9	53.5	2.4
<b>2014</b>	383.7	20.1	1,765.9	2,221.7	1,026.6	356.9	56.8	3.1
<b>2015</b>	400.3	20.5	1,804.7	2,367.7	1,093.8	389.7	63.9	3.1
<b>2016</b>	407.5	18.9	1,862.6	2,427.7	1,129.5	396.3	68.6	3.9
<b>2017</b>	412.8	17.5	1,891.7	2,499.4	1,136.3	403.6	66.9	3.8

**Rates of reported chlamydia cases per 100,000 population OVERALL\*, by age group in Canada, 2008-2017**

Year	Rate per 100,000 population - Overall							
	Overall	<15 years	15-19 years	20-24 years	25-29 years	30-39 years	40-59 years	60+ years
<b>2008</b>	248.8	10.6	999.8	1,345.7	650.5	223.9	40.0	2.7
<b>2009</b>	259.5	11.5	1,052.1	1,391.8	675.5	236.7	43.7	3.4
<b>2010</b>	278.5	11.3	1,097.7	1,498.9	731.2	263.6	49.0	4.2
<b>2011</b>	295.3	11.7	1,145.9	1,607.6	774.5	285.6	53.5	4.4
<b>2012</b>	303.3	10.8	1,137.9	1,633.5	833.7	307.8	58.8	4.6
<b>2013</b>	300.2	11.3	1,101.0	1,613.2	849.4	317.5	60.1	4.9
<b>2014</b>	308.4	10.5	1,092.1	1,661.1	900.9	341.0	64.9	5.9
<b>2015</b>	326.2	11.0	1,133.9	1,766.6	964.4	376.5	73.5	6.4
<b>2016</b>	335.7	10.2	1,172.3	1,815.6	995.2	395.4	81.4	7.1
<b>2017</b>	345.7	9.7	1,209.0	1,870.5	1,024.8	413.1	84.5	7.9

\*Includes unspecified sex

**Rates of reported gonorrhoea cases per 100,000 MALES, by age group in Canada, 2008-2017**

Year	Rate per 100,000 males							
	Overall	<15 years	15-19 years	20-24 years	25-29 years	30-39 years	40-59 years	60+ years
2008	42.6	0.7	71.6	166.2	121.6	67.5	24.3	4.0
2009	36.7	0.4	61.9	144.4	104.0	55.8	22.4	3.2
2010	37.8	0.8	60.9	140.6	113.6	59.3	23.0	4.3
2011	40.2	0.7	62.1	149.0	117.1	64.1	26.0	4.3
2012	42.6	0.6	62.8	154.7	136.4	70.1	25.8	3.7
2013	48.2	0.5	67.9	169.3	152.6	85.1	29.8	4.2
2014	58.8	0.3	70.8	199.6	190.1	107.3	38.4	5.8
2015	70.3	0.5	74.9	220.9	228.7	144.8	45.7	6.3
2016	84.4	0.4	83.0	251.6	269.8	174.7	60.3	9.3
2017	103.3	0.7	106.4	287.7	338.4	217.5	75.3	10.3

**Rates of reported gonorrhoea cases per 100,000 FEMALES, by age group in Canada, 2008-2017**

Year	Rate per 100,000 females							
	Overall	<15 years	15-19 years	20-24 years	25-29 years	30-39 years	40-59 years	60+ years
2008	33.5	3.2	166.7	165.2	80.7	29.8	5.2	0.4
2009	29.6	3.0	146.2	149.2	70.5	26.6	4.4	0.4
2010	29.1	3.0	143.8	142.0	70.5	26.4	5.1	0.5
2011	29.6	2.5	141.0	144.9	76.6	27.1	5.7	0.5

<b>2012</b>	32.5	2.8	152.0	160.9	85.9	31.6	6.2	0.7
<b>2013</b>	32.9	3.7	153.4	158.8	88.5	34.8	6.9	0.3
<b>2014</b>	33.0	2.7	136.8	166.8	91.8	38.3	8.2	0.5
<b>2015</b>	40.8	2.9	154.6	198.8	127.0	54.3	10.5	0.7
<b>2016</b>	47.0	3.0	170.7	217.5	152.4	68.7	13.4	0.9
<b>2017</b>	55.6	3.7	195.8	254.4	184.3	86.7	14.9	1.1

**Rates of reported gonorrhoea cases per 100,000 population OVERALL\*, by age group in Canada, 2008-2017**

Year	Rate per 100,000 population - Overall							
	Overall	<15 years	15-19 years	20-24 years	25-29 years	30-39 years	40-59 years	60+ years
<b>2008</b>	38.0	1.9	118.2	165.8	101.3	48.8	14.8	2.0
<b>2009</b>	33.2	1.7	103.3	146.9	87.4	41.3	13.4	1.7
<b>2010</b>	33.5	1.8	101.4	141.4	92.2	42.8	14.1	2.3
<b>2011</b>	34.9	1.6	100.7	147.1	97.0	45.6	15.9	2.2
<b>2012</b>	37.5	1.7	106.1	158.0	111.4	50.8	16.1	2.1
<b>2013</b>	40.6	2.1	109.3	164.4	121.2	59.9	18.3	2.1
<b>2014</b>	45.9	1.5	102.8	184.0	142.1	72.8	23.3	3.0
<b>2015</b>	55.5	1.7	113.6	210.5	179.1	99.4	28.1	3.3
<b>2016</b>	65.7	1.7	125.5	235.8	212.8	121.6	36.8	4.8
<b>2017</b>	79.5	2.2	150.5	272.0	263.7	152.3	45.0	5.4

\*Includes unspecified sex

**Rates of reported infectious syphilis cases per 100,000 MALES, by age group in Canada, 2008-2017**

Year	Rate per 100,000 males							
	Overall	<15 years	15-19 years	20-24 years	25-29 years	30-39 years	40-59 years	60+ years
2008	7.3	0.0	1.2	9.0	13.1	13.6	11.4	1.9
2009	8.6	0.0	3.4	12.7	17.0	16.4	12.3	1.7
2010	9.2	0.0	3.9	12.9	15.4	15.9	14.2	2.6
2011	9.6	0.0	4.5	16.1	19.8	17.3	13.6	2.1
2012	11.3	0.0	6.3	21.6	22.2	20.5	15.0	2.9
2013	11.9	0.0	4.0	20.9	25.7	21.8	16.0	3.4
2014	12.7	0.0	4.1	19.9	25.5	25.0	18.1	2.9
2015	17.0	0.0	5.3	23.9	36.5	34.2	24.0	4.4
2016	19.8	0.0	5.9	27.4	40.8	39.9	28.7	5.2
2017	20.0	0.0	5.6	30.7	44.2	44.2	26.0	5.1

**Rates of reported infectious syphilis cases per 100,000 FEMALES, by age group in Canada, 2008-2017**

Year	Rate per 100,000 females							
	Overall	<15 years	15-19 years	20-24 years	25-29 years	30-39 years	40-59 years	60+ years
2008	1.1	0.0	2.1	3.6	3.0	2.1	0.8	0.1
2009	0.9	0.0	0.9	3.3	2.9	1.6	0.7	0.1
2010	0.9	0.0	1.5	3.3	2.6	1.5	0.6	0.1

2011	0.7	0.0	1.7	2.0	1.9	1.2	0.4	0.0
2012	0.6	0.0	1.5	2.2	1.1	1.0	0.5	0.0
2013	0.8	0.0	2.0	3.1	2.1	1.5	0.4	0.1
2014	0.9	0.0	2.0	3.6	2.4	1.7	0.6	0.0
2015	1.0	0.0	1.7	3.4	3.9	2.0	0.6	0.0
2016	1.7	0.1	3.5	6.3	5.7	2.9	1.1	0.1
2017	2.4	0.1	5.6	8.2	8.1	4.5	1.5	0.1

**Rates of reported infectious syphilis cases per 100,000 population OVERALL\*, by age group in Canada, 2008-2017**

Year	Rate per 100,000 population - Overall							
	Overall	<15 years	15-19 years	20-24 years	25-29 years	30-39 years	40-59 years	60+ years
2008	4.2	0.0	1.6	6.4	8.1	7.9	6.2	0.9
2009	4.7	0.0	2.2	8.1	10.0	9.0	6.5	0.8
2010	5.0	0.0	2.7	8.2	9.0	8.7	7.4	1.2
2011	5.1	0.0	3.1	9.1	10.9	9.2	7.0	1.0
2012	5.9	0.0	4.0	12.2	11.7	10.7	7.8	1.4
2013	6.3	0.0	3.0	12.4	14.1	11.6	8.2	1.6
2014	6.8	0.0	3.1	12.1	14.1	13.3	9.3	1.4
2015	9.0	0.0	3.5	14.0	20.6	18.0	12.3	2.1
2016	10.7	0.0	4.7	17.4	23.9	21.5	14.9	2.5
2017	11.2	0.1	5.6	20.0	26.7	24.5	13.7	2.5

\*Includes unspecified sex

**A.2 : Surveillance data by province/territory, year, infection and sex, 2013-2017**  
**(Public Health Agency of Canada, 2019)**

Surveillance data by province/territory, year, infection and sex, 2013-2017

<b>ALBERTA</b>	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	6,122	6,272	6,756	6,525	6,455
Female chlamydia cases	9,958	10,348	10,792	10,103	10,129
*Total chlamydia cases	16,081	16,622	17,548	16,628	16,584
Male chlamydia rate per 100,000	303.1	302.7	321.8	308.0	301.9
Female chlamydia rate per 100,000	507.7	514.4	527.6	486.2	480.9
*Total chlamydia rate per 100,000	403.9	407.0	423.4	396.3	390.8
	<b>Gonorrhea</b>				
Male gonorrhea cases	1,122	1,124	1,896	2,107	2,705
Female gonorrhea cases	895	783	1,542	1,674	2,049
*Total gonorrhea cases	2,017	1,908	3,438	3,781	4,757
Male gonorrhea rate per 100,000	55.6	54.2	90.3	99.5	126.5
Female gonorrhea rate per 100,000	45.6	38.9	75.4	80.6	97.3
*Total gonorrhea rate per 100,000	50.7	46.7	83.0	90.1	112.1
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	100	145	350	356	412
Female infectious syphilis cases	24	12	19	52	123
*Total infectious syphilis cases	124	157	369	408	535
Male infectious syphilis rate per 100,000	5.0	7.0	16.7	16.8	19.3
Female infectious syphilis rate per 100,000	1.2	0.6	0.9	2.5	5.8
*Total infectious syphilis rate per 100,000	3.1	3.8	8.9	9.7	12.6
<b>*Total includes unspecified sex</b>					

**BRITISH COLUMBIA**      2013    2014    2015    2016    2017

<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	4,497	5,176	5,578	6,086	6,662
Female chlamydia cases	7,737	8,264	8,774	9,129	9,003
*Total chlamydia cases	12,244	13,452	14,377	15,241	15,693
Male chlamydia rate per 100,000	195.7	221.8	235.8	253.0	273.5
Female chlamydia rate per 100,000	331.8	348.2	363.9	372.0	362.0
*Total chlamydia rate per 100,000	264.4	285.8	301.0	313.6	318.8
	<b>Gonorrhea</b>				
Male gonorrhea cases	1,304	1,505	2,373	2,508	2,364
Female gonorrhea cases	532	522	1,117	1,175	917
*Total gonorrhea cases	1,841	2,031	3,496	3,691	3,295
Male gonorrhea rate per 100,000	56.7	64.5	100.3	104.3	97.1
Female gonorrhea rate per 100,000	22.8	22.0	46.3	47.9	36.9
*Total gonorrhea rate per 100,000	39.8	43.1	73.2	76.0	66.9
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	447	413	598	577	489
Female infectious syphilis cases	6	18	10	13	16
*Total infectious syphilis cases	454	432	608	591	510
Male infectious syphilis rate per 100,000	19.5	17.7	25.3	24.0	20.1
Female infectious syphilis rate per 100,000	0.3	0.8	0.4	0.5	0.6
*Total infectious syphilis rate per 100,000	9.8	9.2	12.7	12.2	10.4

\*Total includes unspecified sex

**MANITOBA**

2013 2014 2015 2016 2017

Number of cases and rates	Chlamydia				
	Male chlamydia cases	2,255	2,271	2,310	2,633
Female chlamydia cases	4,165	4,023	4,229	4,565	4,560
*Total chlamydia cases	6,420	6,294	6,539	7,202	7,249
Male chlamydia rate per 100,000	358.6	356.9	358.9	401.7	403.3
Female chlamydia rate per 100,000	655.0	626.0	652.0	693.0	681.9
*Total chlamydia rate per 100,000	507.7	492.1	506.0	548.0	542.8
	Gonorrhea				
Male gonorrhea cases	536	509	480	1,040	1,572
Female gonorrhea cases	681	598	605	1,200	1,767
*Total gonorrhea cases	1,217	1,107	1,085	2,240	3,339
Male gonorrhea rate per 100,000	85.2	80.0	74.6	158.7	235.8
Female gonorrhea rate per 100,000	107.1	93.1	93.3	182.2	264.2
*Total gonorrhea rate per 100,000	96.2	86.6	84.0	170.5	250.0
	Infectious Syphilis				
Male infectious syphilis cases	53	102	155	158	156
Female infectious syphilis cases	6	16	50	74	95
*Total infectious syphilis cases	59	118	205	232	251
Male infectious syphilis rate per 100,000	8.4	16.0	24.1	24.1	23.4
Female infectious syphilis rate per 100,000	0.9	2.5	7.7	11.2	14.2
*Total infectious syphilis rate per 100,000	4.7	9.2	15.9	17.7	18.8
<b>*Total includes unspecified sex</b>					

**NEW BRUNSWICK**

2013 2014 2015 2016 2017

Number of cases and rates	Chlamydia				
	Male chlamydia cases	588	570	668	675
Female chlamydia cases	1,182	1,176	1,223	1,271	1,361
*Total chlamydia cases	1,770	1,746	1,891	1,946	2,119
Male chlamydia rate per 100,000	156.8	151.9	178.1	178.8	199.8
Female chlamydia rate per 100,000	308.2	306.5	318.7	329.4	351.2
*Total chlamydia rate per 100,000	233.3	230.0	249.2	254.9	276.3
	Gonorrhea				
Male gonorrhea cases	33	32	28	40	33
Female gonorrhea cases	14	12	22	33	25
*Total gonorrhea cases	47	44	50	73	58
Male gonorrhea rate per 100,000	8.8	8.5	7.5	10.6	8.7
Female gonorrhea rate per 100,000	3.7	3.1	5.7	8.6	6.5
*Total gonorrhea rate per 100,000	6.2	5.8	6.6	9.6	7.6
	Infectious Syphilis				
Male infectious syphilis cases	33	26	27	13	17
Female infectious syphilis cases	1	1	4	0	2
*Total infectious syphilis cases	34	27	31	13	19
Male infectious syphilis rate per 100,000	8.8	6.9	7.2	3.4	4.5
Female infectious syphilis rate per 100,000	0.3	0.3	1.0	0.0	0.5
*Total infectious syphilis rate per 100,000	4.5	3.6	4.1	1.7	2.5
<b>*Total includes unspecified sex</b>					

**NEWFOUNDLAND AND  
LABRADOR**

	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	268	296	328	340	338
Female chlamydia cases	533	575	635	624	620
*Total chlamydia cases	801	871	963	964	958
Male chlamydia rate per 100,000	102.9	113.3	125.4	129.5	129.0
Female chlamydia rate per 100,000	199.9	215.5	238.3	233.8	232.6
*Total chlamydia rate per 100,000	152.0	164.9	182.3	182.1	181.2
	<b>Gonorrhoea</b>				
Male gonorrhoea cases	22	41	25	25	22
Female gonorrhoea cases	19	25	13	10	6
*Total gonorrhoea cases	41	66	38	35	28
Male gonorrhoea rate per 100,000	8.4	15.7	9.6	9.5	8.4
Female gonorrhoea rate per 100,000	7.1	9.4	4.9	3.7	2.3
*Total gonorrhoea rate per 100,000	7.8	12.5	7.2	6.6	5.3
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	7	24	33	21	34
Female infectious syphilis cases	1	0	1	2	5
*Total infectious syphilis cases	8	24	34	23	39
Male infectious syphilis rate per 100,000	2.7	9.2	12.6	8.0	13.0
Female infectious syphilis rate per 100,000	0.4	0.0	0.4	0.7	1.9
*Total infectious syphilis rate per 100,000	1.5	4.5	6.4	4.3	7.4
<b>*Total includes unspecified sex</b>					

<b>NORTHWEST TERRITORIES</b>	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	311	314	361	351	352
Female chlamydia cases	559	512	525	533	521
*Total chlamydia cases	870	826	886	884	873
Male chlamydia rate per 100,000	1,385.8	1,397.5	1,595.7	1,528.5	1,522.8
Female chlamydia rate per 100,000	2,616.7	2,390.8	2,429.1	2,457.9	2,387.6
*Total chlamydia rate per 100,000	1,986.1	1,882.2	2,002.8	1,979.9	1,942.8
	<b>Gonorrhoea</b>				
Male gonorrhoea cases	36	114	174	242	240
Female gonorrhoea cases	61	131	187	227	237
*Total gonorrhoea cases	97	245	361	469	477
Male gonorrhoea rate per 100,000	160.4	507.4	769.1	1,053.8	1,038.3
Female gonorrhoea rate per 100,000	285.5	611.7	865.2	1,046.8	1,086.1
*Total gonorrhoea rate per 100,000	221.4	558.3	816.1	1,050.4	1,061.5
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	0	0	1	0	5
Female infectious syphilis cases	0	0	0	0	0
*Total infectious syphilis cases	0	0	1	0	5
Male infectious syphilis rate per 100,000	0.0	0.0	4.4	0.0	21.6
Female infectious syphilis rate per 100,000	0.0	0.0	0.0	0.0	0.0
*Total infectious syphilis rate per 100,000	0.0	0.0	2.3	0.0	11.1
<b>*Total includes unspecified sex</b>					

<b>NOVA SCOTIA</b>	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	737	843	934	983	998
Female chlamydia cases	1,727	1,783	1,898	1,954	1,985
*Total chlamydia cases	2,464	2,628	2,835	2,940	2,985
Male chlamydia rate per 100,000	160.0	183.6	204.1	213.4	214.8
Female chlamydia rate per 100,000	360.0	372.0	396.4	405.3	408.4
*Total chlamydia rate per 100,000	262.0	280.0	302.7	311.8	314.0
	<b>Gonorrhoea</b>				
Male gonorrhoea cases	59	80	78	131	145
Female gonorrhoea cases	38	34	55	72	87
*Total gonorrhoea cases	97	114	133	203	232
Male gonorrhoea rate per 100,000	12.8	17.4	17.0	28.4	31.2
Female gonorrhoea rate per 100,000	7.9	7.1	11.5	14.9	17.9
*Total gonorrhoea rate per 100,000	10.3	12.1	14.2	21.5	24.4
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	80	61	38	17	25
Female infectious syphilis cases	3	3	5	0	1
*Total infectious syphilis cases	83	64	43	17	26
Male infectious syphilis rate per 100,000	17.4	13.3	8.3	3.7	5.4
Female infectious syphilis rate per 100,000	0.6	0.6	1.0	0.0	0.2
*Total infectious syphilis rate per 100,000	8.8	6.8	4.6	1.8	2.7
<b>*Total includes unspecified sex</b>					

<b>NUNAVUT</b>	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>					
	<b>Chlamydia</b>				
Male chlamydia cases	521	433	504	462	509
Female chlamydia cases	954	851	873	896	951
*Total chlamydia cases	1,475	1,284	1,377	1,358	1,460
Male chlamydia rate per 100,000	2,851.7	2,335.9	2,689.9	2,432.2	2,638.8
Female chlamydia rate per 100,000	5,589.7	4,881.3	4,918.0	4,983.3	5,207.2
*Total chlamydia rate per 100,000	4,174.1	3,569.5	3,773.8	3,672.8	3,887.9
	<b>Gonorrhea</b>				
Male gonorrhea cases	163	131	112	65	230
Female gonorrhea cases	302	195	190	122	315
*Total gonorrhea cases	466	326	302	187	545
Male gonorrhea rate per 100,000	892.2	706.7	597.7	342.2	1,192.4
Female gonorrhea rate per 100,000	1,769.5	1,118.5	1,070.4	678.5	1,724.8
*Total gonorrhea rate per 100,000	1,318.7	906.3	827.7	505.7	1,451.3
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	31	37	25	45	33
Female infectious syphilis cases	26	45	26	52	55
*Total infectious syphilis cases	57	82	51	97	88
Male infectious syphilis rate per 100,000	169.7	199.6	133.4	236.9	171.1
Female infectious syphilis rate per 100,000	152.3	258.1	146.5	289.2	301.2
*Total infectious syphilis rate per 100,000	161.3	228.0	139.8	262.3	234.3
<b>*Total includes unspecified sex</b>					

<b>ONTARIO</b>	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	13,352	14,047	15,456	16,831	18,433
Female chlamydia cases	21,317	21,922	23,551	24,974	26,134
*Total chlamydia cases	34,684	35,987	39,044	41,854	44,651
Male chlamydia rate per 100,000	201.0	209.7	229.1	246.2	265.7
Female chlamydia rate per 100,000	310.4	316.9	338.4	354.8	366.3
*Total chlamydia rate per 100,000	256.7	264.3	284.8	301.6	317.3
	<b>Gonorrhea</b>				
Male gonorrhea cases	2,851	3,811	3,950	4,478	5,534
Female gonorrhea cases	1,685	2,020	1,982	2,296	2,281
*Total gonorrhea cases	4,542	5,840	5,939	6,785	7,845
Male gonorrhea rate per 100,000	42.9	56.9	58.5	65.5	79.8
Female gonorrhea rate per 100,000	24.5	29.2	28.5	32.6	32.0
*Total gonorrhea rate per 100,000	33.6	42.9	43.3	48.9	55.8
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	701	846	1,048	1,358	1,492
Female infectious syphilis cases	43	35	41	71	72
*Total infectious syphilis cases	746	882	1,092	1,437	1,571
Male infectious syphilis rate per 100,000	10.6	12.6	15.5	19.9	21.5
Female infectious syphilis rate per 100,000	0.6	0.5	0.6	1.0	1.0
*Total infectious syphilis rate per 100,000	5.5	6.5	8.0	10.4	11.2
<b>*Total includes unspecified sex</b>					

<b>PRINCE EDWARD ISLAND</b>	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	86	72	88	84	109
Female chlamydia cases	156	182	139	205	220
*Total chlamydia cases	242	254	227	289	329
Male chlamydia rate per 100,000	122.7	102.5	125.0	117.2	148.0
Female chlamydia rate per 100,000	210.8	245.8	187.4	272.2	285.9
*Total chlamydia rate per 100,000	167.9	176.0	157.0	196.6	218.5
	<b>Gonorrhoea</b>				
Male gonorrhoea cases	2	3	7	8	12
Female gonorrhoea cases	4	4	3	4	6
*Total gonorrhoea cases	6	7	10	12	18
Male gonorrhoea rate per 100,000	2.9	4.3	9.9	11.2	16.3
Female gonorrhoea rate per 100,000	5.4	5.4	4.0	5.3	7.8
*Total gonorrhoea rate per 100,000	4.2	4.9	6.9	8.2	12.0
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	3	8	7	2	2
Female infectious syphilis cases	2	1	2	0	2
*Total infectious syphilis cases	5	9	9	2	4
Male infectious syphilis rate per 100,000	4.3	11.4	9.9	2.8	2.7
Female infectious syphilis rate per 100,000	2.7	1.4	2.7	0.0	2.6
*Total infectious syphilis rate per 100,000	3.5	6.2	6.2	1.4	2.7
<b>*Total includes unspecified sex</b>					

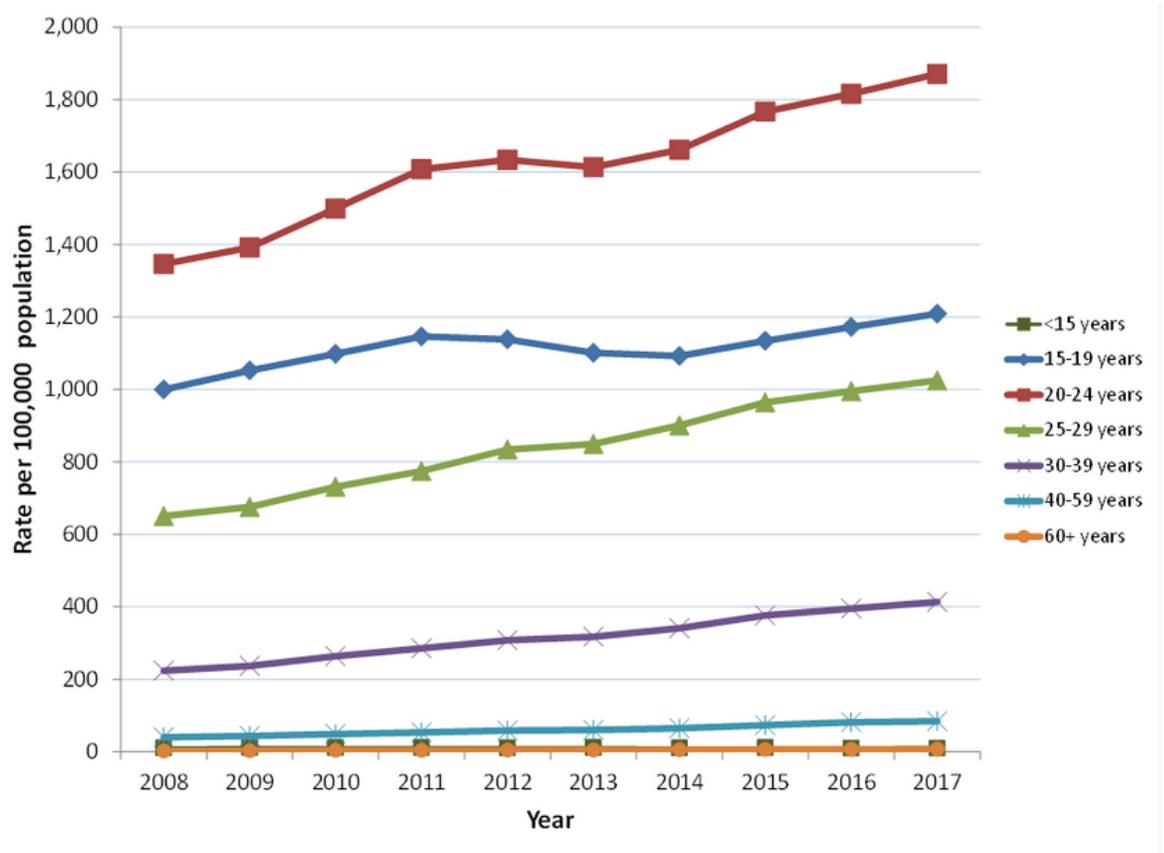
<b>QUEBEC</b>	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	7,708	8,245	8,989	9,566	10,340
Female chlamydia cases	14,486	14,985	15,303	15,760	16,210
*Total chlamydia cases	22,262	23,305	24,390	25,410	26,628
Male chlamydia rate per 100,000	191.2	203.4	221.0	233.6	250.1
Female chlamydia rate per 100,000	355.2	365.8	372.6	381.6	389.3
*Total chlamydia rate per 100,000	274.5	285.9	298.3	308.9	320.9
	<b>Gonorrhea</b>				
Male gonorrhea cases	1,733	2,361	2,832	3,752	4,810
Female gonorrhea cases	888	910	1,047	995	1,317
*Total gonorrhea cases	2,634	3,287	3,895	4,773	6,141
Male gonorrhea rate per 100,000	43.0	58.2	69.6	91.6	116.4
Female gonorrhea rate per 100,000	21.8	22.2	25.5	24.1	31.6
*Total gonorrhea rate per 100,000	32.5	40.3	47.6	58.0	74.0
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	597	542	707	922	846
Female infectious syphilis cases	28	33	25	41	68
*Total infectious syphilis cases	626	576	732	965	915
Male infectious syphilis rate per 100,000	14.8	13.4	17.4	22.5	20.5
Female infectious syphilis rate per 100,000	0.7	0.8	0.6	1.0	1.6
*Total infectious syphilis rate per 100,000	7.7	7.1	9.0	11.7	11.0
<b>*Total includes unspecified sex</b>					

<b>SASKATCHEWAN</b>	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	1,967	2,031	2,188	2,281	2,377
Female chlamydia cases	3,804	3,775	3,903	3,961	4,155
*Total chlamydia cases	5,771	5,807	6,091	6,242	6,493
Male chlamydia rate per 100,000	355.3	362.1	387.5	398.7	410.0
Female chlamydia rate per 100,000	696.5	683.7	701.5	702.5	727.6
*Total chlamydia rate per 100,000	524.8	521.8	543.4	549.5	564.2
	<b>Gonorrhea</b>				
Male gonorrhea cases	532	604	458	686	1,032
Female gonorrhea cases	681	635	499	699	1,190
*Total gonorrhea cases	1,213	1,240	957	1,385	2,222
Male gonorrhea rate per 100,000	96.1	107.7	81.1	119.9	178.0
Female gonorrhea rate per 100,000	124.7	115.0	89.7	124.0	208.4
*Total gonorrhea rate per 100,000	110.3	111.4	85.4	121.9	193.1
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	12	28	20	79	111
Female infectious syphilis cases	5	0	4	6	9
*Total infectious syphilis cases	17	28	24	85	120
Male infectious syphilis rate per 100,000	2.2	5.0	3.5	13.8	19.1
Female infectious syphilis rate per 100,000	0.9	0.0	0.7	1.1	1.6
*Total infectious syphilis rate per 100,000	1.5	2.5	2.1	7.5	10.4
<b>*Total includes unspecified sex</b>					

<b>YUKON</b>	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	96	86	106	110	117
Female chlamydia cases	143	124	177	168	183
*Total chlamydia cases	239	210	283	278	300
Male chlamydia rate per 100,000	515.3	454.8	552.9	561.3	580.4
Female chlamydia rate per 100,000	799.3	680.3	955.8	886.6	939.9
*Total chlamydia rate per 100,000	654.4	565.5	750.9	721.2	757.0
	<b>Gonorrhea</b>				
Male gonorrhea cases	1	28	39	37	35
Female gonorrhea cases	9	21	74	38	42
*Total gonorrhea cases	10	49	113	75	77
Male gonorrhea rate per 100,000	5.4	148.1	203.4	188.8	173.6
Female gonorrhea rate per 100,000	50.3	115.2	399.6	200.5	215.7
*Total gonorrhea rate per 100,000	27.4	131.9	299.8	194.6	194.3
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	2	0	0	0	0
Female infectious syphilis cases	0	0	0	0	0
*Total infectious syphilis cases	2	0	0	0	0
Male infectious syphilis rate per 100,000	10.7	0.0	0.0	0.0	0.0
Female infectious syphilis rate per 100,000	0.0	0.0	0.0	0.0	0.0
*Total infectious syphilis rate per 100,000	5.5	0.0	0.0	0.0	0.0
<b>*Total includes unspecified sex</b>					

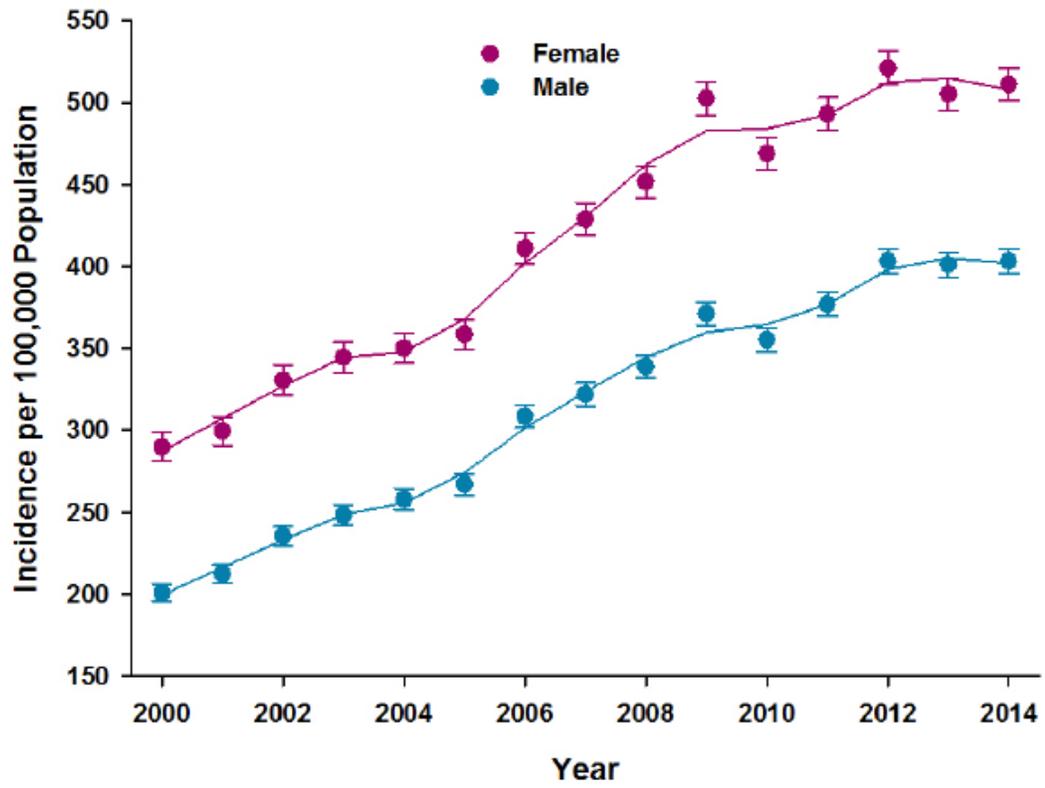
<b>CANADA</b>	2013	2014	2015	2016	2017
<b>Number of cases and rates</b>	<b>Chlamydia</b>				
Male chlamydia cases	38,508	40,656	44,266	46,927	50,137
Female chlamydia cases	66,721	68,520	72,022	74,143	75,992
*Total chlamydia cases	105,323	109,286	116,451	121,236	126,322
Male chlamydia rate per 100,000	221.3	231.2	249.9	261.9	276.5
Female chlamydia rate per 100,000	377.3	383.7	400.3	407.5	412.8
*Total chlamydia rate per 100,000	300.2	308.4	326.2	335.7	345.7
	<b>Gonorrhea</b>				
Male gonorrhea cases	8,394	10,343	12,452	15,119	18,734
Female gonorrhea cases	5,809	5,890	7,336	8,545	10,239
*Total gonorrhea cases	14,228	16,264	19,817	23,709	29,034
Male gonorrhea rate per 100,000	48.2	58.8	70.3	84.4	103.3
Female gonorrhea rate per 100,000	32.9	33.0	40.8	47.0	55.6
*Total gonorrhea rate per 100,000	40.6	45.9	55.5	65.7	79.5
	<b>Infectious Syphilis</b>				
Male infectious syphilis cases	2,066	2,232	3,009	3,548	3,622
Female infectious syphilis cases	145	164	187	311	448
*Total infectious syphilis cases	2,215	2,399	3,199	3,870	4,083
Male infectious syphilis rate per 100,000	11.9	12.7	17.0	19.8	20.0
Female infectious syphilis rate per 100,000	0.8	0.9	1.0	1.7	2.4
*Total infectious syphilis rate per 100,000	6.3	6.8	9.0	10.7	11.2
<b>*Total includes unspecified sex</b>					

**A.3 : Rates of reported chlamydia cases in Canada, by age group and year, 2008-2017**



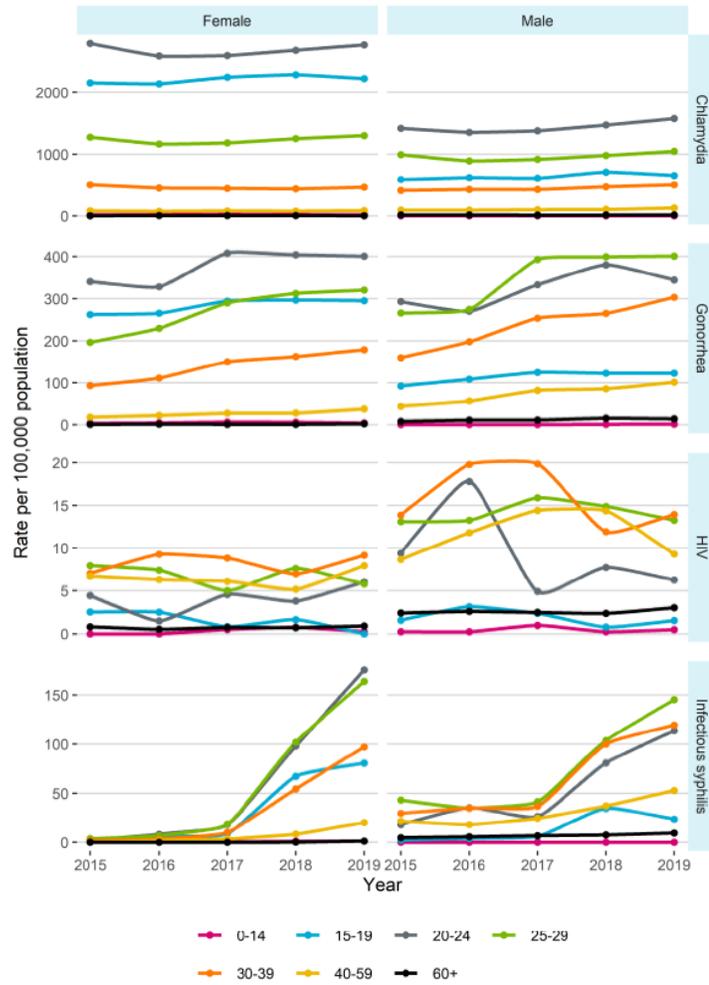
Appendix B : Incidence Rate (per 100, 000) of Chlamydia in Alberta, 2000-2015

(Alberta Health, 2015)

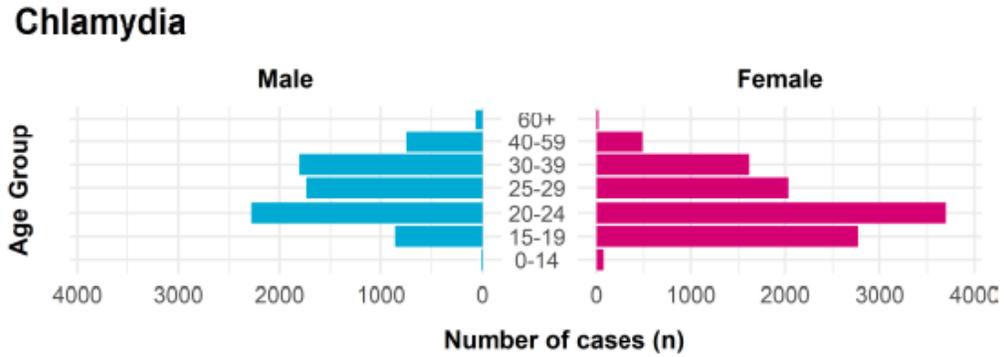


**Appendix C : Incidence Rate (per 100,000) of STI/HIV in Alberta and Calgary (all diagrams copied from Alberta Sexually Transmitted Infections and HIV 2019 (Alberta Health, 2020).**

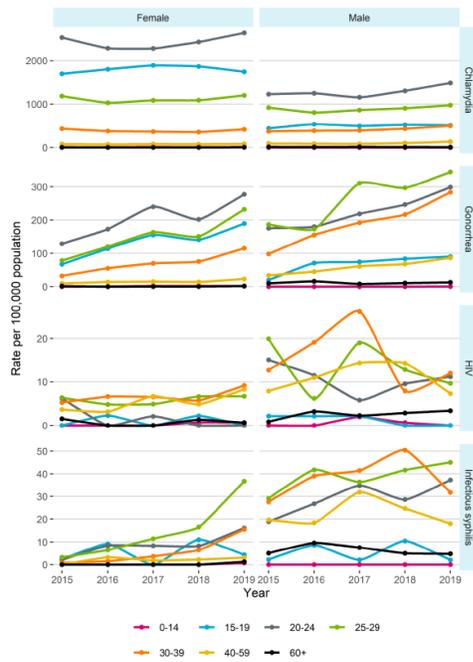
**C.1 : STI/HIV rates by age and gender in Alberta, 2015 to 2019.**



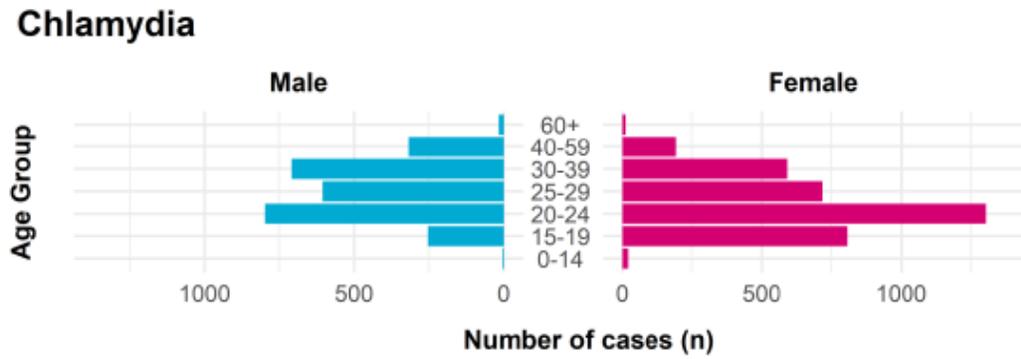
**C.2 : Chlamydia cases by age and gender in Alberta, 2019.**



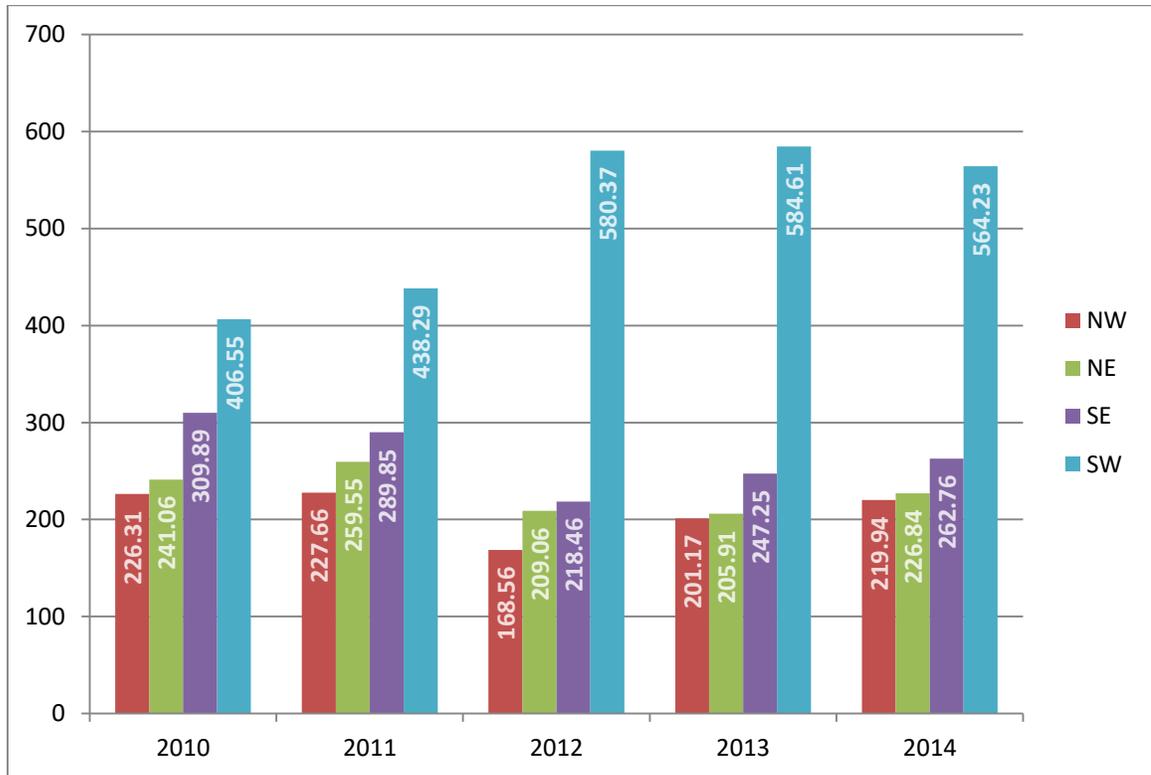
**C.3 : STI/HIV rates by age and gender in Calgary Zone, 2015 to 2019.**



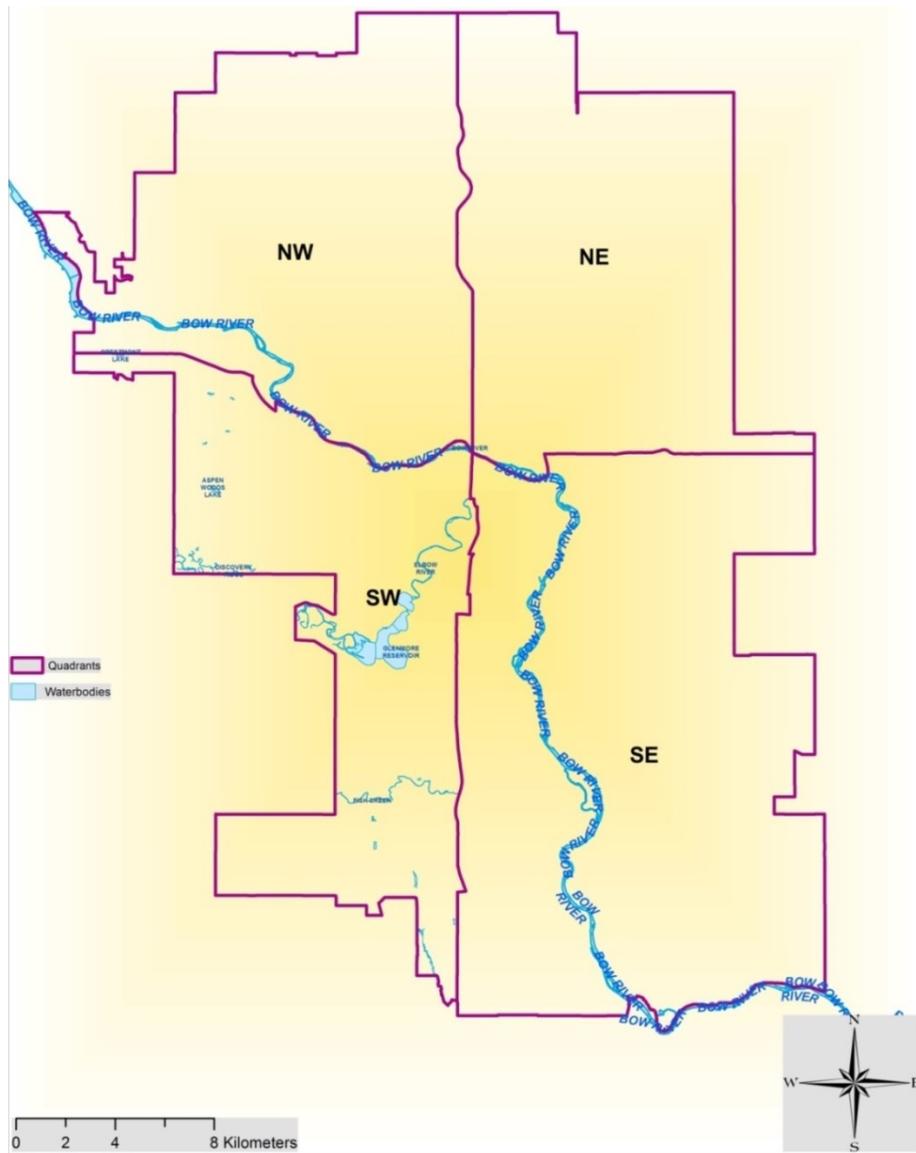
**C.4 : Chlamydia cases by age and gender in Calgary Zone, 2019.**



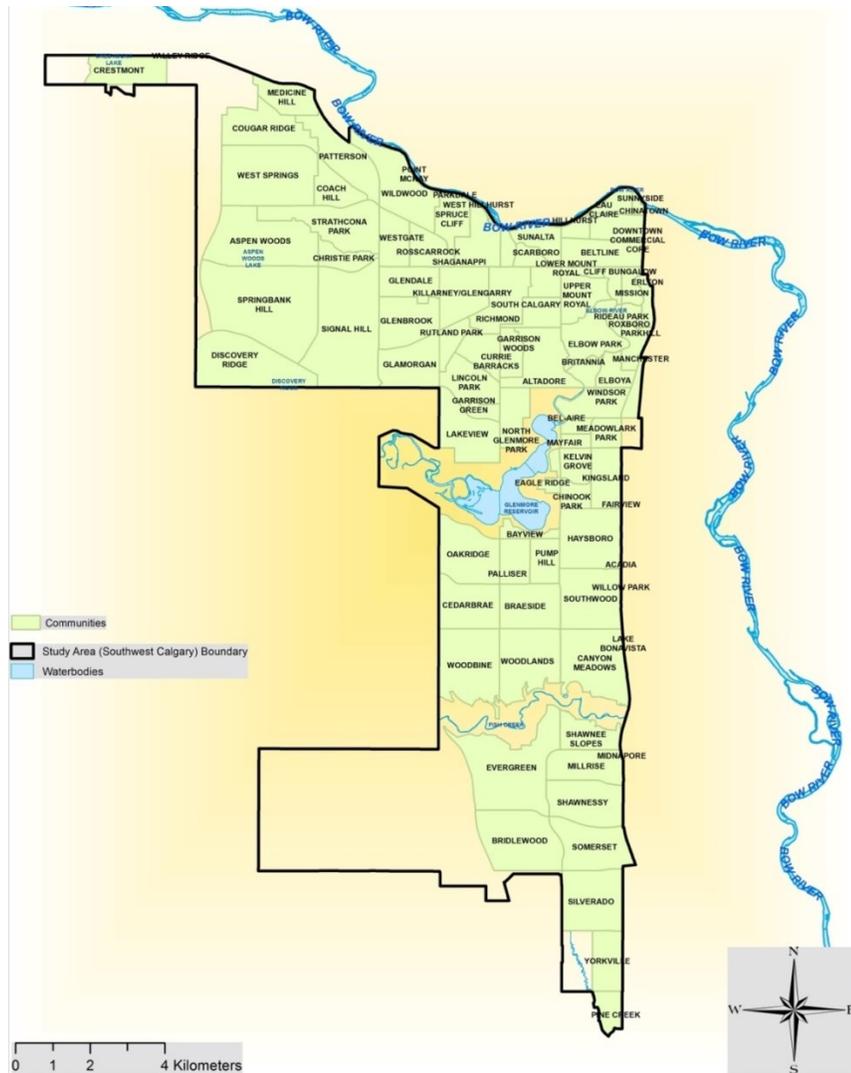
**Appendix D : Comparison of Chlamydia Incidence Rates among the Quadrants of Calgary, 2010 to 2014.**



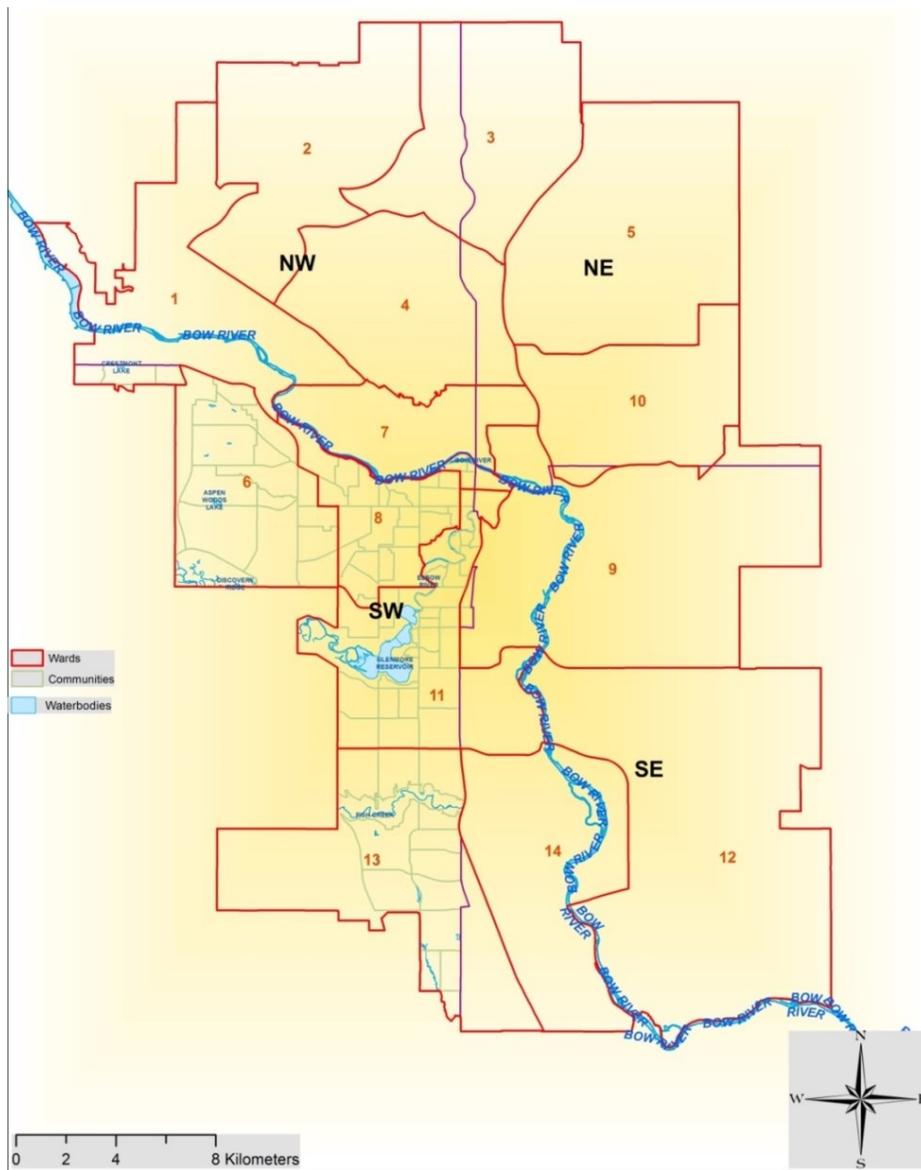
## Appendix E : Calgary Showing All Four Quadrants



## Appendix F : Communities in the Southwest Quadrant of Calgary



## Appendix G : City of Calgary Ward Boundaries



## **Appendix H : Interview Schedules**

### **H.1 : Interview Protocol for Youth**

**Title: Preventive Services and Facilities for Chlamydia in Southwest Calgary: a Mixed-Methods Study of the Barriers to Access and Use among Youth (Protocol number #109040; U of Alberta Ethics ID Pro00083519)**

This questionnaire will help the researcher to establish the demographic profile of all interviewees. Please, could you fill this out after the interview? You can withdraw at any time, for any reason, or refuse to answer any question.

**Time of interview:**

**Date:**

**Place:**

**Pseudonym (to be filled by the researcher):**

**Demographic Questions. Please circle what applies.**

1. What is your assigned biological sex?
  - a. Male
  - b. Female
2. What is your age group?
  - a. 15-19 years
  - b. 20-24 years
3. Do you consider yourself as part of a racialized group?

- a. Yes
  - b. No
4. Are you sexually active?
- a. Yes
  - b. No
5. What is your relationship status?
- a. Married
  - b. Dating
  - c. Common-law
  - d. Separated
  - e. Divorced
  - f. Single
  - g. Other: please specify \_\_\_\_\_
6. In your opinion, does one have to be sexually active before they access chlamydia prevention resources?
- a. Yes
  - b. No
7. Please could you indicate your postal code? [This is needed to help the researcher better analyze the data; you will not be identified in the process]
- \_\_\_\_\_
8. What is the highest level of education you have attained?
- a. Completed a University or College Degree
  - b. Completed Trade Certificate or Apprenticeship
  - c. Completed Senior High school
  - d. Completed Junior High school
  - e. Completed Elementary school
  - f. No formal education
  - g. Other: please specify \_\_\_\_\_

9. For how long have you lived in Calgary?
  - a. I was born here
  - b. More than 1 year
  - c. Less than 1 year

**[You can withdraw at any time, for any reason, or refuse to answer any question. Please if, for any reason, you feel any form of distress after the interview process, you may contact any of the organizations indicated on the sheet that you will be provided with after the interview for counseling]**

1. What do you know about chlamydia?
2. What do you know about existing chlamydia (or other sexually transmitted infections) prevention resources - (treatment facilities and services, testing resources, education resources, including print and electronic materials) in Calgary?
3. Have you ever used any chlamydia (or other sexually transmitted infections) prevention resources? (*Either “a” or “b” below before questions 4 to 9*)
  - a. **If “yes”, what influenced your decision and ability to use those resources? *Be guided by the following questions to probe further:***
    - i. How did personal reasons influence your decision to use the resources?
    - ii. How did your relationship with others influence your decision to use the resources?
    - iii. How did the community and the social environment (e.g. school, workplace, and neighborhood) influence your decision to use the resources?

- iv. Can you think about any manner in which the nature of this society, including policies and healthcare services, might have influenced your decision to use the resources?
  - v. In your opinion, what is it about the **geography** [environment] of Southwest Calgary and Calgary as a whole that facilitates access and use of chlamydia resources?
  - vi. Based on your **experience**, what is your general impression of the nature of prevention resources in Calgary, including the Southwest?
- b. **If “No”, what do you envisage to be an influence on your ability or inability to use those resources?** *Be guided by the following questions to probe further:*
- i. How may personal reasons influence your decision not to use the resources?
  - ii. How may your relationship with others influence your decision not to use the resources?
  - iii. How may the community and the social environment (school, workplace, and neighborhood) influence your decision not to use the resources?
  - iv. Can you think about any manner in which the nature of this society, including policies and healthcare services, may influence your decision not to use the resources?
  - v. In your opinion, what is it about Southwest Calgary and Calgary as places that could either hinder or encourage access and use of chlamydia resources?
  - vi. What is your general **perception** about the nature of chlamydia prevention resources in Calgary, including the Southwest?

4. In addition to other reasons, have you ever used social media for the purpose of dating? Please could you elaborate on your response?
5. In your opinion, could social media influence the tendency for youth to engage in risky activities? Please could you elaborate on your response?
6. Have you ever, predominantly due to the use of social media, been tempted to engage in any activity that could have eventually exposed you to chlamydia? Please could you elaborate on your response?
7. Has social media impacted your knowledge and use of chlamydia prevention resources? Please could you elaborate on your response?
8. If you were to be a user of any social media dating application, how would you feel about seeing sexual health ads on the sites you visit? How would you feel if you receive a reminder to test after confirming to hook-up with somebody through a social network?
9. How may we improve upon knowledge, access, and use of chlamydia prevention services access and use among youth in Southwest Calgary, and Calgary as a whole?

**Thank you very much for participating in this interview. Please be assured of the absolute confidentiality of the conversation that has ensued between us. No identifying information will be used when the study is published.**

**[Questionnaire and list of counselors to be given to participant]**

## **H.2 : Interview Protocol for Service Providers**

**Title: Preventive Services and Facilities for Chlamydia in Southwest Calgary: a Mixed-Methods Study of the Barriers to Access and Use among Youth (Protocol number #109040; U of Alberta Ethics ID Pro00083519)**

**Time of interview:**

**Date:**

**Place:**

**Pseudonym: (to be filled by the researcher):**

**[The nature of some of the questions might make it impossible for your identity to be hidden. To mitigate this risk of you being identified, identifying information will be removed from the published research. You may withdraw at any time, for any reason, or refuse to answer any question].**

1. For approximately how long have you been working with youth?
2. What is the nature of the service you provide for youth?
3. Could you elaborate on the nature of the challenges you face working with youth in Calgary?
4. In your opinion, how may youth be hindered from accessing chlamydia resources (important to let interviewees understand that resources include information that helps them to make informed choices) in Calgary?
5. How, in your opinion, does geography influence access and use of chlamydia prevention resources among youth in Calgary?
6. How, in your opinion, does geography influence risky behavior among youth in Calgary?

7. How would you react to this statement: “Social media are responsible for high chlamydia incidence among youth in Calgary”?
8. Could you comment on the high incidence of chlamydia recorded in Southwest Calgary?
9. Could you comment on anything that encourages youth to use existing resources, including the services you offer?
10. How may we improve upon access and use of chlamydia resources among youth?

**Thank you very much for participating in this interview. Please be assured of the absolute confidentiality of the conversation that has ensued between us. No identifying information will be used when the study is published.**

## **Appendix I : Survey**

**Title: Preventive Services and Facilities for Chlamydia in Southwest Calgary: a Mixed-Methods Study of the Barriers to Access and Use among Youth (Protocol number #109040; U of Alberta Ethics ID Pro00083519)**

Thank you for making time to complete this important survey on the social and geographical factors that could prevent youth in Calgary from using preventive resources for chlamydia [and other sexually transmitted infections]. We think that Calgary will benefit a lot from your responses. Your responses will help us to suggest useful ways to improve sexual health resources in Calgary. In addition, when we are finished with this study, we will write a report about what was learned. At the end of the survey, an email address you may provide will be entered into a draw during which you could win a \$25 Tim Horton's gift card. The survey should take only 13 minutes, and be completely assured that nobody can identify you with the responses you give.

### **Section A: Demographic Questions. Please select what applies**

1. What sex were you assigned at birth? **[Please select one]**
  - a. Male
  - b. Female
2. What is your age group? **[Please select one]**
  - a. 15-19 years
  - b. 20-24 years
3. Do you consider yourself a racialized person? **[Please select one]**
  - a. Yes
  - b. No
4. What is your relationship status? **[Please select one]**

- a. Married
  - b. Dating
  - c. Common-law
  - d. Separated
  - e. Divorced
  - f. Complicated
  - g. Single
  - h. Other: please specify \_\_\_\_\_
5. What is the highest level of education you have attained? **[Please select one]**
- a. Completed a University or College Degree
  - b. Completed Trade Certificate or Apprenticeship
  - c. Completed Senior High school
  - d. Completed Junior High school
  - e. Completed Elementary school
  - f. No formal education
  - g. Other: please specify \_\_\_\_\_
6. For how long have you lived in Calgary? **[Please select one]**
- a. More than 1 year
  - b. Less than 1 year
7. Please could you indicate your postal code or just the first 3 digits of your postal code? [This is needed to facilitate geographic analysis of responses; you will not be identified in the process] \_\_\_\_\_
8. In which community do you reside? [This is needed to help the researcher better analyze the data; you will not be identified in the process] Please specify  
\_\_\_\_\_

**Section B: Use of preventive resources for chlamydia [and other sexually transmitted infections] ["Resources" refers to any kind of information, facility, or**

**service, including online ones, which are helpful to preventing and even treating chlamydia infection].**

9. Which chlamydia preventive resources have you used [or heard about] before?

**[Please select all those that apply]**

- a. Calgary Sexual Health Centre
- b. Calgary STI Clinic (Sheldon Chumir Health Centre)
- c. The Alex Community Health Center
- d. Mosaic Women's Clinic
- e. Alberta Health Services Sexual and Reproductive Health
- f. Alberta Health Services Social Media pages
- g. Other: please specify \_\_\_\_\_
- h. None

**Skip to question 14 if selected "None" for question 9**

10. What was the **first** source of the information you received about the first preventive resource(s) you used [or heard about]? **[Please select one]**

- a. Teacher
- b. Family Doctor
- c. Peers
- d. Radio ad
- e. Television ad
- f. Mail Flyer
- g. Internet Search
- h. Social Media
- i. Family
- j. Other: please specify \_\_\_\_\_
- k. Do not remember

11. Have you ever used any preventive resource for chlamydia or any other sexually transmitted infection?
- a. Yes
  - b. No

**Skip to question 14 if you selected “No” for question 11**

12. Based on your experience, how may you generally rate the ease of accessing and using preventive resources for sexually transmitted infections? **[Please select one]**
- a. Very easy and straightforward process
  - b. Fairly easy and straightforward process
  - c. Very difficult and complicated process
  - d. Fairly difficult and complicated process
13. How helpful was the preventive resource that you used? **[Please select one]**
- a. Extremely helpful
  - b. Fairly helpful
  - c. Extremely unhelpful
  - d. Fairly unhelpful

**Section C: Barriers to access and use of preventive resources for chlamydia [and other sexually transmitted infections] among youth.**

14. Which three (3) of the barriers to youth access and use of preventive resources below would you consider the most significant? **[Please select a maximum of three]**
- a. I believe that I will not contract a sexually transmitted infection
  - b. The transportation system in Calgary is unreliable
  - c. Stigma around sexually transmitted infections
  - d. Healthcare policies do not focus enough on youth
  - e. I would potentially feel uneasy using the resources

- f. I do not know much about sexually transmitted infections and the resources
  - g. Facilities are too far away from where I live
  - h. Online resources are unreliable and youth-unfriendly
  - i. Hospitals and clinics are too intimidating and unwelcoming to youth
  - j. Facilities are too far away from where I live
  - k. The weather in Calgary makes it difficult for me to travel to facilities
  - l. I do not hear a lot about sexually transmitted infections, even at school, so I am not influenced enough
  - m. Provider hours of operation are too restrictive
  - n. There are no means of affordable transportation
  - o. Other: please specify
- 

15. Which one of the following personal reasons would be the strongest to discourage you from using preventive resources for sexually transmitted infections? **[please select one]**

- a. Belief that I cannot contract a sexually transmitted infection
  - b. Fear of being judged
  - c. Not knowing how and where to access resources
  - d. Limited access to financial resources needed to be able to use resources
  - e. Feeling uncomfortable using sexual health resources
  - f. Not being aware that I could be at risk of contracting a sexually transmitted infection
  - g. Other: please specify
- 

16. Which one of the following interpersonal reasons would be the strongest to discourage you from using preventive resources for sexually transmitted infections? **[please select one]**

- a. Family members will judge me and think I am promiscuous
  - b. Shame strategies by my friends
  - c. If no family member or friend talks about sexual health issues
  - d. If my partner does not trust me
  - e. Other: please specify
- 

17. Which one of the following policy and organizational-level reasons would be the strongest to discourage you from using preventive resources for sexually transmitted infections? **[please select one]**

- a. Online information by Alberta Health Services is shame-based
  - b. Restrictive sexual health clinic or hospital hours of operation
  - c. Sexual health clinics and services are not youth-friendly
  - d. There is too much silence about sexually transmitted infections
  - e. Less influential preventive campaigns by Alberta Health Services
  - f. Sexual health policies and programs are discriminatory
  - g. Other: please specify
- 

18. Which one of the following community-level reasons would be the strongest to discourage you from using preventive resources for sexually transmitted infections? **[please select one]**

- a. It takes too much time to travel to service providers
  - b. Facilities are too close to my neighborhood thereby potentially hindering privacy
  - c. It is not closer to any means of affordable transportation
  - d. As far as I know, there are no resources around where I live
  - e. Other: please specify
-

19. In your opinion, what is it about Calgary and/or Southwest Calgary that make [or might make] it even more difficult for youth to use a preventive resource for sexually transmitted infections? **[please select one]**

- a. Services and facilities are too far apart
- b. Unreliable public modes of transportation
- c. Difficulty traveling during winter
- d. Facilities are not close to train line and bus stops
- e. Conservative community, so they don't talk about sexual health issues frequently
- f. Racial differences prevent conversations about sexual health
- g. Other: please specify

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**Section D: Social media dating apps and sexual health**

20. In your opinion, to what extent does the use of social media dating apps make it easy for youth to engage in risky sexual activities? ["Risky sexual activities" are those that increase one's chances of getting infected with a sexually transmitted infection] **[please select one]**

- a. To a very great extent
- b. To a moderate extent
- c. To a minimal extent
- d. It has no influence at all

**Skip to question 22 if you selected "It has no influence at all" for question 20**

21. In your opinion, how might social media dating apps influence youth to engage in risky sexual activities? **[please select one]**

- a. Hooking up with as many partners as they wish is easy
- b. Hooking up through social media is fast and unrestricted

- c. It exposes youth to sexually arousing content
  - d. The location features on some dating apps could make it easier for youth to arrange quick casual sexual encounters
  - e. Youth can keep their sexual encounters private
  - f. Other: please specify
- 

22. How would you rate the extent to which social media could impact your knowledge and use of preventive resources for sexually transmitted infections?

**[please select one]**

- a. To a very great extent
- b. To a moderate extent
- c. To a minimal extent
- d. No impact at all

23. Assuming that you were a user of a dating app, and assuming that you confirmed to hook up sexually with someone, how would you feel about an automatic message that would tell you to access preventive resources for sexually transmitted infections before a sexual encounter? **[please select one]**

- a. It would be too invasive and falsely-assuming since people don't always end up having sex
- b. It would be a great idea since people tend to forget easily
- c. It does not really matter to me

### **Section E: Recommendations**

24. Based on your experience as a resident of Calgary, how satisfied are you with the efforts being made by Alberta Health Services to make it easier for youth to know about and actually use existing preventive resources for chlamydia and sexually transmitted infections? **[please select one]**

- a. Extremely satisfied

- b. Somewhat satisfied
- c. Somewhat dissatisfied
- d. Extremely dissatisfied

25. In your opinion, what could be done in order to improve upon access and use of preventive resources for sexually transmitted infections among youth? **[Please select your top 3]**

- a. Bringing more services into neighborhoods to reduce travel times
- b. Increasing ads on social media to promote awareness about resources
- c. Making public transportation more affordable and reliable
- d. Bringing sexual health symposiums and workshops into communities
- e. Circulating family-friendly sexual health flyers and brochures
- f. Extending facility hours of operation
- g. Having a central online information center on preventive resources
- h. Making resources, including clinics and online resources more youth-friendly
- i. Having test reminder ads on dating apps
- j. Other \_\_\_\_\_

## Appendix J : Interview Transcripts (Samples) – Youth

Knowledge about chlamydia	<i>I don't really know much about it, but it's an STI. I don't really know what the symptoms are or... I am not sure (FR1)</i>
Knowledge about chlamydia and other STI resources	The facility that I would know of if I was looking for informations will be the Calgary Sexual Health Center (FR1)
Ever used a preventative resource?	No, I haven't ever used the resources (FR1)
Barriers and/or Facilitators	<i>I think things like current sexual activity. For me I am not having sex with multiple partners so I wouldn't think that I would need to access that information right away. Depending on where the information is; whether there was some of my students really there, it could make me feel uncomfortable. If it was open, confidential, then you could go... The Calgary Sexual Health Center [is] the main one I can think of in my head, and those are not always easier to get to... When I go to the doctor's, I see pamphlets for STIs and they are there like 'oh you can access the information' but only the people who go there really regularly to the doctor will be able to see that there is other information... The only last time I remember hearing about STIs and even chlamydia was in high school... Where do hear about this information... Calgary is so big so how is the information being known specifically in communities where those kind of things [go on]... I don't know if I would think specifically about chlamydia. If I think of prevention, I think specifically of all STIs. I don't really know if there is anything specific to chlamydia, [With respect to STIs], even the SW is really large, so I don't really know... if there is a place that feels like it's well-go in your community that you could go to actually [access services]... where you would feel comfortable like you are part of the community, it's all over [laughs]... (FR1)</i>
Social media for dating purposes	Not specifically [used social media for dating]. But I have used an app before. Not one that looks like Tinder... (FR1)
Social media and Risky Sexual Behaviours	<i>I should think "yes" [social media can influence risky sexual behaviours] in the sense that... especially when I was 18 [years]... I kind of think that those apps don't really tell you, like it's not warning you about risks that you take like risks that come with you being sexually active... "Oh, hook up"... There is nothing to tell you that "oh you are are happy now, hook up, but this is the thing that you should make sure you are being careful"...it just talks in this way that is just fun, [but it is] not there isn't like real consequences (FR1)</i>
Social media influenced tendency for you to engage in risky sexual activities	No

Social media impacted knowledge and/or use of preventative resources	<i>The only thing I could think of would be if you search for things on Google and your ads on Facebook could affect what you see coz it could tell you about the Calgary Sexual Health Center... and if I am interested in something then I look that up... I look up that page and I would probably see advertisements of it... But, otherwise I don't it's really impacted me. I don't think people really talk about that on social media (FR1)</i>
View about sexual ads on social media dating sites	<i>I think that [ads on hookup apps] would be really good Because, especially for a mainstream application, with a bunch of people will be using it so it wouldn't seem weird... I think part of the reason why maybe it's hard to access resources is because of shame. You've hooked up and you wanna get checked, you are worried like "oh that's awkward"... whereas if that became a norm, everyone is seeing that on the app then it wouldn't be as awkward anymore. It would just be like that's the thing you are supposed to do (FR1).</i>
Recommendations	<i>I think that if there is something that's done after you are in high school. If there is a way to reach out to older, young adults kind of demographic kind of people... Because I think there is not really anything. The only knowledge that you have about it is like when you were last talked about it unless you have to go specifically to a clinic to get treated... (FR1)</i>  <b>Other items mentioned.</b> <ul style="list-style-type: none"> <li>• Advertisement on social media all the time so that people would not feel as awkward about it</li> <li>• Anonymous thing about it and be aware.</li> </ul>

Knowledge about chlamydia	Knows it is an STD from first year in university. They were told about safe sex and everything about STIs. Knowing specifically about chlamydia is not any different from knowing generally about STIs. Make sure you are practicing safe sex no matter what STI there might be.
Knowledge about chlamydia and other STI resources	Knows there is treatment if you go out and look for it at clinics and hospitals Knows nothing about STI-only resources. However, he knows that you can go to the walk-in clinic or family doctor and get prescriptions. He is aware of the resources but he is aware that they are like any general or regular doctor's appointment and that it is confidential.  Nothing was said about STIs in High School.
Ever used a preventative resource?	No, because he has enough knowledge to stay safe.
Barriers and/or Facilitators	<p><b>Personal Barriers: (Shyness and embarrassment)</b> <i>I think it's more convenient honestly to use the online [resources]. I think it's more efficient to go in person to ask any the questions you have with the doctor and just to show your face. I think online, most people would do online just because they don't have to interact with someone about it. It wouldn't be a barrier for online per se but in person it will be a barrier because you don't want to tell a doctor that you are having that problem (MR3).</i></p> <p><b>Social Environment:</b> <i>Just because you just wanna make sure you guys are all safe and healthy and well and wanna make sure everyone doesn't have to deal with that problem. I think mostly the school because the school tries to be proactive, ensure you prevent these things but not so much as the workplace, doesn't have information about it, much information, awareness programs (MR3).</i></p> <p><b>Policy and Healthcare System:</b> <i>They don't really try to advertise like "if you have a problem or something, you can always come here". I think they just assume that we all know that it's there since we all have the free healthcare but they don't specifically touch base on the STDs and stuff like that (MR3).</i></p> <p><b>SW:</b> <i>In the SW, I don't think so, the way it's laid out and everything maybe a few years ago it would have been difficult [to access facilities] when we were starting to expand our community and the transit systems weren't the best. But I think now with all the, especially now with Uber and with all the public transit, the buses, train, I think now it is easy to go places and within my area I can think of 4 medical clinics I could go within 20 km radius. There is a lot of places you could go to as well so I think in the SW it is pretty easy to get access to the resources you need (MR3).</i></p> <p><i>I think other neighborhoods [in the SW] might even be better because ours is still getting developed</i></p>

	<p><i>whilst other communities have already had medical centres and stuff for a while so I must say we are just not planned out well from the beginning and then I think they will around the same places because I feel like we will mimic the plan of how everyone else did it (MR3).</i></p> <p><b>Calgary:</b> <i>If they [AHS] just were proactive about it and kind of like instead of saying that "the resources are here, whenever you need them" we have to inform people about the issues or the problem beforehand so that they don't have to deal with it when it comes. So I think Calgary can easily do that with just how we are built. With all the advertisement all over the place, I think Calgary is built well for that [promoting access to resources] but they just haven't used that to their ability (MR3).</i></p>
Social media for dating purposes	<p><b>Not a direct quote</b> No. However, used it to meet new people at school. It makes it easier for people to interact since you don't have to go to where people are to talk with them. Now you can do it from home.</p>
Social media and Risky Sexual Behaviours	<p>It could but I don't think in a bad way. It's just that don't know the facts so it will just be depending on the person and how informed they are about keeping safe. How proactive the people are.</p> <p><b>He confirmed that it doesn't matter whether the person uses social media or not. If they are not informed, then they will still end up engaging in a risky activity.</b></p>
Social media influenced tendency to engage in risky activities	<p><b>Not a direct quote</b> No. He made sure he was always safe regardless how he talked to a person. With or without social media, he was informed about STDs during his first year of school, so he thinks he would have been fine.</p>
Social media impacted knowledge and/or use of preventative resources	<i>I think just through my school social media... Not like advertisement through Alberta government or something like that. The school has an Instagram so they can inform people about it but there no advertising... In Canada the Canadian government has been advertising on social media platforms but they don't follow (MR3).</i>
View about sexual ads on social media dating sites	<p><i>I think that will be smart and like just to be safe on your part and you have to be able to trust the person so if that option is there then you can already know that you can trust the person instead of having to guess (MR3).</i></p> <p><b>Follow-up response</b> He thinks it is smart because it is proactive It helps the users to be informed and certain that they can trust the person and not worry.</p>

<b>Recommendations</b>	<i>I think just these days you need to promote it (resource availability) on social media with advertisements from Facebook, Instagram, Twitter, and everything. They are now the best place. Because everybody is on their phones and laptops all the time so if an ad pops up, they will look at it and take a little bit of time to figure out what it is (MR3).</i>
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## Appendix K : Demographics of Survey Participants whose Responses were Spatially Analyzed

Demographics of Racialized Female Survey Participants Who Provided Location Information for Spatial Analysis			
Community	15-19 years	20-24 years	Total
ASPEN WOODS	3	2	5
BANKVIEW		3	3
BELTLINE	1	2	3
BRAESIDE	2	2	4
BRIDLEWOOD	2		2
CANYON MEADOWS	1	1	2
CEDARBRAE	1	2	3
CHINOOK PARK		1	1
CHRISTIE PARK	2		2
COACH HILL	1		1
COUGAR RIDGE	1		1
DISCOVERY RIDGE		1	1
EVERGREEN	4	2	6
GLAMORGAN	1	2	3
KILLARNEY/GLENGARRY		1	1
KINGSLAND	1	1	2
LAKEVIEW	2	1	3
LINCOLN PARK	1	3	4
MILLRISE		1	1
PALLISER		1	1
PARKHILL	1		1
SHAWNESSY	1		1
SIGNAL HILL	1	1	2
SOMERSET	1	1	2
SOUTH CALGARY		1	1
SOUTHWOOD	1	1	2
SPRINGBANK HILL	2		2
STRATHCONA PARK		1	1
WEST SPRINGS	1	2	3
WESTGATE		2	2
WOODBINE	3	3	6
WOODLANDS	1	1	2
<b>Grand Total</b>	<b>35</b>	<b>39</b>	<b>74</b>

Demographics of Non-Racialized Female Survey Participants Who Provided Location Information for			
Community	15-19 years	20-24 years	Total
ALTADORE	3		3
ASPEN WOODS	4		4
BANKVIEW	1		1
BEL-AIRE	1		1
BELTLINE	2		2
BRAESIDE	3		3
BRIDLEWOOD	2		2
CANYON MEADOWS	2		2
CEDARBRAE	3		3
CHINATOWN	1		1
CHINOOK PARK	3		3
CHRISTIE PARK	3		3
COACH HILL	1		1
COUGAR RIDGE		1	1
DOWNTOWN COMMERCIAL CORE		1	1
DOWNTOWN WEST END		4	4
ELBOW PARK		3	3
ELBOVA		2	2
EVERGREEN	4		4
GARRISON GREEN	1		1
GARRISON WOODS	1		1
GLAMORGAN	1		1
GLENBROOK		2	2
GLENDALE	1		1
HAYSBORO	2		2
KILLARNEY/GLENGARRY	1		1
KINGSLAND		4	4
LAKEVIEW		5	5
LINCOLN PARK	5		5
LOWER MOUNT ROYAL		2	2
MILLRISE		2	2
MISSION		1	1
NORTH GLENMORE PARK		1	1
OAKRIDGE	3		3
PALLISER	1		1
PARKHILL		2	2
PATTERSON	1		1
RICHMOND		2	2
ROSSCARROCK		2	2
RUTLAND PARK	1		1
SHAGANAPPI		4	4
SHAWNESSY	3		3
SIGNAL HILL	3		3
SILVERADO	4		4
SOMERSET	1		1
SOUTH CALGARY	4		4
SOUTHWOOD	5		5
SPRINGBANK HILL	2		2
SPRUCE CLIFF		2	2
STRATHCONA PARK		2	2
SUNALTA		2	2
UPPER MOUNT ROYAL		1	1
WEST SPRINGS	3		3
WESTGATE		2	2
WILDWOOD	1		1
WINDSOR PARK		1	1
WOODBINE	3		3
<b>Grand Total</b>	<b>79</b>	<b>170</b>	<b>249</b>

Demographics of Racialized Male Survey Participants Who Provided Location Information for Spatial Analysis			
Community	15-19 years	20-24 years	Total
CANYON MEADOWS		1	1
DOWNTOWN COMMERCIAL CORE		1	1
EVERGREEN	2	1	3
GLAMORGAN		1	1
LINCOLN PARK		1	1
SPRINGBANK HILL		1	1
SUNALTA		1	1
<b>Grand Total</b>	<b>3</b>	<b>6</b>	<b>9</b>

Demographics of Non-Racialized Male Survey Participants Who Provided Location Information			
Community	15-19 years	20-24 years	Total
CEDARBRAE	1		1
CRESTMONT		1	1
EVERGREEN	3		3
LAKEVIEW	2		2
MILLRISE	1		1
SHAWNESSY	1		1
SPRINGBANK HILL	1		1
STRATHCONA PARK	1		1
SUNALTA	1		1
UPPER MOUNT ROYAL		1	1
<b>Grand Total</b>	<b>11</b>	<b>2</b>	<b>13</b>

**Appendix L : Ethnic and Economic Profile of Communities with high  
“Conservative Community, so Silence”**

	<b>Median total household income (before tax) in 2015</b>	<b>Per Cent Visible Minority (Census Data)</b>	<b>No Certificate, Diploma, or Degree</b>
<b>ASPEN WOODS</b>	\$199,759	48%	475
<b>BELTLINE</b>	\$76,408	31%	1260
<b>EVERGREEN</b>	\$128,331	44%	1840
<b>GLAMORGAN</b>	\$77,999	22%	565
<b>SIGNAL HILL</b>	\$123,355	34%	1265
<b>WOODBINE</b>	\$119,299	19%	670

**Appendix M : First Source of Sexual Health Information for Youth by Age, Gender, and Racial Identity**

**M.1 : First Source of Sexual Health Information for Female Youth**

			Racialized		Total
			No	Yes	
<b>Female and 15-19 years</b>	Family	Count	10	0	10
		% of Total	7.50%	0.00%	7.50%
	Family Doctor	Count	2	1	3
		% of Total	1.50%	0.80%	2.30%
	Internet search	Count	8	3	11
		% of Total	6.00%	2.30%	8.30%
	Other - Service Provider	Count	1	1	2
		% of Total	0.80%	0.80%	1.50%
	Peers	Count	13	1	14
		% of Total	9.80%	0.80%	10.50%
	Social media	Count	3	5	8
		% of Total	2.30%	3.80%	6.00%
	Teacher	Count	31	18	49
		% of Total	23.30%	13.50%	36.80%
	Television ad	Count	2	0	2
		% of Total	1.50%	0.00%	1.50%
	Do not remember	Count	9	5	14
		% of Total	6.80%	3.80%	10.50%
	No Response	Count	14	6	20
		% of Total	10.50%	4.50%	15.00%
Total	Count	93	40	133	
	% of Total	69.90%	30.10%	100%	
<b>Female and 20-24 years</b>	Family	Count	16	5	21
		% of Total	7.10%	2.20%	9.30%
	Family Doctor	Count	14	2	16
		% of Total	6.20%	0.90%	7.10%
	Internet search	Count	26	5	31
	% of Total	11.50%	2.20%	13.70%	

Mail flyer	Count	1	0	1
	% of Total	0.40%	0.00%	0.40%
Other - Book	Count	1	0	1
	% of Total	0.40%	0.00%	0.40%
Other - Employer	Count	0	1	1
	% of Total	0.00%	0.40%	0.40%
Other - Service Provider	Count	2	2	4
	% of Total	0.90%	0.90%	1.80%
Other - University	Count	0	1	1
	% of Total	0.00%	0.40%	0.40%
Peers	Count	24	9	33
	% of Total	10.60%	4.00%	14.60%
Radio ad	Count	1	0	1
	% of Total	0.40%	0.00%	0.40%
Social media	Count	10	3	13
	% of Total	4.40%	1.30%	5.80%
Teacher	Count	58	8	66
	% of Total	25.70%	3.50%	29.20%
Television ad	Count	1	0	1
	% of Total	0.40%	0.00%	0.40%
Do not remember	Count	7	4	11
	% of Total	3.10%	1.80%	4.90%
No Response	Count	18	7	25
	% of Total	8.00%	3.10%	11.10%
Total	Count	179	47	226
	% of Total	79.20%	20.80%	100%

**M.2 : First Source of Sexual Health Information for Male Youth**

			Racialized		Total
			No	Yes	
<b>Male and 15-19 years</b>	Family Doctor	Count	0	1	1
		% of Total	0.0%	7.1%	7.1%
	Internet search	Count	1	0	1
		% of Total	7.1%	0.0%	7.1%
	Teacher	Count	3	1	4
		% of Total	21.4%	7.1%	28.6%
	Other - Service Provider	Count	1	0	1
		% of Total	7.1%	0.0%	7.1%
	Peers	Count	1	0	1
		% of Total	7.1%	0.0%	7.1%
	Social media	Count	2	0	2
		% of Total	14.3%	0.0%	14.3%
No Response	Count	3	1	4	
	% of Total	21.4%	7.1%	28.6%	
Total	Count	11	3	14	
	% of Total	78.6%	21.4%	100%	
<b>Male and 20-24 years</b>	Teacher	Count	2	2	4
		% of Total	22.2%	22.2%	44.4%
	Other - Employer	Count	0	1	1
		% of Total	0.0%	11.1%	11.1%
	Social media	Count	0	1	1
		% of Total	0.0%	11.1%	11.1%
	No Response	Count	0	3	3
% of Total		0.0%	33.3%	33.3%	
Total	Count	2	7	9	
	% of Total	22.2%	77.8%	100%	

## Appendix N : First Source of Sexual Health information by Level of Education

			Level of Education				Total
			Completed a University or College Degree	Completed Junior High school	Completed Senior High school	Completed Trade Certificate or Apprenticeship	
First Source of Information about Preventive Resources	Teacher	Count	27	29	61	6	123
		% within Level of Education	32.1%	41.4%	28.9%	35.3%	32.2%
	Family	Count	7	5	19	0	31
		% within Level of Education	8.3%	7.1%	9.0%	0.0%	8.1%
	Family Doctor	Count	6	2	12	0	20
		% within Level of Education	7.1%	2.9%	5.7%	0.0%	5.2%
	Internet search	Count	11	3	28	1	43
		% within Level of Education	13.1%	4.3%	13.3%	5.9%	11.3%
	Mail flyer	Count	0	0	1	0	1
		% within Level of Education	0.0%	0.0%	0.5%	0.0%	0.3%
	Other - Book	Count	0	0	1	0	1
		% within Level of Education	0.0%	0.0%	0.5%	0.0%	0.3%
	Other - Employer	Count	1	0	1	0	2
		% within Level of Education	1.2%	0.0%	0.5%	0.0%	0.5%
	Other - Service Provider	Count	1	2	3	1	7
		% within Level of Education	1.2%	2.9%	1.4%	5.9%	1.8%
	Other -	Count	0	0	1	0	1

	University						
		% within Level of Education	0.0%	0.0%	0.5%	0.0%	0.3%
	Peers	Count	8	7	29	4	48
		% within Level of Education	9.5%	10.0%	13.7%	23.5%	12.6%
	Radio ad	Count	0	0	0	1	1
		% within Level of Education	0.0%	0.0%	0.0%	5.9%	0.3%
	Social media	Count	8	3	12	1	24
		% within Level of Education	9.5%	4.3%	5.7%	5.9%	6.3%
	Television ad	Count	0	1	1	1	3
		% within Level of Education	0.0%	1.4%	0.5%	5.9%	0.8%
	Do not remember	Count	4	9	12	0	25
		% within Level of Education	4.8%	12.9%	5.7%	0.0%	6.5%
	No Response	Count	11	9	30	2	52
		% within Level of Education	13.1%	12.9%	14.2%	11.8%	13.6%
Total		Count	84	70	211	17	382
		% within Level of Education	100%	100%	100%	100%	100%

**Appendix O : Frequency of Mention of Sexual Health Resources by Level of Education**

Sexual Health Resource Mentioned	Level of Education				Grand Total
	Completed a University or College Degree	Completed Junior High school	Completed Senior High school	Completed Trade Certificate or Apprenticeship	
Calgary Sexual Health Center	1	8	22		31
	7	4	9		20
		3	5		8
			1	1	2
	2		4	1	7
	6	4	19	3	32
	15	6	15	1	37
		1	5		6
	1		2		3
	1				1
	7	10	23	1	41
		1	1		2
	1	1	4		6
		1			1
	1	4	13		18
	1	6	2		9
1	2	2		5	
	1	3		4	
<b>Grand Total</b>	<b>44</b>	<b>52</b>	<b>130</b>	<b>7</b>	<b>233</b>
Calgary STI Clinic (Sheldon Chumir Health Centre)	6	4	19	3	32
	15	6	15	1	37
		1	5		6
	1		2		3
	1				1
	7	10	23	1	41
	13	1	8	2	24
	4		4		8
	2	2	3		7
	2		1	1	4
	1		1		2
	2	1	3	2	8

	1		2		3
			2		2
			1	1	2
		1			1
<b>Grand Total</b>	<b>55</b>	<b>26</b>	<b>89</b>	<b>11</b>	<b>181</b>
<b>Alberta Health Services Sexual and Reproductive Health website</b>					
	1	1	2	1	5
	1		4		5
	7	4	9		20
		3	5		8
			1	1	2
	15	6	15	1	37
	1	1	4		6
	1	6	2		9
	4		4		8
	2	2	3		7
	1		1		2
	1		2		3
			1		1
			1		1
<b>Grand Total</b>	<b>34</b>	<b>23</b>	<b>54</b>	<b>3</b>	<b>114</b>
<b>The Alex Community Health Center</b>					
	7	10	23	1	41
	1	4	13		18
	1	6	2		9
	1	2	2		5
		1	3		4
	2	1	3	2	8
	1		2		3
			2		2
			1	1	2
		1			1
		2	8		10
			2	1	3
		1	2		3
			1		1
<b>Grand Total</b>	<b>13</b>	<b>28</b>	<b>64</b>	<b>5</b>	<b>110</b>

<b>Alberta Health Services Social Media pages</b>	1		4		5
	2		4		6
		3	5		8
	2		4	1	7
		1	5		6
		1			1
	1	2	2		5
	2	2	3		7
	2		1	1	4
			2		2
			1		1
			1		1
		2	1	3	
<b>Grand Total</b>	<b>10</b>	<b>9</b>	<b>34</b>	<b>3</b>	<b>56</b>
<b>Mosaic Women's Clinic</b>	1		2		3
		1	1		2
	1	1	4		6
		1			1
		1	3		4
	1		1		2
			1	1	2
			2		2
			1		1
			1		1
		1	2		3
		1		1	
<b>Grand Total</b>	<b>3</b>	<b>5</b>	<b>19</b>	<b>1</b>	<b>28</b>
	159	143	390	30	722

**Appendix P : Preventive Resource Use by Gender, Age, and Racial Identity**

Gender of Participant				Racialized		Total	
				No	Yes		
Female	15-19 years	Ever Used any Preventive Resource(s)	No	Count	58	26	84
				% within Racialized	62.4%	65.0%	63.2%
		No response	Count	1	0	1	
			% within Racialized	1.1%	0.0%	0.8%	
		Yes	Count	34	14	48	
			% within Racialized	36.6%	35.0%	36.1%	
	Total		Count	93	40	133	
			% within Racialized	100%	100%	100%	
	20-24 years	Ever Used any Preventive Resource(s)	No	Count	96	26	122
				% within Racialized	53.6%	55.3%	54.0%
		Yes	Count	83	21	104	
			% within Racialized	46.4%	44.7%	46.0%	
		Total		Count	179	47	226
				% within Racialized	100%	100%	100%
	Total	Ever Used any Preventive Resource(s)	No	Count	154	52	206
% within Racialized				56.6%	59.8%	57.4%	
No response		Count	1	0	1		
		% within Racialized	0.4%	0.0%	0.3%		
Yes		Count	117	35	152		

				% within Racialized	43.0%	40.2%	42.3%
		Total		Count	272	87	359
				% within Racialized	100%	100%	100%
Male	15-19 years	Ever Used any Preventive Resource(s)	No	Count	10	1	11
				% within Racialized	90.9%	33.3%	78.6%
			Yes	Count	1	2	3
				% within Racialized	9.1%	66.7%	21.4%
		Total		Count	11	3	14
				% within Racialized	100%	100%	100%
	20-24 years	Ever Used any Preventive Resource(s)	No	Count	1	5	6
				% within Racialized	50.0%	71.4%	66.7%
			Yes	Count	1	2	3
				% within Racialized	50.0%	28.6%	33.3%
		Total		Count	2	7	9
				% within Racialized	100%	100%	100%
	Total	Ever Used any Preventive Resource(s)	No	Count	11	6	17
				% within Racialized	84.6%	60.0%	73.9%
		Yes	Count	2	4	6	
			% within Racialized	15.4%	40.0%	26.1%	
Total		Count	13	10	23		
		% within Racialized	100%	100%	100%		

**Appendix Q : Community Barriers by Gender, Age, and Racial Identity**

				Racialized		Total				
				No	Yes					
15-19 years	Female	Most Significant Community Barrier to Access	As far as I know, there are no resources around where I live	Count	36	12	48			
				% within Racialized	38.7%	30.0%	36.1%			
			Facilities are too close to my neighborhood thereby potentially hindering privacy	Count	10	6	16			
				% within Racialized	10.8%	15.0%	12.0%			
			It is not closer to any means of affordable transportation	Count	7	6	13			
				% within Racialized	7.5%	15.0%	9.8%			
			It takes too much time to travel to service providers	Count	21	9	30			
				% within Racialized	22.6%	22.5%	22.6%			
			No response	Count	19	7	26			
				% within Racialized	20.4%	17.5%	19.5%			
			Total			Count	93	40	133	
						% within Racialized	100%	100%	100%	
				Male	Most Significant Community Barrier to Access	As far as I know, there are no resources around where I live	Count	3	1	4
							% within Racialized	27.3%	33.3%	28.6%
It takes too much time to travel to service providers	Count	3				2	5			
	% within Racialized	27.3%				66.7%	35.7%			

			No response	Count	5	0	5		
				% within Racialized	45.5%	0.0%	35.7%		
		Total		Count	11	3	14		
				% within Racialized	100%	100%	100%		
Total	Most Significant Community Barrier to Access	As far as I know, there are no resources around where I live	Count	39	13	52			
			% within Racialized	37.5%	30.2%	35.4%			
		Facilities are too close to my neighborhood thereby potentially hindering privacy	Count	10	6	16			
			% within Racialized	9.6%	14.0%	10.9%			
		It is not closer to any means of affordable transportation	Count	7	6	13			
			% within Racialized	6.7%	14.0%	8.8%			
		It takes too much time to travel to service providers	Count	24	11	35			
			% within Racialized	23.1%	25.6%	23.8%			
		No response	Count	24	7	31			
			% within Racialized	23.1%	16.3%	21.1%			
		Total			Count	104	43	147	
					% within Racialized	100%	100%	100%	
		20-24 years	Female	Most Significant Community Barrier to Access	As far as I know, there are no resources around where I live	Count	55	20	75
						% within Racialized	30.7%	42.6%	33.2%
	Facilities are too close to my			Count	24	3	27		

		neighborhood thereby potentially hindering privacy	% within Racialized	13.4%	6.4%	11.9%
		It is not closer to any means of affordable transportation	Count	11	5	16
			% within Racialized	6.1%	10.6%	7.1%
		It takes too much time to travel to service providers	Count	55	10	65
			% within Racialized	30.7%	21.3%	28.8%
		No response	Count	33	9	42
			% within Racialized	18.4%	19.1%	18.6%
		Other - Can just read about it online	Count	1	0	1
			% within Racialized	0.6%	0.0%	0.4%
	Total		Count	179	47	226
			% within Racialized	100%	100%	100%
Male	Most Significant Community Barrier to Access	As far as I know, there are no resources around where I live	Count	0	2	2
			% within Racialized	0.0%	28.6%	22.2%
		Facilities are too close to my neighborhood thereby potentially hindering privacy	Count	1	0	1
			% within Racialized	50.0%	0.0%	11.1%
		No response	Count	1	4	5
			% within Racialized	50.0%	57.1%	55.6%
		Other - Resources aren't very private	Count	0	1	1
			% within Racialized	0.0%	14.3%	11.1%
Total			Count	2	7	9

			% within Racialized	100%	100%	100%		
Total	Most Significant Community Barrier to Access	As far as I know, there are no resources around where I live	Count	55	22	77		
			% within Racialized	30.4%	40.7%	32.8%		
		Facilities are too close to my neighborhood thereby potentially hindering privacy	Count	25	3	28		
			% within Racialized	13.8%	5.6%	11.9%		
		It is not closer to any means of affordable transportation	Count	11	5	16		
			% within Racialized	6.1%	9.3%	6.8%		
		It takes too much time to travel to service providers	Count	55	10	65		
			% within Racialized	30.4%	18.5%	27.7%		
		No response	Count	34	13	47		
			% within Racialized	18.8%	24.1%	20.0%		
		Other - Can just read about it online	Count	1	0	1		
			% within Racialized	0.6%	0.0%	0.4%		
		Other - Resources aren't very private	Count	0	1	1		
			% within Racialized	0.0%	1.9%	0.4%		
		Total			Count	181	54	235
					% within Racialized	100%	100%	100%

## Appendix R : Breakdown of Responses as Articulated by Qualitative Interview

### Participants (Youth and Service Providers)

#### R.1 : Barriers to Access

<b>Personal Determinants Articulated by Respondents</b>			
	<b>Male Youth</b>	<b>Female Youth</b>	<b>Service Provider</b>
Perceived irrelevance	3	1	1
Potential Feeling of Uneasiness	2	5	1
Minimal knowledge	4	2	2
<b>Total</b>	<b>9</b>	<b>8</b>	<b>4</b>
<b>Interpersonal Determinants Articulated by Respondents</b>			
	<b>Male Youth</b>	<b>Female Youth</b>	<b>Service Provider</b>
Stigma and Shame	4	3	2
<b>Total</b>	<b>4</b>	<b>3</b>	<b>2</b>
<b>Organizational Determinants Articulated by Respondents</b>			
	<b>Male Youth</b>	<b>Female Youth</b>	<b>Service Provider</b>
Silence about Sexually Transmitted Infections	4	7	0
Nature of Online Information	1	1	1
Mode of Operation and Nature of Facilities	0	0	2
Vague Education Curriculum Outcomes	0	0	1
<b>Total</b>	<b>5</b>	<b>8</b>	<b>4</b>
<b>Community Determinants Articulated by Respondents</b>			
	<b>Male Youth</b>	<b>Female Youth</b>	<b>Service Provider</b>
Calgary as a Place	1	6	2
Weather	2	0	1
Distance and Transportation System	3	2	1
<b>Total</b>	<b>6</b>	<b>8</b>	<b>4</b>

**R.2 : Opinions on the Influence of Social Media on Sexual Risk Activities**

<b>Social Media have no Influence</b>		
<b>Male</b>	<b>Female</b>	<b>Service Providers</b>
3	0	2
<b>Social Media Have Influence</b>		
<b>Male</b>	<b>Female</b>	<b>Service Providers</b>
9	11	1

**R.3 : Opinions on Targeted Testing Reminders on Social Media Dating Apps**

	<b>Male Respondents</b>	<b>Female Respondents</b>	<b>Service Providers</b>
Ideal	10	11	2
Not Ideal	1	0	0
No Comment	1	0	1

## Appendix S : Profile of Interviewees

Gender	Age Group	Racialized	Sexually Active	Relationship Status	Opinion: Does one have to be sexually active to use resources	Highest Education Level Completed	Years in Calgary	Ever used Preventive Resource
Female	20-24	No	Yes	Married	No	Completed a University or College Degree	More than 1 year	No
Female	20-24	Yes	No	Dating	No	Completed a University or College Degree	More than 1 year	No
Female	20-24	Yes	No	Dating	No	Completed Senior High School	More than 1 year	No
Female	20-24	Yes	No	Dating	No	Completed a University or College Degree	More than 1 year	Yes
Female	20-24	Yes	No	Single	No	Completed a University or College Degree	More than 1 year	No
Female	20-24	Yes	Yes	Dating	Yes	Completed a University or College Degree	More than 1 year	No
Female	20-24	Yes	No	Single	No	Completed Senior High School	More than 1 year	No
Female	20-24	No	Yes	Complicated	No	Completed Trade Certificate or Apprenticeship	More than 1 year	No
Female	15-19	Yes	No	Single	No	Completed Senior High School	More than 1 year	No
Female	15-19	No	No	Dating	No	Completed Junior High School	More than 1 year	No
Female	15-19	Yes	Yes	Dating	No	Completed Senior High School	More than 1 year	No
Male	15-19	Yes	No	Single	No response	Completed Junior High School	No response	No
Male	20-24	Yes	Yes	Single	No	Completed a University or College	More than 1 year	No

						Degree		
Male	20-24	Yes	No	Single	No	Completed Senior High School	More than 1 year	No
Male	20-24	No	Yes	Dating	No	Completed Trade Certificate or Apprenticeship	More than 1 year	Yes
Male	20-24	No	No	Single	Yes	Completed Senior High School	More than 1 year	No
Male	15-19	Yes	Yes	Dating	No	Completed Senior High School	More than 1 year	No
Male	15-19	No	No	Single	No	Completed Junior High School	More than 1 year	No
Male	15-19	Yes	Yes	Dating	Yes	Completed Senior High School	More than 1 year	No
Male	15-19	Yes	Yes	Dating	No	Completed Senior High School	More than 1 year	No
Male	15-19	Yes	No	Dating	No	Completed Senior High School	More than 1 year	No
Male	15-19	Yes	Yes	Single	No	Completed Junior High School	More than 1 year	No
Male	15-19	Yes	No	Single	No	Completed Junior High School	More than 1 year	No

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