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L'utilisation des soins prénataux chez les migrants sans assurance maladie à Montréal

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Cette thèse intitulée

L'utilisation des soins prénataux chez les migrants sans assurance maladie à Montréal

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A été évaluée par un jury composé des personnes suivantes

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Abstract

EN:

Objective: Previous research has identified poor prenatal care use among uninsured migrants in Canada, however, the factors influencing this usage remain largely unexplored. The study objective was to quantify the use of prenatal care among this group and to identify the barriers and facilitating factors to prenatal care use.

Methods: A cross-sectional survey of uninsured migrants in Montreal, Canada was carried out between January 2016 and August 2017. Participants were recruited from a local volunteer clinic and from the community using venue-based and snowball sampling. Outcome measures included prenatal care use, prenatal care initiation, and prenatal care adequacy. Regression analysis identified barriers and facilitating factors to prenatal care use.

Results: 125 previous pregnancies in Canada were identified among 101 women. 65.0% of pregnancies involved prenatal care use and 44.6% involved an early initiation of care. Among the 62 pregnancies carried to term, 29.5% received adequate prenatal care. Women ≥35 years of age (OR 0.13, 95% CI: 0.03-0.54, p=0.01), between the ages of 18-24 (OR 0.30, 95% CI: 0.09-0.99, p=0.049), and those who did not know where to consult (OR 0.25, 95% CI: 0.06-0.99, p=0.049) were significantly less likely (p<0.05) to use prenatal care. Women aged 30-34 (OR 0.27, 95% CI: 0.10-0.72, p=0.01) were significantly less likely (p<0.05) to initiate prenatal care early. In contrast, women who were married or in common-law relationships (OR 3.16, 95% CI: 1.04-9.62, p=0.04) were significantly more likely (p<0.05) to initiate prenatal care early.

Conclusion: Our study found that prenatal care use among uninsured migrants was very poor. Factors influencing prenatal care use were varied and related to demographics, social network, and migration. Future policy should aim to improve access to prenatal care among this vulnerable population.

Keywords: medically uninsured, prenatal care, migrant health, pregnancy, precarious status, healthcare use

FR:

Objectif : Des recherches antérieures ont identifié une mauvaise utilisation des soins prénataux chez les migrants sans assurance maladie au Canada. Cependant, les facteurs qui influencent cette utilisation restent largement inexplorés. L'objectif de cette étude était de quantifier l'utilisation des soins prénataux dans ce groupe et d'identifier les barrières et les facteurs facilitant l'utilisation des soins prénataux.

Méthodes : Une étude transversale sur les migrants sans assurance maladie à Montréal, Canada, a été menée entre janvier 2016 et août 2017. Les participants ont été recrutés dans une clinique bénévole locale et dans la communauté en utilisant un échantillonnage à partir de lieux et en boule de neige. Les mesures des résultats comprenaient l'utilisation des soins prénataux, l'initiation des soins prénataux et l'adéquation des soins prénataux. L'analyse de régression a identifié les barrières et les facteurs facilitant l'utilisation des soins prénataux.

Résultats : 125 grossesses antérieures au Canada ont été recensées parmi 101 femmes. 65.0% des grossesses impliquaient une utilisation des soins prénataux et 44.6% impliquaient un début tôt des soins. Parmi les 62 grossesses menées à terme, 29.5% ont reçu des soins prénataux adéquats. Les femmes ≥35 ans (OR 0.13, IC à 95%: 0.03-0.54, p = 0.01), entre 18 et 24 ans (OR 0.30, IC à 95%: 0.09-0.99, p=0.049), et celles qui ne savaient pas où consulter (OR 0.25, IC à 95%: 0.06-0.99, p=0.049) avaient significativement moins de chances (p <0.05) d'utiliser les soins prénataux. Les femmes âgées de 30 à 34 ans (OR 0.27, IC à 95%: 0.10-0.72, p=0.01) avaient significativement moins de chances (p <0.05) de commencer tôt les soins prénataux. En revanche, les femmes mariées ou en union de fait (OR 3.16, IC à 95%: 1.04-9.62, p=0.04) avaient significativement plus de chances (p <0.05) de commencer tôt les soins prénataux.

Conclusion : Notre étude a révélé que l'utilisation des soins prénataux chez les migrants sans assurance était très faible. Les facteurs influençant l'utilisation des soins prénatals étaient variés et liés à la démographie, au réseau social et à la migration. Les politiques futures devraient viser à améliorer l'accès aux soins prénatals au sein de cette population vulnérable.

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List of Abbreviations

ACOG	American College of Gynecologists and Obstetricians
APNCU	Adequacy of Prenatal Care Utilization
CATPCA	Categorical Principal Component Analysis
OR	Odds Ratio
PCA	Principal component analysis
PCR	Principal component regression
PFSI	Programme fédéral de santé intermédiaire
RAMQ	Régie de l'assurance maladie du Québec
UN	United Nations

Acknowledgements

Chapter 1

1. Introduction

1.1 Rationale

International migration is increasing and occurs for a variety of reasons including the pursuit of economic opportunity and the escape from conflict, persecution, and environmental change (International Organization for Migration, 2019). Current estimates suggest that there are over 270 million international migrants worldwide (International Organization for Migration, 2019), while the latest Canadian census found that over 20% of the population was foreign-born (Statistics Canada, 2017). Despite the position of the World Health Organization (2017) that health is a fundamental human right that is guaranteed to all without discrimination, certain migrants in Canada continue to face precarious access to care due to their migratory status (Jarvis, D'Souza, & Graves, 2019).

These individuals, termed "uninsured migrants" do not have access to a provincial or federal health insurance plan (Rousseau et al., 2008) and form a heterogeneous group comprised of undocumented migrants, temporary foreign workers, international students, individuals awaiting sponsorship, and foreign visitors (Health Canada, 2018; Régie de l'assurance maladie du Québec, 2018). Undocumented migrants, alone, are now estimated to number approximately 250,000 across Canada – 40,000 of whom are in Montreal (Médecins du Monde, 2014).

The precarious access to care among this population extends to prenatal care, which consists of routine scheduled medical visits during pregnancy (Healy et al., 2006). Despite the demonstrated benefits of prenatal care including the earlier identification of infections and anemia (Healy et al., 2006), reductions in morbidity and perinatal mortality (Foster, Guzick, & Pulliam, 1992; Reed, Westfall, Bublitz, Battaglia, & Fickenscher, 2005), and a favourable cost-benefit relationship (Lu, Lin, Prietto, & Garite, 2000), studies continue to demonstrate an inadequate access to prenatal care among

uninsured migrants in Canada (Jarvis et al., 2011; Rousseau, Ricard-Guay, Laurin-Lamothe, Gagnon, & Rousseau, 2014; Wilson-Mitchell & Rummens, 2013). For example, a study from Toronto demonstrated that 80% of uninsured migrant women received less-than-adequate prenatal care (Wilson-Mitchell & Rummens, 2013). In addition, a study from Montreal by Rousseau et al. (2014) found that 65.9% uninsured migrants had no prenatal visits and that uninsured migrants had significantly fewer prenatal care visits compared to insured refugee claimants (Rousseau et al., 2014). These findings led the study's authors to conclude that for perinatal care among uninsured migrants, "sub-standard care is almost the rule" (Rousseau et al., 2014).

Despite this health inequity, uninsured migrants in Canada remain a poorly studied group (Jarvis et al., 2019; Magalhaes, Carrasco, & Gastaldo, 2010) and the factors influencing their use of prenatal care remain largely unexplored in the literature (Jarvis et al., 2019). Qualitative findings from two studies (Jarvis et al., 2019; Rousseau et al., 2014) have identified cost, a fear of deportation, poor treatment by staff, a lack of knowledge about the healthcare system, and non-standard entry points to care as barriers to prenatal care. In contrast, support from friends and non-profit groups was found to promote prenatal care use (Jarvis et al., 2019). To date, however, there have been no quantitative studies which have investigated the factors influencing the use of prenatal care among uninsured migrants in Canada.

Understanding the factors which influence prenatal care use among this population is valuable from both medical and public health perspectives as this can suggest mechanisms to reduce morbidity, address health inequity, and decrease long-term costs (Lu et al., 2000; Phillimore, 2016). In this project, we use data from a cross-sectional survey of uninsured migrants in Montreal to describe their use of prenatal care and to identify their barriers and facilitators to prenatal care use.

1.2 Road Map

This thesis is organized around a scientific manuscript to be submitted for publication (Chapter 6). Following this introductory chapter, Chapter 2 will provide background information regarding uninsured migrants and prenatal care use. In Chapter 3, a literature

review on the barriers and facilitating factors to prenatal care use among migrants will be presented. Chapter 4 will outline the research question and objectives, while Chapter 5 will discuss the research methodology used in the study. In Chapter 6, the research question will be addressed in the form of a scientific manuscript. Specifically, the prenatal care use among a sample of uninsured migrants will be described and the factors influencing prenatal care use among this group will be explored. Chapter 7 will provide additional results not included in the scientific manuscript, while Chapter 8 will include further discussion of our findings. Finally, Chapter 9 will discuss the scientific contributions and policy implications of this work and suggest future research directions.

Chapter 2

2. Background

2.1 International Migration and Uninsured Migrants in Canada

International migration refers to the movement of individuals from their country of origin to a host country on a temporary or permanent basis (Perruchoud & Redpath-Cross, 2011). It can occur in positive contexts such as the pursuit of economic opportunity but can also occur in negative settings such as the fleeing of violence, persecution and environmental change (International Organization for Migration, 2019). The most recent estimates suggest that there are approximately 270 million international migrants worldwide (International Organization for Migration, 2019). Moreover, according to the 2016 Canadian census (Statistics Canada, 2017), there are over 7.5 million foreign-born individuals living in Canada, representing approximately 20% of the population.

The term "uninsured migrants" is used to refer to a subset of migrants in Canada who do not have access to a provincial (such as the RAMQ in Quebec) or federal (such as the Interim Federal Health Program) health insurance plan (Rousseau et al., 2014). This is a heterogeneous group which includes undocumented migrants, temporary foreign workers, international students, individuals awaiting sponsorship, and foreign visitors (Health Canada, 2018; Régie de l'assurance maladie du Québec, 2018). Undocumented migrants refer to: (1) failed refugee claimants, (2) individuals who enter Canada with a visa but do not respect its terms or conditions, and (3) individuals who enter Canada illegally, through smuggling or other means (Papademetriou, 2005; Rousseau et al., 2014). Although accurate numbers are unavailable, a report by Médecins du Monde (2014) estimates that there are approximately 250,000 undocumented migrants across Canada – 40,000 of whom are in Montreal. Figure 1 depicts the relationship between the various migrant groups and their access to health insurance in Quebec.
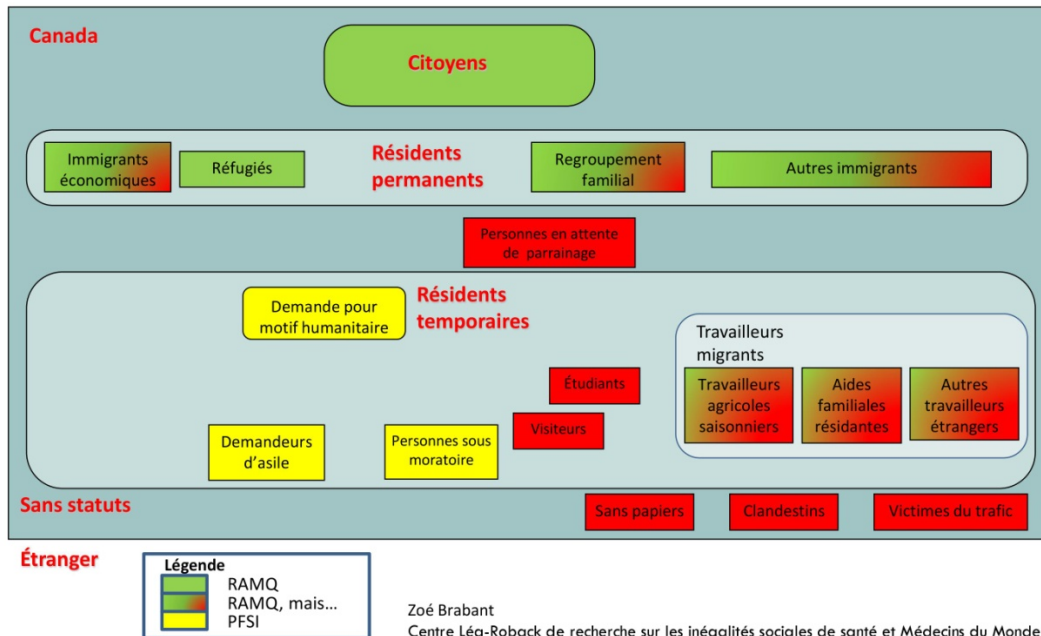
Figure 2.1 *Access to government health insurance among migrants. Summary of provincial (RAMQ) and federal (interim federal health program (PFSI)) health insurance access in Quebec according to migratory status (From Brabant (2015) as cited in Massé (2017). Reprinted with permission).*

2.2 Access to Care Among Uninsured Migrants

Despite the declaration by the World Health Organization that health is a fundamental human right that is guaranteed to all without discrimination, migrants without health insurance continue to face precarious access to care in Canada due to their migratory status (Caulford & Vali, 2006; World Health Organization, 2003). Munro, Jarvis, Munoz, D'Souza, and Graves (2013) posit that access to care among uninsured individuals in Canada is limited by three types of factors: financial, logistic and cultural. Financial reasons include fees which are often "prohibitive", while logistical challenges include the difficulties in arranging care outside of regular pathways and in the absence of certain social services to which uninsured individuals do not have access (Munro et al., 2013). Lastly, cultural factors include a lack of familiarity with the health care system in the new country. Hacker, Anies, Folb, and Zallman (2015) note that access to care among undocumented migrants is further compromised by systemic factors such as legal and documentation-related issues as well as individual barriers such as a fear of deportation.

2.3 Prenatal Care and Its Use Among Uninsured Migrants

Prenatal care consists of routine scheduled medical visits during pregnancy and is recognized as one of the most significant obstetrical advances of the past century (Healy et al., 2006). Prenatal care can help to promote maternal health and lead to the earlier detection of complications such as infections (Carroli, Rooney, & Villar, 2001; Healy et al., 2006). Previous research has also demonstrated prenatal care to be effective in reducing fetal death (Foster et al., 1992). For example, the introduction of a prenatal care program among uninsured patients in West Virginia led to a statistically significant decrease in fetal mortality rate from 35.4 to 7.0 per 1000 live births (Foster et al., 1992). Prenatal care also impacts pregnancy outcomes with Reed et al. (2005) finding that reduced access to prenatal care doubled the risk of fetal distress and excessive bleeding during labour. In addition, Lu et al.'s (2000) study of undocumented immigrants in California found prenatal care to be cost-effective with every \$1 spent on prenatal care resulting in \$3.33 of savings in postnatal care and \$4.63 of savings in incremental long-term costs such as specialized education.

Studies have previously described the precarious access to prenatal care among migrants without health insurance. Delvaux, Buekens, Godin, and Boutsen's (2001) study of 10 countries in Europe found that foreign nationals were three times more likely to receive inadequate prenatal care compared to citizens. However, prenatal care use was further reduced among uninsured migrants who were more than 12 times more likely to receive inadequate prenatal care compared to insured migrants (Blondel & Marshall, 1998). To date, only three studies have quantified prenatal care use among uninsured migrants in Canada. Wilson-Mitchell and Rummens's (2013) study on migrants in Toronto reported that 80% of uninsured pregnant women received less-than-adequate prenatal care. Meanwhile, Jarvis et al. (2011) found that uninsured women in Montreal presented significantly later in pregnancy and had significantly fewer prenatal visits than women with health insurance. Lastly, Rousseau et al.'s (2014) study from Montreal found that 80% of uninsured women had two or fewer prenatal visits during their pregnancy, with 65% having no prenatal visits at all. Nevertheless, uninsured migrants continue to represent an understudied group in Canada (Jarvis et al., 2019).
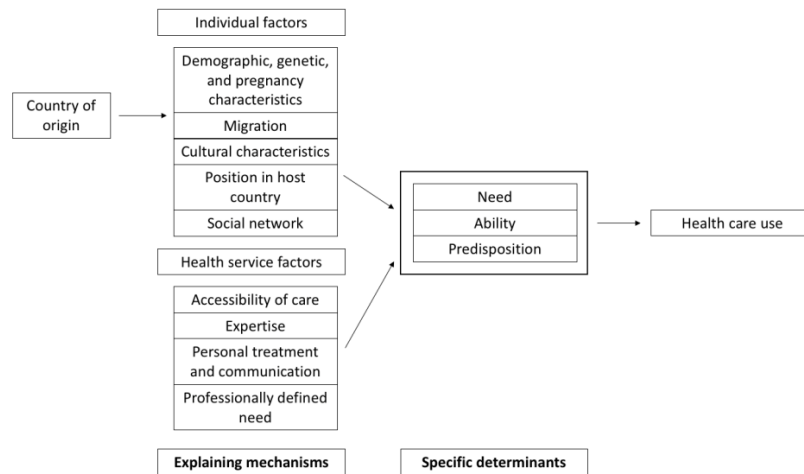
Figure 2.2 *Foets et al.'s (2007) conceptual model. Health care use among migrants is explained by specific determinants, which are influenced by a range of explaining mechanisms (adapted from Boerleider et al. (2015)).*

In an effort to explain the use of prenatal care among migrants, Foets, Suurmond, and Stronks (2007) proposed a modification of the Andersen Model of Health Care Utilization (Figure 2.2). According to this conceptual framework, health care use is determined by Andersen's predisposing, enabling and need factors (Andersen, 1995). In turn, these are influenced by a range of individual and health service factors termed "explaining mechanisms" (Foets et al., 2007). This model is useful for migrant populations as it accommodates potential explanations between an individual's country of origin and their prenatal care use (Boerleider et al., 2015). A detailed description of the components comprising each explaining mechanism is proposed by Boerleider et al. (2015) and presented in Appendix A.

2.4 Measurement of Adequate Prenatal Care Utilization

Several methods have been described to measure the adequacy of prenatal care utilization. Generally, these measures combine information pertaining to the number of prenatal care visits attended and the time at which prenatal care was initiated (Alexander & Kotelchuck, 1996). First proposed in 1994, Kotelchuck's Adequacy of Prenatal Care Utilization (APNCU) index is widely considered the standard measure of prenatal care adequacy (Kotelchuck, 1994; Martinez-Garcia et al., 2012). This index takes into account the debut of prenatal care in a more precise manner by considering the month rather than

trimester of initiation (Kotelchuck, 1994; Martinez-Garcia et al., 2012). In addition, rather than considering the total number of prenatal visits, the APNCU adjusts the number of expected visits based on the month during which prenatal care began (Martinez-Garcia et al., 2012). It is important to note, however, that the number of expected visits in Kotelchuck's model is calculated using guidelines from the American College of Obstetricians and Gynecologists and that prenatal care guidelines differ from country to country which limits the applicability of the APNCU in other countries (Martinez-Garcia et al., 2012). Jarvis et al. (2011) have proposed a modification of the APNCU based on Canadian standards of care. Termed the "APNCU-Montreal", this index stipulates that routine prenatal care should be initiated before 13 weeks of gestation and consist of 12 prenatal visits (Jarvis et al., 2011).

Chapter 3

3. Literature Search

3.1 Search Strategy

The objective of the literature search was to identify barriers and facilitators to prenatal care utilization among uninsured migrants. However, considering the paucity of literature on this group (Jarvis et al., 2019), the search was expanded to encompass all migrants.

Three main concepts were incorporated in the search strategy: (1) migrants, (2) prenatal care, and (3) utilization of health care (Figure 3). To capture a broader cross-section of the literature, several databases were used: Medline and EMBASE for the biomedical science literature, and CINAHL for the allied health and nursing literature. Search keywords and MeSH terms used for each database are listed in Appendix B.
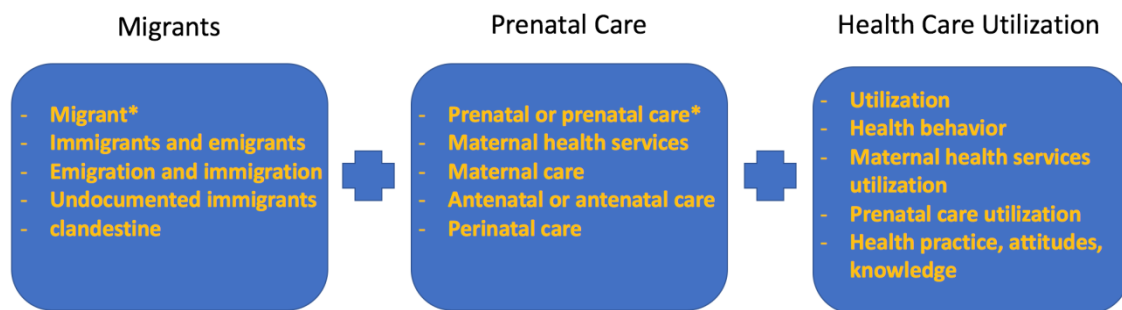
Figure 3.1 *Search strategy used to identify barriers and facilitating factors to prenatal care utilization among migrants.*

Articles were included if they: a) were primary research articles, b) involved first-generation migrants living in a Western country (ie. Canada, United States, Western Europe, Australia or New Zealand), and c) were published in English or French after 1980. Studies which amalgamated migrant and non-migrant study populations but did not include separate subgroup analyses were excluded.

Articles found were initially screened by title. Articles retained were then screened by abstract and finally by full-text reading. Reference lists of articles were also consulted to identify any further relevant studies.

48 primary articles were identified (Appendix C). This included 20 articles from the United States, 15 from Europe, eight from Canada and five from Australia. Twenty-three of the studies used quantitative analysis, 21 used qualitative methods, and four involved mixed-methods.

3.2 Barriers and Facilitating Factors to Prenatal Care Use Among Migrants

Barriers and facilitating factors to prenatal care use are summarized in Tables 1 and 2 for quantitative and qualitative studies, respectively. Factors identified in mixed method studies were classified according to the type of analysis (quantitative or qualitative) which led to their identification. Tables 1 and 2 are organized according to the "explaining mechanisms" of Foets et al's (2007) conceptual framework (Appendix A). Additional details for each study including sample size and study context (country) are included in Appendix C.

Table 3.1 *Barriers and facilitators to prenatal care utilization among migrants identified through quantitative methods*

	Category	Barriers	Facilitators
Individual factors	Demographics, genetics and pregnancy	Nulliparity and 20-34 years old (Martinez-Garcia et al., 2012) 1-2 previous children and ≥35 years old (Martinez-Garcia et al., 2012) >35 years old (Bell & Whiteford, 1987) Multiparous (Blondel & Marshall, 1998) Younger age (Atkins, Held, & Lindley, 2018; Blondel & Marshall, 1998) Hispanic or Sub-saharan African ethnicity (Atkins et al., 2018; Paz-Zulueta, Llorca, & Santibanez, 2015)	European descent (Atkins et al., 2018; Henderson, Carson, Jayaweera, Alderdice, & Redshaw, 2018) Pregnancy health risks (Held & Lindley, 2018)
	Migration		
	Culture	Poor language proficiency (Brar et al., 2009) Perception that prenatal care is unnecessary (Zambrana, Scrimshaw, & Dunkel-Schetter, 1996)	Non-recent arrival in host country (Bell & Whiteford, 1987; Gaviria, Stern, & Schensul, 1982; Kingston et al., 2011)
	Position in host country	Low or intermediate level of education (Atkins et al., 2018; Held & Lindley, 2018; Wherry, Fabi, Schickedanz, & Saloner, 2017) Refugee status (Agbemenu, Auerbach, Murshid, Shelton, & Amutah-Onukagha, 2019; Gibson-Helm et al., 2015; Kentoffio, Berkowitz, Atlas, Oo, & Percac-Lima, 2016) Absence of legal status (Chavez, Cornelius, & Jones, 1986; Fuentes-Afflick et al., 2006) Absence of medical insurance (Bell & Whiteford, 1987; Blondel & Marshall, 1998; Held & Lindley, 2018; Jarvis et al., 2011; Rousseau et al., 2014; Zambrana et al., 1996) Lack of financial resources (Zambrana et al., 1996) Asylum seeker status (Malebranche et al., 2020)	Providing undocumented migrants with government identification (Korinek & Smith, 2011) Expanding insurance coverage to include prenatal care (Atkins et al., 2018; Drewry et al., 2015; Swartz, Hainmueller, Lawrence, & Rodriguez, 2017, 2019; Wherry et al., 2017)
	Social network	Being single (Blondel & Marshall, 1998)	Living with partner (Zambrana et al., 1996)
Health	Accessibility of	Fear of detention/deportation	

service factors	care	(Loue, Cooper, & Lloyd, 2005) Difficulty to book appointments (Loue et al., 2005) Transport difficulties (Brar et al., 2009; Zambrana et al., 1996)	
	Expertise		
	Personal treatment and communication		Absence of communication difficulties (Bell & Whiteford, 1987) Language-concordant physician (Gaviria et al., 1982)
	Professionally defined need		Having a personal physician (Bell & Whiteford, 1987)

Table 3.2 Barriers and facilitators to prenatal care utilization among migrants identified through qualitative methods

	Category	Barriers	Facilitators
Individual factors	Demographics, genetics and pregnancy	Emotional/physical depression (Sherraden & Barrera, 1996) Feeling unwell (Phillimore, 2016) South Asian ethnicity (Phillimore, 2016)	European descent (Phillimore, 2016)
	Migration	Lack of familiarity with health care system (Almeida, Casanova, Caldas, Ayres-de-Campos, & Dias, 2014; Barona-Vilar et al., 2013; Davies & Bath, 2001; Higginbottom et al., 2016; Jarvis et al., 2019; Phillimore, 2016; Sami et al., 2019) Previous experience with prenatal care in country of origin (Barona-Vilar et al., 2013) Arriving in host country late in pregnancy (Phillimore, 2016)	
	Culture	Preference for a female care provider (Higginbottom et al., 2016; Moxey & Jones, 2016; Owens, Dandy, & Hancock, 2016) Perception of pregnancy as a natural state (Essen et al., 2000; Higginbottom et al., 2016) Poor language proficiency (Almeida et al., 2014; Davies & Bath, 2001; Degni, Suominen, El Ansari, Vehvilainen-Julkunen, & Essen, 2014; Higginbottom et al., 2016; Hoang, Le, & Kilpatrick, 2009; Moxey & Jones, 2016; Reitmanova & Gustafson, 2008; Rice & Naksook, 1998; Sami et al., 2019; Sherraden & Barrera, 1996) Belief that community-based clinics provide inferior compared to hospitals (Stapleton, Murphy, Correa-Velez, Steel, & Kildea, 2013) Lack of assertiveness (Hoang et al., 2009) Perception of prenatal care as a burden (Reitmanova & Gustafson, 2008) Unaware of need to consult during pregnancy (Bollini,	Consider prenatal care to be important (Herrel et al., 2004; Rice & Naksook, 1998)

		Stotzer, & Wanner, 2007; Chinouya & Madziva, 2019) Perception that physical exams are intrusive (Chinouya & Madziva, 2019) Cultural norm to delay disclosure of pregnancy (Chinouya & Madziva, 2019)	
	Position in host country	Lack of financial resources (Higginbottom et al., 2016; Jarvis et al., 2019; Moxey & Jones, 2016; Phillimore, 2016; Rousseau et al., 2014; Sherraden & Barrera, 1996; Stapleton et al., 2013) Fear of losing job (Barona-Vilar et al., 2013; Phillimore, 2016) Lack of child care (Herrel et al., 2004; Sherraden & Barrera, 1996) Household/domestic responsibilities (Phillimore, 2016; Stapleton et al., 2013) Absence of medical insurance (Beine, Fullerton, Palinkas, & Anders, 1995) Absence of legal status (Almeida et al., 2014; Phillimore, 2016)	
	Social network	Lack of social support network (Higginbottom et al., 2016) Community members (Moxey & Jones, 2016)	Partner fluent in language (Rice & Naksook, 1998) Friends knowledgeable about prenatal care services (Jarvis et al., 2019; Phillimore, 2016; Rice & Naksook, 1998) Support from community members/organizations (Beine et al., 1995; Korinek & Smith, 2011; Moxey & Jones, 2016; Phillimore, 2016)
Health service factors	Accessibility of care	Transport difficulties (Herrel et al., 2004; Higginbottom et al., 2016; Moxey & Jones, 2016; Owens et al., 2016; Phillimore, 2016; Shaffer, 2002; Sherraden & Barrera, 1996; Stapleton et al., 2013) Perceived discrimination by providers and staff (Berggren, Bergstrom, & Edberg, 2006; Davies & Bath, 2001; Degni et al., 2014; Higginbottom et al., 2016; Reitmanova & Gustafson, 2008; Sami et al., 2019) Fear of deportation (Chinouya & Madziva, 2019; Phillimore,	Easily accessible location (Almeida et al., 2014; Owens et al., 2016) Flexible appointment times (Stapleton et al., 2013) Reminders for appointments (Herrel et al., 2004)

		2016; Rousseau et al., 2014) Difficulty to book appointments (Almeida et al., 2014; Barona-Vilar et al., 2013; Higginbottom et al., 2016; Owens et al., 2016; Phillimore, 2016; Sami et al., 2019) Long waits (Sherraden & Barrera, 1996) Inconvenient hours (Shaffer, 2002; Sherraden & Barrera, 1996)	
	Expertise	Failure to provide culturally competent care (Degni et al., 2014; Higginbottom et al., 2016; Reitmanova & Gustafson, 2008; Stapleton et al., 2013) Lack of continuity of care (Phillimore, 2016; Sami et al., 2019)	Continuity of care (Owens et al., 2016; Stapleton et al., 2013) Patient-centred model of care (Stapleton et al., 2013) Culturally competent care (Moxey & Jones, 2016; Shaffer, 2002) Services tailored to undocumented migrants (Sami et al., 2019)
	Personal treatment and communication	Poor treatment by providers and staff (Degni et al., 2014; Rousseau et al., 2014) Poor access to interpretation services (Phillimore, 2016) Dependence on interpreter (Higginbottom et al., 2016) Dependence on written information (Higginbottom et al., 2016) Poor communication (Almeida et al., 2014; Degni et al., 2014; Phillimore, 2016) Failure to provide documentation in patient's language of preference (Hoang et al., 2009; Phillimore, 2016) Lack of pregnancy-related information provided (Davies & Bath, 2001; Reitmanova & Gustafson, 2008)	Adapting communication to migrant's needs (Owens et al., 2016) Trust of providers and staff (Stapleton et al., 2013) Language-concordant physician (Shaffer, 2002)
	Professionally defined need		Referral/information from GP (Phillimore, 2016; Rice & Naksook, 1998) Referral/information from midwife (Phillimore, 2016) Referrals for undocumented migrants (Sami et al., 2019)

3.2.1 Individual Factors

3.2.1.1 Demographics, Genetics, and Pregnancy

Both ends of a female's reproductive years were associated with a higher risk of poor prenatal care use (Atkins et al., 2018; Bell & Whiteford, 1987; Blondel & Marshall, 1998). For example, women under 25 years of age in Blondel and Marshall's (1998) study had a higher risk of poor attendance compared to those between the ages of 25-29, while Atkins et al.'s (2018) findings showed that the younger a mother was, the less likely she was to have adequate prenatal care. Bell and Whiteford's (1987) study, on the other hand, demonstrated that older women (>35 years of age) were least likely to return for follow-up prenatal care visits.

Blondel and Marshall's (1998) study also considered the impact of parity on prenatal care use and identified multiparous women as less likely than nulliparous women to attend prenatal visits. In addition, an interaction between age and parity was demonstrated in Martinez-Garcia et al.'s (2012) study from Spain, which revealed that, among migrants from the Maghreb, nulliparous women between the ages of 20 and 34 years old had the greatest risk of inadequate prenatal care utilization. In contrast, among Eastern European women, those with 1-2 children and over the age of 34 were associated with the highest risk of inadequate prenatal care (Martinez-Garcia et al., 2012). These findings were reasoned by a hypothesis that younger nulliparous women from the Maghreb may be more affected by cultural, religious and educational aspects, whereas older Eastern European women may have already begun their reproductive cycle prior to migrating and may thus be less familiar with prenatal care in Spain (Martinez-Garcia et al., 2012).

Perceived health during pregnancy was also found to play a role as feeling unwell or experiencing emotional or physical depression during pregnancy were cited as barriers to attending prenatal care appointments (Phillimore, 2016; Sherraden & Barrera, 1996). Health risks during pregnancy (such as gestational diabetes or gestational hypertension), however, were associated with significantly more prenatal care visits and were significantly less likely to be associated with inadequate care (Held & Lindley, 2018).

Migrants from European or Caucasian backgrounds were most likely to utilize prenatal care in three studies (Atkins et al., 2018; Henderson et al., 2018; Phillimore, 2016). In contrast, women from sub-Saharan Africa and South Asia were the least likely to consult in Paz-Zulueta et al.'s (2015) and Phillimore's (2016) studies, respectively.

3.2.1.2 Migration

Seven qualitative studies (Almeida et al., 2014; Barona-Vilar et al., 2013; Davies & Bath, 2001; Higginbottom et al., 2016; Jarvis et al., 2019; Phillimore, 2016; Sami et al., 2019) noted that the unfamiliarity and difficulty in navigating the health care system presented a barrier to care for migrants. In addition, participants in Barona-Vilar et al.'s (2013) study reported that their experiences with previous pregnancies in their native countries suggested to them that regular prenatal visits were not necessary to have a healthy baby. Lastly, Phillimore (2016) found that migrants arriving to the host country in the later stages of pregnancy had difficulty registering with maternity services in time to access prenatal care before birth.

3.2.1.3 Culture

Poor language proficiency was cited as a barrier to care in ten qualitative studies and one quantitative study (Almeida et al., 2014; Brar et al., 2009; Davies & Bath, 2001; Degni et al., 2014; Higginbottom et al., 2016; Hoang et al., 2009; Moxey & Jones, 2016; Reitmanova & Gustafson, 2008; Rice & Naksook, 1998; Sami et al., 2019; Sherraden & Barrera, 1996), whereas a preference for a female care provider was reported by Higginbottom et al. (2016), Owens et al. (2016), and Moxey and Jones (2016). Participants in Stapleton et al.'s (2013) study preferred hospital over clinic visits due to a tendency to associate hospitals with medical expertise which presented a challenge to migrants who often resided in the outer suburbs and far from centrally located hospitals. A belief that prenatal care was not necessary was espoused by Hispanic migrants in Zambrana et al.'s (1996), while some Muslim immigrants in Reitmanova and Gustafson's (2008) study reported that they viewed prenatal care as more of a burden than a benefit. In contrast, migrants in Rice and Naksook's (1998) and Herrel et al.'s (2004) studies,

who considered prenatal care to be important and beneficial, were more likely to use prenatal care services.

Both Higginbottom et al. (2016) and Essen et al. (2000) found that Somali women tended to view pregnancy as a natural state and therefore did not see the need to seek medical attention. In addition, migrants in Chinouya and Madziva's (2019) and Bollini et al.'s (2007) studies, respectively, reported that they were unaware of the need to consult early in pregnancy or at all. Cultural norms among African women, which prevented the disclosure of pregnancy to third parties in the first trimester, also resulted in a delay in the initial presentation for care (Chinouya & Madziva, 2019). Moreover, some women perceived physical exams to be intrusive which caused them to delay their appointments (Chinouya & Madziva, 2019). Finally, Hoang et al.'s (2009) study of Asian women noted that a lack of assertiveness due to cultural expectations negatively impacted the women's ability to seek health care that was in accordance with their preferences.

Three quantitative studies (Bell & Whiteford, 1987; Gaviria et al., 1982; Kingston et al., 2011) found that migrants who had lived longer in the host country were more likely to use prenatal care compared to their newly arrived counterparts, which suggests a potential role for a process of acculturation (Bell & Whiteford, 1987).

3.2.1.4 Position in Host Country

Three studies (Atkins et al., 2018; Held & Lindley, 2018; Wherry et al., 2017) found that individuals with less than a high school education were less likely to receive adequate prenatal care. In addition, a lack of financial resources was identified as a barrier to care in eight studies (Higginbottom et al., 2016; Jarvis et al., 2019; Moxey & Jones, 2016; Phillimore, 2016; Rousseau et al., 2014; Sherraden & Barrera, 1996; Stapleton et al., 2013; Zambrana et al., 1996). A fear of losing one's job was also cited as a barrier to attending appointments (Barona-Vilar et al., 2013; Phillimore, 2016).

Legal status also presented a barrier to care. Kentoffio et al. (2016), Gibson-Helm et al. (2015), and Agbemenu et al. (2019) found refugee status to be associated with decreased prenatal care use compared to non-refugees. Whereas, Malebranche et al's (2020) study

found that asylum seekers in Calgary, Alberta took significantly longer to seek prenatal care and were more likely to receive inadequate prenatal care than refugees. In addition, four studies identified that being undocumented was a risk factor for poor prenatal care use (Almeida et al., 2014; Chavez et al., 1986; Fuentes-Afflick et al., 2006; Phillimore, 2016). In contrast, the provision of government-issued identification to undocumented migrants was demonstrated to increase prenatal care use (Korinek & Smith, 2011). Korinek and Smith (2011) reasoned that official identification documents helped migrants with local integration and facilitated access to institutions including healthcare.

An absence of medical insurance was identified as a barrier to prenatal care use in six quantitative studies and one qualitative study (Beine et al., 1995; Bell & Whiteford, 1987; Blondel & Marshall, 1998; Held & Lindley, 2018; Jarvis et al., 2011; Rousseau et al., 2014; Zambrana et al., 1996). In contrast, the expansion of medical insurance coverage to incorporate prenatal care was associated with an increase in prenatal care visits (Atkins et al., 2018; Drewry et al., 2015; Swartz et al., 2017; Wherry et al., 2017), adequate prenatal care use (Atkins et al., 2018; Drewry et al., 2015; Swartz et al., 2017, 2019; Wherry et al., 2017), and the early initiation of prenatal care (Drewry et al., 2015; Swartz et al., 2017). Of note, expanded insurance coverage had the largest effect on individuals with lower education levels (Drewry et al., 2015; Wherry et al., 2017).

Finally, household responsibilities and a lack of child care were also reported by migrants as barriers to prenatal care (Herrel et al., 2004; Phillimore, 2016; Sherraden & Barrera, 1996; Stapleton et al., 2013).

3.2.1.5 Social Network

Higginbottom et al.'s (2016) study of migrant women in Canada found that being away from traditional supports such as family caused a delay or irregularity in prenatal care visits. In contrast, support from friends who were knowledgeable about maternity services and from community members or organizations was found to promote prenatal care use (Beine et al., 1995; Jarvis et al., 2019; Phillimore, 2016; Rice & Naksook, 1998). Beine et al. (1995), for example, described how Somali women received help from fellow

community members to complete paper work necessary to gain access to prenatal care. In addition, Korinek and Smith (2011) found that undocumented migrants living in immigrant enclaves benefitted from social capital and information that facilitated awareness of prenatal care. Interestingly, however, Moxey and Jones (2016) reported that community members could also serve as barriers to prenatal care by discouraging women to consult through the perpetuation of rumours.

Individuals in Blondel and Marshall's (1998) study who were single were more than three times more likely to have poor attendance for prenatal care visits compared to those who were married or cohabiting. In contrast, Zambrana et al. (1996) found that Mexican women living with the baby's father initiated prenatal care over three weeks earlier than those who did not live with the baby's father. Lastly, Rice and Naksook (1998) report that having a partner who was fluent in the language of the host country helped women navigate the system and arrange prenatal care.

3.2.2   Health Service Factors

3.2.2.1 Accessibility of Care

Difficulty in scheduling appointments and transport difficulties were cited as barriers to accessing prenatal care in seven and ten studies, respectively (Almeida et al., 2014; Barona-Vilar et al., 2013; Brar et al., 2009; Herrel et al., 2004; Higginbottom et al., 2016; Loue et al., 2005; Moxey & Jones, 2016; Owens et al., 2016; Phillimore, 2016; Rhodes et al., 2015; Sami et al., 2019; Shaffer, 2002; Sherraden & Barrera, 1996; Stapleton et al., 2013; Zambrana et al., 1996). In addition, individuals in six studies reported a perception that they were discriminated against by health care providers or staff (Berggren et al., 2006; Davies & Bath, 2001; Degni et al., 2014; Higginbottom et al., 2016; Reitmanova & Gustafson, 2008; Sami et al., 2019). For example, Davies and Bath (2001) found that health care professionals would occasionally refuse to see patients who had not brought an interpreter, while migrants in Reitmanova and Gustafson's study (2008) reported being subject to stereotypical and prejudiced comments by health care professionals. A belief that accessing health care could place one at risk of detention or deportation was also mentioned as a barrier in several studies (Chinouya & Madziva, 2019; Phillimore,

2016; Rousseau et al., 2014). In addition, inconvenient clinic hours and long waiting times were also identified as barriers to care (Shaffer, 2002; Sherraden & Barrera, 1996).

In contrast, an easily accessible location, flexible appointment times, and reminders about appointments helped facilitate prenatal care use among migrants (Almeida et al., 2014; Herrel et al., 2004; Owens et al., 2016; Stapleton et al., 2013).

3.2.2.2 Expertise

Culturally competent care was reported to facilitate prenatal care use in two studies (Moxey & Jones, 2016; Shaffer, 2002). For example, Shaffer (2002) noted that the availability of caregivers who were knowledgeable about cultural customs and norms had an important influence on the decision of Hispanic migrants to access prenatal care. In contrast, several studies reported that a failure to provide culturally competent care was a barrier, with Stapleton et al. (2013), for example, highlighting a lack of sensitivity regarding female circumcision among caregivers (Degni et al., 2014; Higginbottom et al., 2016; Reitmanova & Gustafson, 2008). Continuity of care was cited as a facilitating factor by Owens et al. (2016) and Stapleton et al. (2013), whereas participants in Phillimore's (2016) study reported that a lack of continuity of care reduced their confidence to attend follow-up visits. Migrants in Sami et al.'s (2019) study also found the lack of continuity of care as a challenge.

The provision of patient-centered care which took into consideration personal and social circumstances was cited as important especially by those who had newly arrived in the host country (Stapleton et al., 2013). For example, a clinical installation in Geneva which provided services targeted to undocumented migrants was found to help this population access prenatal care (Sami et al., 2019).

3.2.2.3 Personal Treatment and Communication

Poor treatment by care providers represented a barrier to care with women believing they were treated poorly by care providers due to their presumed inability to pay (Rousseau et al., 2014) or for their higher number of previous pregnancies (Degni et al., 2014). Poor

communication by providers was cited in three studies and included challenges related to linguistic proficiency as well as a perceived strictness which prevented patients from asking further questions (Almeida et al., 2014; Degni et al., 2014; Phillimore, 2016). Despite the use of interpretation services, women in Higginbottom et al.'s (2016) study reported difficulty expressing their feelings and articulating their problems. Meanwhile, Phillimore (2016) reported delays in booking appointments due to the lack of access to a translator.

Higginbottom et al. (2016) noted that a dependence on written information could be overburdening for migrant women and did not meet the needs of individuals from more "oral" societies. Moreover, a failure to provide educational pamphlets in a patient's language of preference was noted by Hoang et al. (2009). Lastly, Reitmanova and Gustafson (2008) and Davies and Bath (2001) reported that women received very limited pregnancy-related information from providers due to language barriers or a perception of staff being too busy, respectively.

In contrast, the adoption of a communication approach which met the patient's needs and a physician-patient rapport which engendered trust were both well-received (Owens et al., 2016; Stapleton et al., 2013). In addition, Bell and Whiteford (1987) note that an absence of communication problems led Asian refugee women in Iowa to be more likely to attend a subsequent prenatal care visit. Meanwhile, Hispanic migrants, regardless of duration of stay in the United States, were found to prefer a physician who spoke Spanish (Gaviria et al., 1982), and cited this as an important factor in initiating and continuing prenatal care (Shaffer, 2002).

3.2.2.4 *Professionally Defined Need*

Migrants in Rice and Naksook (1998) and Phillimore's (2016) qualitative studies reported that a referral or information about accessing maternity services from a health care professional such as a physician or midwife helped to facilitate access to prenatal care. In addition, Sami et al.'s (2019) study found that a clinic for undocumented migrants could facilitate access to hospital antenatal consultations for this population. Lastly, Bell and Whiteford (1987) found that women who reported having a personal

physician were significantly more likely to attend follow up prenatal care visits than women who did not have a personal physician.

3.3 Strengths and Limitations of the Literature

One strength of the literature on the barriers and facilitators to prenatal care use among migrants was the variety of study designs used which included quantitative, qualitative, and mixed-methods. Qualitative and quantitative analyses provided complementary perspectives and have been found to be helpful for studying migrant populations (Shafiei, Small, & McLachlan, 2012). One weakness of the literature, however, was that several factors in Foets et al.'s (2007) framework have not yet been explored in quantitative studies. In addition, comparisons between studies were often compromised as different definitions of "adequate" prenatal care were employed.

An additional strength of the literature was that the articles were published in a range of countries which allowed for a broader appreciation of the diverse challenges faced by migrants in Western countries. However, a relative weakness was that a large number of studies (20/48) came from the United States, while only eight Canadian studies were identified. In addition, although the literature contained studies on marginalized groups such as refugees and undocumented migrants, these individuals often had access to government insurance programs such as Emergency Medicaid in the United States (Swartz et al., 2019). In contrast, there was a paucity of studies on uninsured migrants specifically. The literature search identified only three studies (Jarvis et al., 2019; Jarvis et al., 2011; Rousseau et al., 2014) which focused on these migrants.

In terms of methodology, several quantitative studies such as Wherry et al. (2017) and Drewry et al. (2015) used birth registry data which reduced coverage bias. In contrast, other quantitative studies relied on hospital or clinic data. For example, Martinez-Garcia et al. (2012) found their data only contained 71% of births from their catchment area which suggested the possibility of a selection bias.

With respect to the qualitative studies, the majority (13/22) used convenience sampling, while only six studies used purposive sampling. Only one of the studies reported that

saturation of the data was attained. These factors limited the generalizability of the qualitative findings.

Chapter 4

4. Research Question and Objectives

Given the paucity of studies which focused on migrants without health insurance, we proposed to carry out a study which aimed to identify barriers and facilitators to prenatal use among this population. We employed a quantitative analysis in light of the gaps in the quantitative literature concerning barriers and facilitators to prenatal care. Our study involved secondary data from a larger study which entailed a Canadian sample of uninsured migrants, which have been previously documented to be a poorly studied group (Jarvis et al., 2019; Magalhaes et al., 2010). Our research question and objectives were thus:

Research Question: What are the barriers and facilitating factors which influence prenatal care use among migrants without health insurance in Montreal?

Objective 1: Describe the utilization of prenatal care among migrants without health insurance in Montreal.

Objective 2: Use quantitative analysis to identify barriers and facilitating factors to prenatal care use among migrants without health insurance in Montreal.

Chapter 5

5. Research Methodology

5.1 Study Design

A cross-sectional study was carried out between January 2016 and August 2017 in Montreal, Canada to describe the prenatal care use among uninsured migrants and to identify factors which influence this use. Cross-sectional studies can be advantageous given the relative low cost and simplicity. In addition, cross-sectional studies do not require follow-up which is convenient given potential difficulties that may be experienced when trying to get in contact with a vulnerable population for follow up. An important limitation with a cross-sectional design, however, is the difficulty in establishing causality (Gordis, 2014). Interpretation must be cautious and Bradford-Hill (1965) criteria must be taken into consideration as cross-sectional studies inherently reveal associations.

5.2 Conceptual Model

Data analysis was based on Foets et al.'s model (2007) (Figure 2.2) which is an adaptation of Andersen's Model of Healthcare Utilization (Andersen, 1995). According to Andersen's model, health care use is determined by predisposition, ability and need. Predisposition refers to demographic, social structure, and health beliefs that may influence health care use, while ability refers to community and personal resources which must be present in order for health care use to take place (Andersen, 1995). Need refers to both perceived and evaluated need. Perceived need is dependent on social structure and health beliefs, while evaluated need refers to professional judgment regarding health status and need for medical care.

According to Foets et al. (2007), Andersen's determinants are influenced by a range of individual and health service factors which, in turn, influence prenatal care use among migrants. The ability of Foets et al.'s (2007) framework to accommodate potential

explanations between country of origin and prenatal care use makes this model especially suitable for use with migrant populations (Boerleider et al., 2015).

5.3 Study Sample

5.3.1   Sample Strategy

This research project analyzed a subsample of a larger study ("Comment améliorer la santé et l'accès aux soins de santé des migrants sans couverture médicale de Montréal?") whose methodology was described elsewhere (Fete, Aho, Benoit, Cloos, & Ridde, 2019). The larger study investigated migrants (defined as those born outside of Canada) who lacked access to a provincial or federal health insurance plan. Study participants were: a) over 18 years of age and b) resided or intended to reside in the province of Quebec for more than 6 months and/or obtain permanent residence. Individuals who were Canadian citizens, held a legal status which provided eligibility for public insurance, were unable to communicate in one of the study languages (English, French, Arabic, Spanish, Haitian Creole, Mandarin), or who had access to a private insurance plan which covered prenatal care were excluded. The subsample of interest for this study consisted of migrant women who had at least one pregnancy in the province of Quebec during the past five years.

5.3.2   Participant Recruitment

Two parallel recruitment processes were used in the larger study. The first involved the "Médecins du Monde" clinic (Montréal, Québec), which was established in 2011 and provides free primary care to migrants with precarious status (Médecins du Monde, n.d.). Recruitment was systematic in that all migrants who presented to the clinic were invited to participate in the study by a research assistant who was distinct from the clinical staff. The second recruitment process occurred in the community and used venue-based sampling as described in Fête et al. (2019). Key informants identified a list of neighbourhoods and other venues (food banks, parks, etc.) where the study population was likely to gather. Snowball sampling was also used as study participants were invited to communicate information about the study to other potential participants.

5.3.3   Sample Size Calculation

In order to determine the sample size for the larger study, equation 5.1 was used, whereby n=sample size, N=population size (assumed to be infinity given the paucity of data on the target population), p=proportion for the variables of interest, and q=1-p. d was the desired precision of the estimate (set to 5%).

$$n = \frac{N\hat{p}\hat{q}}{\dfrac{d^2}{1.96^2}(N-1) + \hat{p}\hat{q}}$$

Equation 5.1. Formula used to calculate the required sample size to estimate a proportion

Given the objectives of the larger study, variables of interest included the perceived health, health care needs, and access to health care among migrants. In light of findings from prior research (Table 5.1) which studied these variables among the migrant population in North America, a proportion of p=0.3 was chosen (and thus q=1-p=0.7). The anticipated response rate was also taken into consideration. Given previous studies (Florence et al., 2010; Torres & Sanz, 2000) which involved in-person recruitment, a response rate of 70% was anticipated. This led to a final sample size of approximately 400. As described in section 5.3.2, two parallel recruitment processes were used and the desired sample size (400) was targeted for each recruitment arm which led to an overall target sample size of 800.

Table 5.1 Summary of previous studies from North America looking at perceived health among migrants

Study	Population	Variable	Value
Bergeron, Auger, and Hamel (2009)	Immigrants in Montreal	Perception of a poor/fair health	10.6%
De Maio and Kemp (2010)	Immigrants in Canada	Perception of poor/fair health	8.1%
McDonald and Kennedy (2004)	Immigrants in Canada	Perception of poor/fair health	Females: 12% Males: 8.2%
Siddiqi, Zuberi, and Nguyen (2009)	Immigrants in Canada	Health needs not met	8.5%
Zunzunegui, Forster, Gauvin, Raynault, and Douglas Willms (2006)	Immigrants in Montreal	Excellent or very good state of perceived health	40-60% in Montreal
Marshall, Urrutia-	Female immigrants in	Absence of regular care	67.1%

Rojas, Mas, and Coggin (2005)	Texas		

5.4 Data Collection

A quantitative questionnaire was designed based on the Trajectory model (Edberg, Cleary, & Vyas, 2011). Where possible, questions were based on scales validated for use in migrant populations (Daher, Ibrahim, Daher, & Anbori, 2011; Hoopman, Terwee, Muller, & Aaronson, 2006; Zunzunegui et al., 2006). The 83-item questionnaire included questions on: 1) sociodemographics (age, language, education level, etc.), 2) health status 3) prenatal care use, 4) revenue, 5) social support, 6) migration status, and 7) barriers to care.

Trained multilingual research assistants verified participants' eligibility for the study, obtained informed consent, and administered the questionnaire during one-on-one interviews using a tablet and OdK Collect software (Open Data Kit). Interview duration varied between 30 and 90 minutes.

5.5 Data Analysis

All statistical analyses were carried out using SPSS 25 (IBM Corporation, Chicago, IL). Unless otherwise specified, a p-value of <0.05 was used to determine statistical significance.

5.5.1 Dependent Variables

Dependent variables considered in the study included "prenatal care use", "initiation of prenatal care", and the "adequacy of prenatal care use". Prenatal care use was dichotomized into "yes" (at least one prenatal care visit with a health care professional (midwife, physician or nurse)) or "no". The initiation of prenatal care was dichotomized into "early" (first prenatal care visit in the first three months) or "not early" (no prenatal care visits or first prenatal care visit after the third month) (Fuentes-Afflick et al., 2006). Adequacy of prenatal care use was examined using a subset of the data (pregnancies carried to term). Prenatal care use was considered "adequate" if care was initiated in the first three months and if there were at least six prenatal care visits. Prenatal care was

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considered "inadequate" if initiation of prenatal care occurred after three months and/or if there were fewer than six prenatal care visits. Although local practice (ACNPU-Montreal) and the American College of Gynecologists and Obstetricians (ACOG) guidelines both recommend the initiation of prenatal care in the first trimester along with 12 or 13 prenatal care visits, respectively, a conservative definition of "adequate" prenatal care was used. Such conservative definitions have been used in previous research on uninsured migrant populations (Fuentes-Afflick et al., 2006; Jarvis et al., 2011).

5.5.2   Independent Variables

Candidate (independent) variables were identified using Foets et al.'s (2007) conceptual model. The study questionnaire did not examine health service factors and thus only individual factors were considered. Independent variables included age, perceived health, number of previous pregnancies in Quebec without health insurance, knowledge of where to access care, language fluency, country of birth, legal status, education level, food insecurity, marital status, and having someone with whom to share concerns. Food insecurity was used as a proxy for financial precarity since in addition to income it was also influenced by expenditures, household size, and having to provide for family members abroad. Countries of birth were separated into "high-income" or "low-middle income" based on the World Bank classification.

5.5.3   Descriptive Statistics

Descriptive statistics were used to compare demographic information, pregnancy characteristics, and prenatal care utilization. The Fisher's Exact Test and student's t-test were used for between-group comparisons for proportions and means, respectively.

Given the small number of pregnancies carried to term, descriptive statistics (rather than regression analysis) were used for the third dependent variable (adequacy of prenatal care use). In this case, the Fisher's exact test and the Mann Whitney U-Test were used for between-group comparisons for proportions and means, respectively.

5.5.4 Regression Analysis

A two-step logistic regression analysis was used to identify factors which significantly influenced prenatal care use and the early initiation of prenatal care. In the first step, univariate logistic regression was run for each predictor (independent) variable. A cut-off value of $p<0.2$ was used to identify independent variables to retain. In the second step, retained predictor variables were entered into a multivariable model and adjusted for age and food insecurity. As a result of missing data, the number of pregnancies studied for each variable differed. Assessment of Goodness of Fit was carried out using the Hosmer and Lemeshow test.

5.6 Additional Methods of Data Analysis Attempted

The data analysis methods described in section 5.5 contributed to the journal article in Chapter 6, however, other methods of data analysis were considered in the project and are described below. These include a principal component regression analysis and the calculation of a risk score to predict prenatal care use.

5.6.1 Principal Component Regression

Principal Component Analysis (PCA) is a method used to reduce dimensionality, improve interpretability, and minimize information loss in large datasets (Jolliffe & Cadima, 2016). PCA results in the creation of uncorrelated variables (termed "principal components") which maximize the proportion of variance explained. Although PCA is traditionally used for continuous or discrete variables, variations of PCA such as Categorical Principal Component Analysis (CATPCA) allow for dimension reduction of datasets which contain a mix of categorical (including binary), ordinal, and numeric variables (Kemalbay & Korkmazoğlu, 2014).

Principal Component Regression (PCR) is a regression analysis based on PCA whereby principal components (rather than individual variables) are used as predictors in the model. One of the advantages of PCR is that it can help to avoid collinearity (Liu et al., 2003 (Liu, Kuang, Gong, & Hou, 2003). Regression analysis following CATPCA is

analogous to PCR and has been demonstrated in the literature (Kapucu, Ilk, & Batmaz, 2018; Kemalbay & Korkmazoğlu, 2014).

The analysis followed the steps of Kemalbay and Korkmazoğlu (2014). First, the suitability of the data (containing the eleven independent variables described in section 5.5.2) for CATPCA was confirmed through a Bartlett's test of sphericity and the Kaiser–Meyer–Olkin measure. Principal components were then extracted using a cut-off eigenvalue of 1. Retained principal components were then used as predictor variables in a logistic regression model for each of the dependent variables of interest (prenatal care use and initiation of prenatal care). A chi-square test was used to report the overall significance of the models while the Nagelkerke R^2 was used to report the proportion of the variance in the dependent variables that was explained by the models. Given the smaller dataset, CATPCA was not carried out for the third dependent variable (adequacy of prenatal care).

5.6.2   Development of a Risk Score

A risk score to predict prenatal care use was also considered and was inspired by Kilic et al. (2017) who developed and validated a risk score to predict hospital readmission rates. Analogous to their methodology, the dataset was split randomly into training (94/125 pregnancies) and test (31/125 pregnancies) subsets which comprised of 75% and 25% of the pregnancies respectively.

For each dependent variable of interest (prenatal care use and initiation of prenatal care), the training set was used to perform univariate logistic regression for the independent variables described in section 5.5.2. Independent variables associated with the dependent variable (p<0.20) were entered into a multivariable regression model.

Independent variables in the multivariable model significantly associated (p<0.05) with the dependent variable were used to calculate a risk score. Similar to Kilic et al. (2017), risk points were attributed for each variable based on the relative magnitude of the odds ratio. A total risk score was derived by summing the risk points for each independent variable. Using the test set, a logistic regression was then performed to evaluate the

predictive ability of the risk score. A Hosmer and Lemeshow test was also performed to assess of Goodness of Fit of the model.

5.7 Ethical Considerations

This project presented several ethical challenges given the involvement of a marginalized study population (Clark-Kazak, 2017). First, informed and voluntary consent was crucial. In order to avoid coercing marginalized individuals into participating, excessive financial compensation was avoided. Participants were awarded $30 which was commensurate with the amount of time needed to complete the survey. In addition, participants were free to withdraw from the study at any time. Verbal consent was obtained from all participants given that the study population may have had previous interactions with authorities which may have rendered them suspicious of written consent forms (Clark-Kazak, 2017).

Given the precarious status of participants, confidentiality was an integral element to consider (Clark-Kazak, 2017). All data was anonymized at the time of collection and securely stored in password-protected files. Moreover, each member of the research team with access to the data signed a confidentiality agreement. In addition, as per the REB submission, all data will be destroyed five years after completion of the study.

As outlined by Clark-Kazak (2017), research involving marginalized populations places an ethical obligation on the research team to diffuse findings through multiple media formats. Accordingly, in addition to a scientific article and an oral research presentation, findings from this research project were intended to support position papers in conjunction with Médecins du Monde. Moreover, findings from the larger project were intended to contribute to a documentary being planned with "Blimp Télé".

Chapter 6

6. Factors Influencing Prenatal Care Use Among Uninsured Migrants: A Cross-Sectional Study from Montreal, Canada

This chapter contains a journal article on the factors influencing prenatal care use among a population of uninsured migrants in Montreal, Canada. Sections 6.2 and 6.3 largely contain repeated information from earlier chapters. Sections 6.3-6.6 present new information.

The authors of the article are Ahmed Faress, Marie-Jo Ouimet, Joséphine Aho, Patrick Cloos and Valéry Ridde.

Ahmed Faress contributed to the conception of the study on prenatal care access, data analysis, and writing of the manuscript.

Marie-Jo Ouimet contributed to the conception and data collection of the larger study (Comment améliorer la santé et l'accès aux soins de santé des migrants sans couverture médicale de Montréal?") as well as the study on prenatal care access. She contributed to the data analysis and extensively reviewed the manuscript.

Joséphine Aho contributed to the conception and data collection of the larger study (Comment améliorer la santé et l'accès aux soins de santé des migrants sans couverture médicale de Montréal?") as well as the study on prenatal care access. She contributed to the data analysis and reviewed the manuscript.

Patrick Cloos extensively reviewed the manuscript.

Valéry Ridde contributed to the conception and data collection of the larger study (Comment améliorer la santé et l'accès aux soins de santé des migrants sans couverture

médicale de Montréal?") as well as the study on prenatal care access. He extensively reviewed the manuscript.

6.1 Abstract

Objective: Previous research has identified poor prenatal care use among uninsured migrants in Canada, however, the factors influencing this usage remain largely unexplored. The study objective was to quantify the use of prenatal care among this group and to identify their barriers and facilitating factors to prenatal care use.

Methods: A cross-sectional survey of uninsured migrants in Montreal, Canada was carried out between January 2016 and August 2017. Participants were recruited from a local clinic and from the community using venue-based and snowball sampling. Outcome measures included prenatal care use, prenatal care initiation, and prenatal care adequacy. Regression analysis identified barriers and facilitating factors to prenatal care use.

Results: 125 previous pregnancies in Canada were identified among 101 women. 65.0% of pregnancies involved prenatal care use and 44.6% involved an early initiation of care. Among the 62 pregnancies carried to term, 29.5% received adequate prenatal care. Women ≥ 35 years of age, between the ages of 18-24, and those who did not know where to consult were significantly less likely ($p<0.05$) to use prenatal care. Women aged 30-34 were significantly less likely ($p<0.05$) to initiate prenatal care early. In contrast, women who were married or in common-law relationships were significantly more likely ($p<0.05$) to initiate prenatal care early.

Conclusion: Our study found that prenatal care use among uninsured migrants was very poor. Factors influencing prenatal care use were varied and related to demographics, social network, and migration. Future policy should aim to improve access to prenatal care among this vulnerable population.

6.2 Introduction

Uninsured migrants are a growing group in Canada who do not have access to a provincial or federal health insurance plan (Rousseau et al., 2008). They form a

heterogeneous group comprised of undocumented migrants, temporary foreign workers, international students, individuals awaiting sponsorship, and foreign visitors (Health Canada, 2018; Régie de l'assurance maladie du Québec, 2018). Undocumented migrants are now estimated to number approximately 250,000 across Canada – with 40,000 in Montreal (Médecins du Monde, 2014). Despite the position of the World Health Organization (2017) that the right to the highest attainable standard of health is a fundamental human right guaranteed to all, these migrants continue to face precarious access to care in Canada due to their migratory status (Jarvis et al., 2019).

This precarious access extends to prenatal care, which consists of routine scheduled medical visits during pregnancy (Healy et al., 2006). Despite demonstrated benefits including the earlier identification of infections and anemia (Healy et al., 2006), reductions in morbidity and perinatal mortality (Foster et al., 1992; Reed et al., 2005), and a favourable cost-benefit relationship (Lu et al., 2000), studies continue to demonstrate an inadequate access to prenatal care among uninsured migrants (Jarvis et al., 2011; Rousseau et al., 2014; Wilson-Mitchell & Rummens, 2013). A study from Toronto determined that 80% of uninsured migrant women received less-than-adequate prenatal care (Wilson-Mitchell & Rummens, 2013). A study from Montreal by Rousseau et al. (2014) found that uninsured migrants had significantly fewer prenatal care visits compared to insured refugee claimants and that 65.9% of uninsured migrants had no prenatal care visits during their pregnancy. As of 2020, uninsured migrants in Quebec remain ineligible for government-covered prenatal care, however community organizations including Médecins du Monde and La Maison Bleue provide limited access to prenatal care visits as well as lab testing for this population (Aube, Pisanu, & Merry, 2019; Médecins du Monde, n.d.).

Despite the known health inequities, uninsured migrants in Canada remain an understudied population (Brabant & Raynault, 2012; Jarvis et al., 2019; Magalhaes et al., 2010). The factors influencing their use of prenatal care remain largely unexplored in the literature (Jarvis et al., 2019). Qualitative findings (Jarvis et al., 2019; Rousseau et al., 2014) have identified cost, a fear of deportation, poor treatment by staff, a lack of knowledge about the healthcare system, and non-standard entry points to care as barriers

to prenatal care use. To date, however, there have been no studies which have used quantitative analysis to investigate the factors influencing the use of prenatal care among this population in Canada.

Understanding the factors which influence prenatal care use among uninsured migrants is valuable from both medical and public health perspectives as this can suggest mechanisms to reduce morbidity, address health inequity, and decrease long-term costs (Lu et al., 2000; Phillimore, 2016). In this paper, we use data from a cross-sectional survey of uninsured migrants in Montreal to describe the use of prenatal care and to identify barriers and facilitators to prenatal care use.

6.3 Methods

A cross-sectional study was carried out in Montreal between January 2016 and August 2017. Ethics approval was obtained from the Research Ethics Board at the University of Montreal Hospital Research Centre (Montreal, Quebec) (14.204). Written informed consent was provided by all participants. This study involved a subset of participants derived from a larger study whose methods and ethical considerations were described in further detail in Fete et al. (2019).

6.3.1   Study Participants

Participants were: a) migrants (defined as those born outside Canada) without provincial or federal health insurance b) at least 18 years of age, and c) resided or intended to reside in the province of Quebec for more than 6 months and/or obtain permanent residence. We excluded individuals who were Canadian citizens, held a legal status which provided eligibility for public insurance, were unable to communicate in one of the study languages (English, French, Arabic, Spanish, Haitian Creole, Mandarin), or who had access to a private insurance plan which covered prenatal care.

The subset of interest for our study consisted of females with at least one previous pregnancy within the last five years while uninsured in Quebec. With the exception of

two deliveries (one in the United States and one in Chile), all deliveries took place in Quebec.

6.3.2 Participant Recruitment

Two recruitment processes were used for the larger study. The first involved the "Médecins du Monde" clinic (Montréal, Québec), which was established in 2011 and provides free primary care to migrants with precarious status (Médecins du Monde, n.d.). Recruitment was systematic in that all migrants who presented to the clinic were invited to participate in the study by a research assistant who was distinct from the clinical staff. The second recruitment process occurred in the community and used venue-based sampling as described in Fete et al. (2019). Key informants identified a list of neighbourhoods and other venues (food banks, parks, etc.) where the study population was likely to gather. Snowball sampling was also used as study participants were invited to communicate information about the study to other potential participants.

6.3.3 Questionnaire and Data Collection

A quantitative questionnaire was designed based on the Trajectory model (Edberg et al., 2011). Where possible, questions were based on scales validated for use in migrant populations ((Daher et al., 2011; Hoopman et al., 2006; Zunzunegui et al., 2006). The 83-item questionnaire included questions on: 1) sociodemographics (age, language, education level, etc.), 2) health status 3) prenatal care use, 4) revenue, 5) social support, 6) migration status, and 7) barriers to care.

Trained multilingual research assistants verified participants' eligibility for the study, obtained informed consent, and administered the questionnaire during one-on-one interviews using a tablet and OdK Collect software (Open Data Kit). Interview duration varied between 30 and 90 minutes.

6.3.4 Conceptual Model

Our analysis was based on the conceptual model proposed by Foets et al. (2007) where (Figure 1) both individual and health service factors influence the specific determinants

(need, ability, and predisposition) of Andersen's Model of Healthcare Utilization (Andersen, 1995), which in turn determine prenatal care use. As per Boerleider et al. (2015), this conceptual framework is useful with migrant populations as it explores a range of factors which may help explain the relationship between country of origin and prenatal care use.

6.3.5   Dependent Variables

Dependent dichotomous variables included "prenatal care use", "initiation of prenatal care", and the "adequacy of prenatal care use". Prenatal care use was dichotomized into "yes" (at least one prenatal care visit with a health care professional (midwife, physician or nurse)) or "no". The initiation of prenatal care was dichotomized into "early" (first prenatal care visit in the first three months) or "not early" (no prenatal care visits or first prenatal care visit after the third month) (Fuentes-Afflick et al., 2006).

A subset of the data (pregnancies carried to term) was examined to assess the adequacy of prenatal care. Prenatal care use was considered "adequate" if the initiation was in the first three months and there were ≥6 prenatal care visits. It was considered "inadequate" if initiation of prenatal care occurred after the third month and/or if there were <6 prenatal care visits. While local practice (ACNPU-Montreal) and the American College of Gynecologists and Obstetricians (ACOG) guidelines recommended the initiation of prenatal care in the first trimester along with 12 or 13 prenatal care visits, respectively, we adopted a conservative definition of "adequate" prenatal care which has been used in previous research with an uninsured migrant population (Fuentes-Afflick et al., 2006; Jarvis et al., 2011).

6.3.6   Independent Variables

Candidate (independent) variables potentially associated with prenatal care use were identified using Foets et al.'s (2007) conceptual model. Our questionnaire did not probe health service factors and therefore only individual factors were considered. These variables included: age, perceived health, number of previous pregnancies in Quebec without health insurance, knowledge of where to access care, language fluency, country

of birth, legal status, education level, food insecurity, marital status, and having someone to share concerns with. Food insecurity was used to measure financial precarity since, in addition to income, it was also influenced by expenditures, household size, and having to provide for family members abroad. Countries of birth were separated into "high-income" or "low-middle income" based on the World Bank classification.

6.3.7 Data Analysis

All statistical analyses were carried out using SPSS 25 (IBM Corporation, Chicago, IL). Unless otherwise specified, we used a p-value of <0.05 to determine significance.

6.3.7.1 Descriptive Statistics

Descriptive statistics were used to analyze demographic information. The Fisher's Exact Test and student's t-test were used for between-group comparisons for proportions and means, respectively.

Given the small number of pregnancies carried to term, regression analysis was not carried out for our third dependent variable (adequacy of prenatal care use). Instead, descriptive statistics were used. The Fisher's exact test and the Mann Whitney U-Test were used for between-group comparisons for proportions and means, respectively.

6.3.7.2 Regression Analysis

A two-step logistic regression analysis was used to identify factors which influenced prenatal care use and the early initiation of prenatal care. In the first step, univariate logistic regression was run for each predictor (independent) variable. A cut-off value of p<0.2 was used to identify independent variables to retain. In the second step, retained predictor variables were entered into a multivariable model and adjusted for age and food insecurity. As a result of missing data, the number of pregnancies studied for each variable differed. Assessment of Goodness of Fit was carried out using the Hosmer and Lemeshow test.
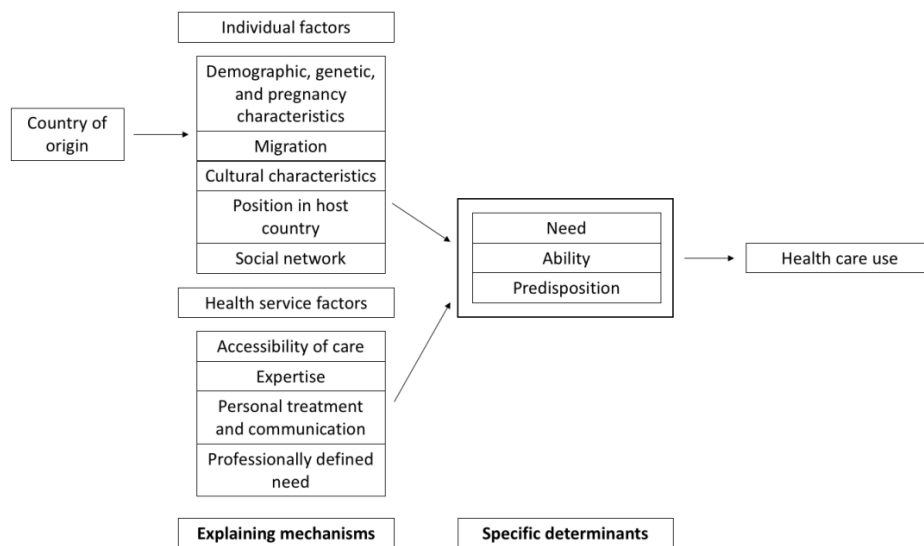
Figure 6.1 *Conceptual framework showing individual and health service factors which influence prenatal care use among migrants (adapted from Boerleider et al. (2015)).*

6.4 Results

6.4.1 Sample

803 participants were recruited including 433 (53.9%) from the community and 370 (46.1%) at the clinic. The sample included 63.0% (506/803) females. A total of 125 uninsured pregnancies in the previous five years were identified among 101 women. Demographic characteristics for the subset of interest are summarized in Table 6.1.

The majority (84/101, 83.2%) of participants were recruited from the clinic for uninsured migrants. A majority (83.2% (84/101)) of women in our subset had one pregnancy in the previous five years, while 9.9% (10/101) had two pregnancies, and 6.9% (7/101) had three pregnancies.

Uninsured migrants without legal status had lived in Quebec, on average, for significantly longer (2.78 ± 3.17 years) than those with legal status (1.10 ± 1.31 years) (p=0.007). In addition, individuals without legal status were significantly more likely to be single (34.4% (11/32) vs. 7.2% (5/69), p=0.022) than those with legal status. Lastly, almost 25% (7/29) of migrants without legal status reported that they experienced food

insecurity often, which was significantly higher (p=0.003) than among those with legal status (2/66, 3.0%).

6.4.2 Pregnancy Characteristics

Approximately 50% (62/119) of pregnancies were carried to term (Table 6.2). The majority of abortions (10/12, 83.3%) were completed using medical means. Pregnancies that were not carried to term and where the participants did not report an abortion were assumed to be miscarriages. It was therefore estimated that approximately 30% (11/37) and 40% (34/82) of pregnancies among migrants without and with legal status, respectively, resulted in miscarriages.

6.4.3 Prenatal Care Use

Prenatal care was not used in 32.4% (12/37) and 36.0% (31/86) of pregnancies among migrants without and with legal status respectively (Table 6.3). In addition, 40.0% (14/35) and 46.5% (40/86) of pregnancies among these two groups, respectively, had an early initiation of prenatal care.

Among pregnancies carried to term, prenatal care was deemed inadequate in 70% (14/20) and 70.7% (29/41) of pregnancies among migrants with and without legal status, respectively.

6.4.4 Factors Influencing Use of Prenatal Care

Univariate analysis identified three variables (not knowing where to consult, marital status, and someone to share worries with) which predicted prenatal care use (at least one visit with a health care professional) (Table 6.4). The adjusted multivariable model (χ^2=21.7, df=8, p=0.006) found that individuals who reported not knowing where to consult were significantly less likely (OR 0.25, 95% CI: 0.06-0.99) to utilize prenatal care (p=0.049). Women between the ages of 18 and 24 (OR 0.30, 95% CI: 0.09-0.99, p=0.049) and those over 35 (OR 0.13, 95% CI: 0.03-0.54, p=0.01) were significantly less likely to use prenatal care compared to women between the ages of 25 and 29.

6.4.5 Factors Influencing Early Initiation of Prenatal Care

Three variables were identified in the univariate analysis as predicting the early initiation of prenatal care with a significance of p<0.20: perceived health, not knowing where to consult, and marital status (Table 5). The adjusted multivariable model (χ^2=20.6, df=8, p=0.008) found that individuals who were married or in common-law relationships were significantly more likely (OR=3.16, 95% CI: 1.04-9.62) to initiate prenatal care early than individuals who were single, divorced, or widowed (p=0.04). Women between the ages of 30 and 34 were significantly less likely (OR 0.27, 95% CI: 0.10-0.72) than those between the ages of 25 and 29 to initiate prenatal care early (p=0.01).

6.4.6 Description of Individuals with Adequate Prenatal Care Use

Demographic characteristics among pregnancies associated with adequate and inadequate prenatal care use are shown in Table 6.6. 70% (28/40) of pregnancies with inadequate prenatal care were associated with an income of $1500 or less. In contrast, 53.3% (8/15) of pregnancies with adequate prenatal care were associated with an income of greater than $1500. Temporary foreign workers and those from Subsaharan Africa and Latin America were more likely to have inadequate prenatal care.

Table 6.1 Demographic characteristics of uninsured migrants with (n=69) and without (n=32) legal status.

	Uninsured migrants without legal status, n (%)[a]	Uninsured migrants with legal status, n (%)[a]
Age (mean ± SD)	29.47 ± 4.94	29.58 ± 4.59
Place of recruitment		
Community	4 (12.5)	13 (18.8)
Clinic for uninsured migrants	28 (87.5)	56 (81.2)
Previous pregnancies in Quebec without health insurance		
None	27 (84.4)	57 (82.6)
One	4 (12.5)	6 (8.7)
Two	1 (3.1)	6 (8.7)
Legal status		
Temporary foreign worker	0 (0.0)	8 (11.6)
Student	0 (0.0)	11 (15.9)
Visitor	0 (0.0)	26 (37.7)
Other temporary status (waiting for sponsorship)	0 (0.0)	24 (34.8)
None – application in process	12 (37.5)	0 (0.0)
None – no application in process	20 (62.5)	0 (0.0)
Years living in Quebec		
Range	0-15	0-5
Mean ± SD	2.78 ± 3.17**	1.10 ± 1.31**
Country of origin		
Asia	1 (3.1)	1 (1.5)
Caribbean	7 (21.9)	10 (14.7)
Europe/United States	3 (9.4)	3 (4.4)
Latin America (Mexico/Central/South America)	7 (21.9)	18 (26.5)
Middle East and North Africa	6 (18.8)	20 (29.4)
Subsaharan Africa	8 (25.0)	16 (23.5)

Education level		
None	1 (3.2)	0 (0.0)
Primary	1 (3.2)	1 (1.4)
Secondary	5 (16.1)	10 (14.5)
Post-secondary	6 (19.4)	7 (10.1)
University – undergraduate level	14 (45.2)	31 (44.9)
University – graduate level	4 (12.9)	20 (29.0)
Income, ($) (monthly)		
≤500	5 (17.9)	10 (16.4)
501-1000	12 (42.9)	14 (23.0)
1001-1500	4 (14.3)	13 (21.3)
1501-2000	2 (7.1)	15 (24.6)
2001-2500	5 (17.9)**	1 (1.6)**
≥2501	0 (0.0)	8 (13.1)
Food insecurity		
Never	15 (51.7)	46 (69.7)
Sometimes	7 (24.1)	18 (27.3)
Often	7 (24.1)**	2 (3.0)**
Marital status		
Married	16 (50.0)*	52 (75.4)*
Common-law	4 (12.5)	9 (13.0)
Widowed	0 (0.0)	1 (1.4)
Separated	1 (3.1)	1 (1.4)
Divorced	0 (0.0)	1 (1.4)
Single	11 (34.3)**	5 (7.2)**
Language fluency		
Neither English or French	1 (3.1)*	16 (23.2)*
English Only	11 (34.4)*	8 (11.6)*
French Only	9 (28.1)	24 (34.8)
Both English and French	11 (34.4)	21 (30.4)

[a] Column totals for each independent variable may vary due to missing data
* p<0.05
** p<0.01

Table 6.2 *Pregnancy characteristics for pregnancies among uninsured migrants without (n=38) and with (n=87) legal status.*

	Pregnancies among uninsured migrants without legal status, n (%)[a]	Pregnancies among uninsured migrants with legal status, n (%)[a]
Pregnancy Outcome		
Live birth	21 (56.8)	41 (50.0)
Miscarriage	11 (29.7)	34 (41.4)
Abortion	5 (13.5)	7 (8.5)
Abortions		
Medical abortion	5 (100.0)	5 (71.4)
Abortion with traditional methods	0 (0.0)	1 (14.3)
Medical abortion with traditional methods	0 (0.0)	1 (14.3)

[a] Column totals may vary for each variable due to missing data

Table 6.3 *Prenatal care use for pregnancies among uninsured migrants without (n=38) and with (n=87) legal status.*

	Pregnancies among uninsured migrants without legal status, n (%)[a]	Pregnancies among uninsured migrants with legal status, n (%)[a]
Accessed prenatal care		
Yes	25 (67.6)	55 (64.0)
No	12 (32.4)	31 (36.0)
Initiation of prenatal care		
None	12 (34.3)	31 (36.0)
First trimester (Months 1-3)	14 (40.0)	40 (46.5)
Second trimester (Months 4-6)	8 (22.9)	10 (11.6)
Third trimester (Months 7-9)	1 (2.9)	5 (5.8)
Number of prenatal care visits*		
0	5 (25.0)	12 (29.3)
1	0 (0.0)	3 (7.3)
2-5	5 (25.0)	10 (24.4)
6-10	8 (40.0)	9 (22.0)
≥10	2 (10.0)	7 (17.1)

Adequate[¶] prenatal care*		
Yes	6 (30.0)	12 (29.3)
No	14 (70.0)	29 (70.7)

[a] Column totals may vary for each variable due to missing data

*Among pregnancies leading to a live birth (pregnancies carried to term)

[¶] Initiation of prenatal care during first trimester + ≥6 prenatal visits (definition adapted from Fuentes-Afflick et al., 2006)

Table 6.4 *Factors associated with use of prenatal care (≥1 prenatal care visit). Univariate and multivariate (unadjusted and adjusted) models are shown.*

Variable	n (%)	OR	95% C.I.	p-value	n (%)	OR	95% C.I.	p-value	n (%)	OR	95% C.I.	p-value
		Univariate analysis[¶]			Multivariate analysis (unadjusted)				Multivariate analysis (adjusted*)			
Demographic, genetic, and pregnancy characteristics												
Perceived health												
Poor/acceptable (reference)	33 (26.8)	1.00										
Good/very good/excellent	90 (73.2)	0.91	(0.39, 2.11)	0.82								
Migration												
Number of previous pregnancies in Quebec without health insurance	123 (100)	0.67	(0.34, 1.33)	0.25								
Did not know where to access care												
No (reference)	109 (88.6)	1.00			109 (88.6)	1.00			104 (88.9)	1.00		
Yes	14 (11.4)	0.25	(0.08, 0.81)	0.02	14 (11.4)	**0.27**	**(0.08, 0.89)**	**0.03**	13 (11.1)	**0.25**	**(0.06, 0.99)**	**0.049**
Cultural Characteristics												
Language fluency												
Neither English or French (reference)	19 (15.4)	1.00										
English alone	24 (19.5)	1.42	(0.39, 5.11)	0.59								
French alone	40 (32.5)	1.21	(0.39, 3.80)	0.74								
Both English and French	40 (32.5)	0.88	(0.28, 2.70)	0.82								
Country of birth												
Low/middle income country (reference)	110 (90.2)	1.00										
High income country	12 (9.8)	1.06	(0.30, 3.73)	0.93								
Position in Host Country												
Legal status												
Without legal status (reference)	37 (30.1)	1.00										
With legal status	86 (69.9)	0.85	(0.38, 1.93)	0.70								
Level of education												
None/primary/secondary (reference)	20 (16.4)	1.00										

Variable	n (%)	OR	95% C.I.	p-value	n (%)	OR	95% C.I.	p-value	n (%)	OR	95% C.I.	p-value
Post-secondary/university	102 (83.6)	0.79	(0.28, 2.22)	0.65								
Social Network												
Marital status												
Single/divorced/widowed/ separated (reference)	29 (23.6)	1.00			29 (23.6)	1.00			27 (23.1)	1.00		
Married/common-law	94 (76.4)	2.09	(0.89, 4.89)	0.09	94 (76.4)	1.73	(0.71, 4.21)	0.23	90 (76.9)	2.16	(0.79, 5.91)	0.13
Someone to share worries with												
No (reference)	26 (21.1)	1.00			26 (21.1)	1.00			24 (20.5)	1.00		
Yes	97 (78.9)	1.83	(0.76, 4.41)	0.18	97 (78.9)	1.76	(0.70, 4.42)	0.23	93 (79.5)	2.32	(0.81, 6.61)	0.12
Adjusting variables												
Age												
18-24									20 (17.1)	**0.30**	**(0.09, 0.99)**	**0.05**
25-29 (reference)									45 (38.5)	1.00		
30-34									39 (33.3)	0.42	(0.15, 1.21)	0.11
≥35									13 (11.1)	**0.13**	**(0.03, 0.54)**	**0.01**
Food insecurity												
Never (reference)									76 (65.0)	1.00		
Sometimes									31 (26.5)	1.37	(0.29, 6.59)	0.69
Often									10 (8.5)	0.47	(0.18, 1.24)	0.13

¶p<0.2 used to determine variables to include in multivariate analysis
*Model adjusted for age and food insecurity

Table 6.5 *Factors associated with early (first trimester) initiation of prenatal care. Univariate and multivariate (unadjusted and adjusted) models are shown.*

Variable	Univariate analysis¶				Multivariate analysis (unadjusted)				Multivariate analysis (adjusted*)			
	n (%)	OR	95% C.I.	p-value	n (%)	OR	95% C.I.	p-value	n (%)	OR	95% C.I.	p-value
Demographic, genetic, and pregnancy characteristics												
Perceived health												
Poor/acceptable (reference)	32 (26.4)	1.00			32 (26.4)	1.00			29 (25.2)	1.00		
Good/very good/excellent	89 (73.6)	2.15	(0.92, 5.06)	0.08	89 (73.6)	1.94	(0.80, 4.68)	0.14	86 (74.8)	1.47	(0.55, 3.94)	0.44
Migration												
Number of previous pregnancies in Quebec without health insurance	121 (100)	0.8320	(0.42, 1.67)	0.60								
Did not know where to access												

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	n (%)	OR	(CI)	p	n (%)	OR	(CI)	p	n (%)	OR	(CI)	p
care												
No (reference)	107 (88.4)	1.00			107 (88.4)	1.00			102 (88.7)	1.00		
Yes	14 (11.6)	0.18	(0.04, 0.83)	0.03	14 (11.6)	0.22	(0.05, 1.04)	0.06	13 (11.3)	0.22	(0.04, 1.19)	0.08
Cultural Characteristics												
Language fluency												
Neither English or French (reference)	19 (15.7)	1.00										
English alone	23 (19.0)	1.21	(0.36, 4.09)	0.76								
French alone	40 (33.1)	1.23	(0.41, 3.67)	0.71								
Both English and French	39 (32.2)	0.49	(0.16, 1.53)	0.22								
Country of birth												
Low/middle income country (reference)	108 (90.0)	1.00										
High income country	12 (10.0)	1.25	(0.38, 4.12)	0.71								
Position in Host Country												
Legal status												
Without legal status (reference)	35 (28.9)	1.00										
With legal status	86 (71.1)	1.30	(0.59, 2.90)	0.51								
Level of education												
None/primary/secondary (reference)	19 (15.8)	1.00										
Post-secondary/university	101 (84.2)	0.70	(0.26, 1.86)	0.47								
Social Network												
Marital status												
Single/divorced/widowed/ separated (reference)	28 (23.1)	1.00			28 (23.1)	1.00			26 (22.6)	1.00		
Married/common-law	93 (76.9)	2.45	(0.98, 6.11)	0.06	93 (76.9)	2.01	(0.78, 5.20)	0.15	89 (77.4)	**3.16**	**(1.04, 9.62)**	**0.04**
Someone to share worries with												
No (reference)	26 (21.5)	1.00										
Yes	95 (78.5)	1.38	(0.57, 3.35)	0.48								
Adjusting variables												
Age												
18-24									20 (17.4)	0.35	(0.11, 1.14)	0.08
25-29 (reference)									45 (39.1)	1.00		
30-34									37	**0.2**	**(0.10**	**0.01**

										(32.2)	7	, **0.72)**	
≥35										13 (11.3)	0.27	(0.07 , 1.05)	0.06
Food insecurity													
Never (reference)										74 (64.3)	1.00		
Sometimes										31 (27.0)	1.59	(0.37 , 6.89)	0.54
Often										10 (8.7)	0.80	(0.33 , 2.35)	0.88

¶p<0.2 used to determine variables to include in multivariate analysis
*Model adjusted for age and food insecurity

Table 6.6 *Demographic characteristics for pregnancies with inadequate (n=43) and adequate (n=18) prenatal care use.*

	Inadequate prenatal care, n (%)[a]	Adequate prenatal care, n (%)[a]
Age (mean ± SD)	28.65 ± 4.81	29.89 ± 4.54
Place of recruitment		
Community	5 (11.6)	3 (16.7)
Clinic for uninsured migrants	38 (88.4)	15 (83.3)
Previous pregnancies in Quebec without health insurance		
None	35 (81.4)	15 (83.3)
One	6 (14.0)	3 (16.7)
Two	2 (4.7)	0 (0.0)
Legal status		
Temporary foreign worker	4 (9.3)	0 (0.0)
Student	7 (16.3)	2 (11.1)
Visitor	11 (25.6)	7 (38.9)
Other temporary status (waiting for sponsorship)	7 (16.3)	3 (16.7)
None – application in process	6 (14.0)	2 (11.1)
None – no application in process	8 (18.6)	4 (22.2)
Years living in Quebec		
Range	0-15	0-7
Mean ± SD	1.67 ± 2.72	1.78 ± 1.92
Country of origin		
Asia	0 (0.0)	0 (0.0)
Caribbean	7 (16.3)	2 (11.1)
Europe/United States	3 (7.0)	3 (16.7)
Latin America (Mexico/Central/South America)	13 (30.2)	4 (22.2)
Middle East and North Africa	7 (16.3)	5 (27.8)
Subsaharan Africa	13 (30.2)	4 (22.2)
Education level		
None	0 (0.0)	1 (5.6)
Primary	1 (2.3)	1 (5.6)
Secondary	4 (9.3)	3 (16.7)
Post-secondary	9 (20.9)	2 (11.1)
University – undergraduate level	18 (41.9)	5 (27.8)
University – graduate level	11 (25.6)	6 (33.3)
Income, ($) (monthly)		
≤500	7 (17.5)	1 (6.7)
501-1000	12 (30.0)	5 (33.3)
1001-1500	9 (22.5)	1 (6.7)
1501-2000	3 (7.5)**	6 (40.0)**
2001-2500	4 (10.0)	1 (6.7)
≥2501	5 (12.5)	1 (6.7)
Food insecurity		
Never	27 (65.6)	8 (47.1)
Sometimes	11 (26.8)	6 (35.3)
Often	3 (7.3)	3 (16.7)
Marital status		
Married	25 (58.1)	11 (61.1)

Common-law	6 (14.0)	4 (22.2)
Widowed	0 (0.0)	0 (0.0)
Separated	2 (4.7)	0 (0.0)
Divorced	0 (0.0)	0 (0.0)
Single	10 (23.3)	3 (16.7)
Language fluency		
Neither English or French	7 (16.3)	4 (22.2)
English Only	8 (18.6)	5 (27.8)
French Only	12 (27.9)	7 (38.9)
Both English and French	16 (37.2)	2 (11.1)

[a] Column totals may vary for each variable due to missing data
* p<0.05
** p<0.01

6.5 Discussion

6.5.1 Use of prenatal care

In this study, we described the use of prenatal care among a sample of uninsured migrants. To our knowledge, only three previous studies from Canada have quantified the use of prenatal care among this marginalized population. Our study found that 30% of women had no prenatal care visits, which was considerably lower than a previous study from Montreal which found this figure at 65% (Rousseau et al., 2014). It is possible that this discrepancy was due to a selection bias. Whereas Rousseau et al. (2014) performed a chart review of all pregnant women who consulted over a two-year period at a major hospital and two community health centres, we recruited 80% of our sample from a clinic for uninsured migrants. It is therefore possible that migrants who were more closely connected to accessible care were overrepresented in our study.

The other two Canadian studies (Jarvis et al., 2011; Wilson-Mitchell & Rummens, 2013) reported that adequate prenatal care was utilized by approximately 20%-25% of uninsured migrants, which was slightly less than the 30% found in our study. However, we used a conservative definition of adequate prenatal care (Fuentes-Afflick et al., 2006) which likely contributed to this difference.

Comparing our data to statistics from the general population highlights the extent of the existing health inequity. While 93% of women in Quebec initiated care during the first trimester (Agence de la santé publique du Canada, 2009), only 44% of women in our sample did. While 32% of women in our sample had fewer than two prenatal visits, only

0.9% of women in Quebec had fewer than five prenatal visits during their pregnancy (Agence de la santé publique du Canada, 2009).

6.5.2 Barriers and facilitators to prenatal care use

Our study identified several barriers and facilitators to prenatal care use and to early prenatal care utilization. Our finding that younger women were less likely to use prenatal care is consistent with previous research from France (Blondel & Marshall, 1998) and the United States (Atkins et al., 2018). Blondel and Marshall (1998) suggested that younger women may be less likely to consult for a few reasons including not knowing they were pregnant or not wanting the pregnancy.

The finding that older women were less likely to utilize prenatal care and less likely to initiate care early was in line with previous research by Bell and Whiteford (1987) who reported that migrants over 35 years of age were less likely to return for follow up prenatal visits compared to younger migrant women. This deficit in care is of clinical significance given the increased risk of complications such as placenta previa and gestational diabetes in older women (Jolly, Sebire, Harris, Robinson, & Regan, 2000). Poorer prenatal care use among older women may have been influenced by parity with previous research on migrants suggesting that multiparous women are less likely to use prenatal care (Blondel & Marshall, 1998). Barona-Vilar et al. (2014) found that experience with previous pregnancies among migrant women could suggest to them that regular prenatal visits were not necessary to have a healthy baby. Unfortunately, we did not collect data on parity which remains a limitation of our study.

That individuals who did not know where to consult were less likely to use prenatal care was consistent with previous qualitative research which identified the lack of knowledge about the health care system as a barrier to prenatal care among migrants (Barona-Vilar et al., 2014; Jarvis et al., 2019; Phillimore, 2016). Lastly, we found that being married or in a common-law relationship promoted an early initiation of prenatal care. Previous research by Zambrana et al. (1996) also noted the importance of partnership with migrant women living with a partner being found more likely to initiate care early. Partners can provide emotional, financial, and instrumental support, with Rice and Naksook (1998),

for example, highlighting that having a partner who was fluent in the language of the host country helped migrant women navigate the system and arrange prenatal care.

Our exploration of factors influencing adequate prenatal care use was limited given our small sample size. Even though our results were not controlled for confounding variables, our findings lead us to think that a lack of financial resources may present a barrier to adequate prenatal care use among this population. This would be consistent with previous qualitative findings by Rousseau et al. (2014) and Jarvis et al. (2019), however, further research is recommended.

6.5.3   Limitations

Our study had several limitations. First, although the literature (Boerleider et al., 2015) and the model elaborated by Foets et al. (2007) suggested that both individual and health systems factors influence prenatal care use among migrants, given its exploratory nature our questionnaire and study only considered individual factors. It is therefore possible that health systems factors influenced prenatal care use in our sample but were not captured in our analysis. For example, a recent report from Canada (Dagenais et al., 2018) highlighted the considerable financial burden on uninsured migrants imposed by the system which requires them to pay out-of-pocket to access care. Secondly, we used self-reported data. In addition to potential recall bias, some migrants may have been reluctant to share identifying information which may limit the accuracy of our data. Lastly, as discussed above, a selection bias may be at play given that the majority of women with previous pregnancies were recruited from a clinic for uninsured migrants and may therefore be more connected to the health care system than the average uninsured migrant in Canada.

6.5.4   Implications for Policy

Extending universal prenatal care coverage to all women in Canada, regardless of migratory status, would better address human rights considerations and Canada's obligations under international law (Office of the United Nations High Commissioner for Human Rights, 2008; World Health Organization, 2017). Moreover, given that all

children born in Canada are granted Canadian citizenship, this approach would likely be cost-effective, while contributing to the most favorable short and long term outcomes for all Canadian children (Jarvis et al., 2019; Lu et al., 2000). Similar approaches have been adopted in several European countries (European Union Agency for Fundamental Rights, 2011), while access to publicly funded prenatal care has recently been expanded to undocumented migrants in US states such as Oregon (Swartz et al., 2019) and Nebraska (Atkins et al., 2018).

Our finding that a lack of knowledge on where to consult was associated with reduced prenatal care use, suggested the importance of promoting existing prenatal care services for uninsured migrants. This can be done through information campaigns which target uninsured migrants, funding to increase services or clinic hours, or the provision of government identification documents to uninsured migrants to facilitate access to prenatal services.

6.6 Conclusions

Our findings provide further evidence of the substandard prenatal care use among uninsured migrants in Canada and, from a public health perspective, provide support for policies of universal healthcare coverage and access for all regardless of legal or migratory status. The barriers and facilitators to prenatal care use identified were varied and included factors related to demographics, social network, and migration. Our findings can further discussion about health disparities in prenatal care use in Canada and support evidence-based policy at clinical and public health levels. Future research on uninsured migrants is encouraged to provide further insight into the factors influencing prenatal care use among this group, including those at the health systems level.

Chapter 7

7. Additional Results

As outlined in section 5.6, additional methods of data analysis were attempted during the research project. These results were not presented in Chapter 6 but are included in this chapter.

7.1 Principal Component Regression

Similar to Kemalbay and Korkmazoğlu (2014), the suitability of the dataset (containing the eleven independent variables described in section 5.5.2) for CATPCA was first confirmed through a Bartlett's test of sphericity (χ^2=91.01, df = 55, p=0.002) and the Kaiser–Meyer–Olkin measure (KMO index = 0.533). Using a cut-off eigenvalue of 1, five principal components (dimensions) were retained which together accounted for 63.3% of the variance (Table 7.1). Table 7.2 displays the matrix of component loadings.

Table 7.1 Model summary of CATPCA with a 5-dimensional solution

Dimension	Cronbach's Alpha	Eigenvalue	% of variance explained
1	0.522	1.902	17.3%
2	0.381	1.529	13.9%
3	0.269	1.324	12.0%
4	0.167	1.179	10.7%
5	0.027	1.025	9.3%
Total	.942[a]	6.959	63.3%

* Total Cronbach's Alpha is based on the total eigenvalue

Table 7.2 Matrix of component loadings

Independent Variable	Dimension				
	1	2	3	4	5
Number of previous pregnancies	-0.352	0.227	-0.539	0.126	-0.483
Level of education	0.025	0.344	-0.157	0.791	0.109
Perceived health	-0.125	0.265	-0.43	-0.41	0.412
Legal status	0.417	0.636	-0.211	-0.044	-0.303
Someone to share worries with	-0.457	-0.111	-0.517	-0.094	-0.05
Marital status	0.598	0.188	-0.082	-0.074	0.435
Did not know where to access care	-0.31	0.034	0.537	-0.012	-0.327

Country of birth	0.555	-0.297	-0.262	0.325	-0.074
Language fluency	-0.667	-0.182	-0.17	0.117	0.32
Food insecurity	-0.167	0.757	0.198	-0.259	-0.015
Age	0.381	-0.376	-0.281	-0.408	-0.335

The five principal components were used as predictor variables in a logistic regression model. The regression models for prenatal care use and initiation of prenatal care, respectively, are shown in Tables 7.3 and 7.4 respectively. In both cases, the overall models were insignificant (χ^2=8.2, df=5, p=0.146 and χ^2=10.3, df=5, p=0.068, respectively). The Nagelkerke R^2 showed that 8.9% and 10.9% of the variance in prenatal care use and initiation of prenatal care, respectively, were explained by the regression models. Principal Component 5 was found to be significantly associated with both prenatal care use and initiation of prenatal care. This factor included variables related to the individual's medical history (number of previous pregnancies and perceived health) and sociodemographic characteristics (age and marital status).

Table 7.3 Regression output for prenatal care use among uninsured migrants

Term	Odds Ratio	95% Confidence Interval	p-value
Principal Component 1	1.236	(0.847, 1.804)	0.272
Principal Component 2	0.987	(0.675, 1.444)	0.948
Principal Component 3	1.063	(0.728, 1.551)	0.752
Principal Component 4	1.068	(0.739, 1.544)	0.727
Principal Component 5	1.648	(1.117, 2.431)	0.012
Constant	1.911		0.001

Table 7.4 Regression output for initiation of prenatal care among uninsured migrants

Term	Odds Ratio	95% Confidence Interval	p-value
Principal Component 1	1.370	(0.930, 2.017)	0.111
Principal Component 2	1.095	(0.757, 1.585)	0.63
Principal Component 3	0.796	(0.533, 1.189)	0.265
Principal Component 4	0.844	(0.582, 1.224)	0.372
Principal Component 5	1.558	(1.054, 2.303)	0.026
Constant	0.777		0.191

7.2 Development of a risk score

Univariate logistic regression performed on the training set identified that food insecurity and knowledge of where to access care were associated with prenatal care use (p<0.20).

These two independent variables were then entered into a multivariable logistic regression model (Table 7.5). None of the independent variables were found to be significantly associated (p<0.05) with prenatal care use and thus a risk score could not be calculated.

Table 7.5 *Multivariable logistic regression output for prenatal care use*

Independent variable	Odds Ratio (95% Confidence Interval)	p-value
Did not know where to consult		
Yes	Reference	Reference
No	2.742 (0.749, 10.041)	0.128
Food insecurity		
Always	Reference	Reference
Sometimes	0.295 (0.048, 1.795)	0.185
Never	0.845 (0.156, 4.577)	0.845

In contrast, univariate logistic regression identified a single independent variable (knowledge of where to access care) which was associated with the early initiation of prenatal care (p<0.20). This variable was then entered into a regression model (Table 7.6) and was found to be significant (p<0.05). Although the intent of calculating a global risk score was to combine multiple risk factors and although there was only one significant variable, a risk score was calculated for academic purposes (Table 7.7).

Table 7.6 *Logistic regression output for prenatal care use*

Covariate	Odds Ratio (95% Confidence Interval)	p-value
Did not know where to consult		
Yes	Reference	Reference
No	5.087 (1.057, 24.492)	0.042

Table 7.7 *Risk score for predicting early initation of prenatal care*

Covariate	Points
Did not know where to consult	
Yes	0
No	5

In order to evaluate its predictive ability with respect to the early initiation of care, the risk score was applied to pregnancies in the test set (Table 7.8). The overall logistic regression model (χ^2=1.354, df = 1, p=0.245) and the risk score (p=1.000) were not found to be statistically significant. The Hosmer and Lemeshow test could not be performed since the degrees of freedom were equal to 0 (df=d-2, where d=number of rows in the contingency table).

Table 7.8 *Logistic regression output for prenatal care use*

						95% CI for Exp(B)	
Variable	B	S.E.	d.f.	p-value	Exp(B)	Lower	Upper
Risk Score	4.241	8038.592	1	1.000	69.448	0.000	*

*Upper bound of confidence interval (exp(4.241 + 1.96 × 8038.592) not defined

Chapter 8

8. Additional Discussion

This chapter contains additional discussion of the results presented in Chapters 6 and 7. Section 8.1 and 8.3 present additional discussion of the results from Chapter 6, while section 8.2 presents discussion of the results from Chapter 7.

8.1 Comparison of Findings with International Studies

Our findings that uninsured migrants were less likely to use prenatal care was consistent with data from international studies. For example, Heaman et al.'s (2013) review of prenatal care use in Western countries found that migrants (insured and uninsured) were more likely than non-migrants to receive inadequate prenatal care in the majority of studies (25/29, 86.2%). However, the disparity of prenatal care use has been found to be even more pronounced for uninsured migrants. For example, uninsured migrants in France were found to be 12.2 times more likely to have inadequate prenatal care compared to insured migrants (Blondel & Marshall, 1998). A second study from France (Zeitlin, Bucourt, Rivera, Topuz, & Papiernik, 2004) found that migrants had lower levels of insurance coverage and were more likely to have inadequate prenatal care compared to women born in France.

8.2 Discussion of Additional Results

In an effort to simplify the interpretation of our data, a Categorical Principal Component Regression analysis was performed. We identified one significant principal component and the variables that contributed to this component, including age, marital status, number of previous pregnancies, and perceived health, were consistent with previous literature (Blondel & Marshall, 1998; Phillimore, 2016; Zambrana et al., 1996). For example, our finding that women with previous pregnancies were less likely to use prenatal care was consistent with Blondel and Marshall (1998) who found that

primiparous migrant women were almost twice as less likely to have poor prenatal care use compared to those who were nulliparous. Even though we identified a significant principal component, the overall CATPCA regression models were insignificant and there was a poor goodness of fit as reflected by the low Nagelkerke's R^2 values.

We also attempted to design and validate a risk score to predict prenatal care use among uninsured migrants. Risk scores have been used to describe health care use in similar populations with Jang et al. (2018), for example, looking at the effect of immigrant-specific factors to predict health care access among Asian Americans. We sought to calculate a global risk score which was additive and considered the overall risk as a sum of the individual risk factors, however, our analysis identified only a single risk factor. We found that not knowing where to consult was a risk factor for poor prenatal care use which was consistent with previous literature (Barona-Vilar et al., 2014). Our capacity to produce a risk score with multiple independent risk factors was likely compromised, however, by our small sample size which is a known limitation of regression analyses (Hackshaw, 2008).

8.3 Addressing the Prenatal Care Use Gap

Several options exist which could help improve prenatal care use among uninsured migrants in Canada. One possibility is to provide government-funded prenatal care services to this population. Swartz et al. (2019) found that the provision of prenatal care coverage to undocumented migrants in Oregon led to a 32.8% reduction in inadequate prenatal care use. Similarly, Drewry et al. (2015) study of migrants in six US states found that the introduction of government-funded prenatal care led to a significant increase in adequate prenatal care use.

Jarvis et al. (2019) suggests group prenatal care as another approach to improve prenatal care use among uninsured migrants (Jarvis et al., 2019). Although individual prenatal care remains the standard of care, group prenatal care models can help to address barriers related to cost and provider availability (American College of Obstetricians and Gynecologists, 2018). In addition, this approach can provide opportunities for social

support, which may make it particularly suitable for migrant populations for whom the lack of social support is a known barrier to prenatal care use (Higginbottom et al., 2016). Moreover, group prenatal care use not been shown to cause harm and a review by Thielen (2012) found that group prenatal care use was associated with longer gestational periods and higher birthweight compared to individual prenatal care (American College of Obstetricians and Gynecologists, 2018).

Providing government identification documents may also facilitate access for a subset of uninsured migrants, namely undocumented migrants. Korinek and Smith (2011), for example, found increased use of prenatal care among undocumented migrants who had obtained a driver's licence. Providing a driver's licence helped migrants better integrate and improved their awareness of local services (Korinek & Smith, 2011).

Finally, at the institution-level, the creation of culturally safe environments for uninsured migrants to access care should be prioritized. Migrants in several qualitative studies have identified the lack of culturally competent care as a barrier to their prenatal care use (Degni et al., 2014; Higginbottom et al., 2016; Reitmanova & Gustafson, 2008; Stapleton et al., 2013). Moreover, perceived and actual discrimination by health care providers or staff has also been noted in several studies (Berggren et al., 2006; Davies & Bath, 2001; Degni et al., 2014; Higginbottom et al, 2016; Reitmanova and Gustafson, 2008; Sami et al., 2019). In contrast, Sami et al. (2019) found that the creation of a service specifically tailored towards uninsured migrants facilitated access to prenatal care among this group.

With respect to institution-level changes, cultural safety should be prioritized over cultural competency. Cultural safety better addresses power differentials by shifting the focus towards the culture of the provider or clinical environment and encouraging them to address biases that may be leading to lower standards of care for certain patients (Curtis et al., 2019; Laverty, McDermott, & Calma, 2017).

Chapter 9

9. Conclusions

9.1 Scientific Contributions

The contributions of this thesis are two-fold:

1. We demonstrated that prenatal care use among uninsured migrants in Montreal, Canada was very poor. These findings are consistent with previous research from Canada (Jarvis et al., 2011; Rousseau et al., 2014; Wilson-Mitchell & Rummens, 2013) and provide further evidence to describe this health disparity among a vulnerable and understudied population.

2. We used quantitative analysis to identify several factors related to demographics, social network, and migration which influence prenatal care use among the uninsured migrant population in Canada. Although previous research (Jarvis et al., 2019; Rousseau et al., 2014) have identified barriers among this population in Canada using qualitative methods, no studies, to our knowledge, have done so using quantitative methods. Our findings can inform future interventions which aim to address this disparity in health care use.

9.2 Policy Implications

Our findings provide further evidence of the substandard prenatal care use among uninsured migrants in Canada and, from a public health perspective, provide support for policies of universal healthcare coverage and access for all regardless of legal or migratory status. Extending prenatal care coverage to all women in Canada, regardless of migratory status, would better address human rights considerations and Canada's obligations under international law (Office of the United Nations High Commissioner for Human Rights, 2008; World Health Organization, 2017). Moreover, given that all children born in Canada are granted Canadian citizenship, this approach would likely be

cost-effective, while contributing to the most favorable short and long-term outcomes for all Canadian children (Jarvis et al., 2019; Lu et al., 2000). Similar approaches have been adopted in several European countries (European Union Agency for Fundamental Rights, 2011), while access to publicly funded prenatal care has recently been expanded to undocumented migrants in US states such as Oregon (Swartz et al., 2019) and Nebraska (Atkins et al., 2018).

Our finding that a lack of knowledge on where to consult was associated with reduced prenatal care use, suggested the importance of promoting existing prenatal care services for uninsured migrants. This can be done through information campaigns which target uninsured migrants, funding to increase services or clinic hours, or by providing uninsured migrants with government identification documents to facilitate access to prenatal services. In addition, efforts to render prenatal care services culturally safe will help to reduce barriers to care and make these services more accessible to the populations they intend to serve.

9.3 Future Directions

The barriers and facilitators to prenatal care use identified were varied and included factors related to demographics, social network, and migration. Our findings can further discussion about health disparities in prenatal care use in Canada and support evidence-based policy at public health and clinical levels. However, given that our study was the first in Canada to use quantitative methods to identify factors influencing prenatal care use among this population, further research in Montreal and elsewhere in Canada is encouraged to better understand these factors. Future studies should also address a limitation of our study by collecting data on parity given its demonstrated influence on prenatal care use. Future research on this population should also aim for larger sample sizes as this was another limitation of our study. Lastly, given that our study only considered factors at the individual level, future research is encouraged to provide insight into factors at the health systems level which may influence prenatal care use among uninsured migrants.

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Appendix A : Components of "explaining mechanisms" in Foets et al.'s (2007) conceptual model

Table A.1. Factors incorporated in each explaining mechanism (adapted from Boerleider et al., 2013)

	Explaining mechanism	Components
Individual factors	Demographics, genetics and pregnancy	women's age, parity, planning and acceptance of pregnancy, pregnancy related health behaviour and perceived health during pregnancy
	Migration	women's knowledge of/familiarity with the prenatal care services/system, experiences and expectations with prenatal care use in their country of origin, pregnancy status on arrival in the new industrialized western country
	Culture	women's cultural practices, values and norms, acculturation, religious beliefs and views, language proficiency, beliefs about pregnancy and prenatal care
	Position in the host country	women's education level, women's pregnancy-related knowledge, household arrangement, financial resources and income
	Social network	size and degree of contact with social network, information and support from social network
Health service factors	Accessibility of care	transport, opening hours, booking appointments, direct and indirect discrimination by the prenatal care providers
	Expertise	prenatal care tailored to patients' needs and preferences
	Treatment and communication	communication from prenatal care providers to women, personal treatment of women by prenatal care providers, availability of health promotion/information material, use of alternative means of communication
	Professionally defined need	referral by general practitioners and other healthcare providers to prenatal care providers

Appendix B: Search keywords and MeSH terms

Database	Keywords ± MeSH terms	Number of Initial Results
Medline	1. migrant.mp. or exp "Transients and Migrants"/ 2. exp Undocumented Immigrants/ 3. undocumented.mp. 4. exp "EMIGRANTS AND IMMIGRANTS"/ or immigrant*.mp. 5. exp "Emigration and Immigration"/ or refugee*.mp. or exp Refugees/ 6. clandestine.mp. 7. prenatal.mp. or exp PRENATAL CARE/ 8. maternal health services.mp. or exp Maternal Health Services/ 9. maternal care.mp. 10. antenatal care.mp. 11. perinatal care.mp. or exp Perinatal Care/ 12. exp "Patient Acceptance of Health Care"/ or utilization.mp. or usage.mp 13. exp Prenatal Care/ut {Utilization} 14. *Maternal Health Services/ut {Utilization} 15. exp Health Knowledge, Attitudes, Practice/ 16. exp Health Behavior/ 17. *Perinatal Care/ut {Utilization} 18. 1 or 2 or 3 or 4 or 5 or 6 19. 7 or 8 or 9 or 10 or 11 20. 12 or 13 or 14 or 15 or 16 or 17 21. 18 and 19 and 20 22. limit 21 to (english or french)	311
Embase	1. exp migrant/ or migrant.mp. 2. exp undocumented immigrant/ or undocumented.mp. 3. exp immigrant/ or immigrant*.mp. or exp migration/ 4. exp refugee/ or refugee*.mp. 5. clandestine.mp. 6. prenatal.mp. or exp prenatal care/ 7. maternal care.mp. or exp maternal care/ 8. maternal health services.mp. or exp maternal health service/ 9. antenatal care.mp. 10. perinatal care.mp. or exp perinatal care/ 11. exp health care utilization/ or utilization.mp. 12. exp attitude to health/ 13. health behaviour.mp. or exp health behavior/ 14. 1 or 2 or 3 or 4 or 5 15. 6 or 7 or 8 or 9 or 10	315

	16. 11 or 12 or 13 17. 14 and 15 and 16 18. limit 17 to (english or french) 19. limit 18 to yr="1980 -Current"	
CINAHL	S1. (MH "Transients and Migrants") OR "migrant" S2. (MH "Immigrants, Illegal") OR "undocumented" S3. (MH "Immigrants+") OR (MH "Emigration and Immigration") OR "immigrant*" S4. (MH "Refugees+") OR "refugee*" S5. "clandestine" S6. (MH "Prenatal Care") OR "prenatal" S7. "maternal care" S8. (MH "Maternal Health Services+") OR "maternal health services" S9. "antenatal care" S10. (MH "Perinatal Care") OR "perinatal care" S11. "health care utilization" S12. "health care use" S13. "utilization" OR (MH "Health Resource Utilization") S14. (MH "Prenatal Care/UT") S15. (MH "Maternal Health Services/UT") S16. S1 OR S2 OR S3 OR S4 OR S5 S17. S6 OR S7 OR S8 OR S9 OR S10 S18. S11 OR S12 OR S13 OR S14 OR S15 S19. S16 AND S17 AND S18 S20. Narrow by Language: - english OR french	138

Appendix C: Characteristics of Studies Included in the Literature Review

Study No.	First Author	Year	Title	Country	Study Design	Data Collection	Sample Size	Sample Strategy
1	Malebranche	2020	Antenatal Care Utilization and Obstetric and Newborn Outcomes Among Pregnant Refugees Attending a Specialized Refugee Clinic	Canada	Quantitative	Chart review	179 women (78 government assisted refugees, 69 privately sponsored refugees, and 32 asylum seekers)	All refugee and asylum seeking women 17 years of age or older who had at least 2 clinic visits and a singleton pregnancy resulting in a livebirth between January 2011 and December 2016 were included
2	Swartz	2019	Oregon's Expansion of Prenatal Care Improved Utilization Among Immigrant Women	United States	Quantitative	Medical claims data from January 1, 2003 through October 1, 2015	A total of 213,746 pregnancies were included, with 35,182 covered by Emergency Medicaid, 12,510 covered by Emergency Medicaid Plus (with prenatal care), and 166,054 covered by standard Medicaid	All claims from 2003 to October 2015 related to medicaid, emergency medicaid, and emergency medicaid plus

#								
3	Chinouya	2019	Late booking amongst African women in a London borough, England: implications for health promotion.	United Kingdom	Qualitative	Semi-structured interviews	23 Black African women	Purposive and snowball sampling
4	Agbemenu	2019	Reproductive Health Outcomes in African Refugee Women: A Comparative Study	United States	Quantitative	Review of enhanced electronic birth certificate data	789 African refugee, 17,487 Black, and 59,615 White women	Not specified
5	Sami	2019	Giving birth in Switzerland: a qualitative study exploring migrant women's experiences during pregnancy and childbirth in Geneva and Zurich using focus groups	Switzerland	Qualitative	Focus groups	33 women aged 21 to 40 years	Convenience (recruitment during prenatal visits and through organizations) and snowball
6	Jarvis	2019	Uninsured Pregnant Patients: Where Do We Begin?	Canada	Qualitative	Semistructured interviews	9	Convenience
7	Atkins	2018	The impact of expanded health insurance coverage for unauthorized pregnant women on prenatal care utilization	United States	Quantitative	Birth records	20876 unauthorized women	All birth records in South Carolina and Nebraska
8	Henderson	2018	Recency of migration, region of origin and women's experience of maternity care in England: Evidence from a large cross-sectional survey	United Kingdom	Quantitative	Cross-sectional national survey	5332	Random sample of 10000 from birth records (response rate of 54%)
9	Held	2018	The Relationship Between Country of Origin and Prenatal Care Among Unauthorized Mexican and Guatemalan Immigrants	United States	Quantitative	Retrospective cohort study	4188 unauthorized Latina women who originated from Mexico or Guatemala	All birth certificate files
10	Wherry	2017	State And Federal Coverage For Pregnant Immigrants: Prenatal Care Increased, No Change Detected For Infant Health.	United States	Quantitative	1998–2013 birth infant death data (National Center for Health	1632 state-year observations	All data considered

								Statistics)
11	Swartz	2017	Expanding Prenatal Care to Unauthorized Immigrant Women and the Effects on Infant Health	United States	Quantitative	Retrospective chart review	213746 pregnancies in Oregon	All claims from 2003 to October 2015 related to medicaid, emergency medicaid, and emergency medicaid plus
12	Kentoffio	2016	Use of maternal health services: comparing refugee, immigrant and US-born populations.	United States	Quantitative	Retrospective chart review	375 (53 refugees, 186 immigrants. 136 US-born)	All refugees who initiated care during study period and had pregnancies. Controls are matched for age, gender and date of care initiation.
13	Higginbottom	2016	An ethnographic investigation of the maternity healthcare experience of immigrants in rural and urban Alberta, Canada	Canada	Qualitative	Focus groups	86 (including 34 immigrant workers)	Purposive sampling
14	Phillimore	2016	Migrant maternity in an era of superdiversity: New migrants' access to, and experience of, antenatal care in the West Midlands, UK	United Kingdom	Qualitative	Interviews	82 migrant women + 18 individuals working regularly with migrant women including community health staff; GPs; pregnancy outreach workers; hospital staff; and third sector workers	Snowball

15	Moxey	2016	A qualitative study exploring how Somali women exposed to female genital mutilation experience and perceive antenatal and intrapartum care in England	United Kingdom	Qualitative	Semistructured interviews	10 Somali women resident in Birmingham, who had accessed antenatal care services in England within the past 5 years.	Convenience and snowball sample
16	Owens	2016	Perceptions of pregnancy experiences when using a community-based antenatal service: A qualitative study of refugee and migrant women in Perth, Western Australia	Australia	Qualitative	Focus groups	12	Purposive sampling
17	Gibson-Helm	2015	Maternal health and pregnancy outcomes among women of refugee background from Asian countries.	Australia	Quantitative	Retrospective chart review	16300	All singleton pregnancies between 2002 and 2011 at Monash Health
18	Drewry	2015	The Impact of the State Children's Health Insurance Program's Unborn Child Ruling Expansions on Foreign-Born Latina Prenatal Care and Birth Outcomes, 2000–2007	United States	Quantitative	a quasi-experimental retrospective observational cohort design using 2000–2007 National Center for Health Statistics (NCHS) live birth files from sixteen states	583917	All birth files
19	Paz-Zuleta	2015	Disparities in Access to Prenatal Care Services for African Immigrant Women in Spain	Spain	Quantitative	Retrospective cohort study	231 African immigrant women	All pregnant African immigrant women with uncomplicated pregnancies with delivery dates between

#	Author	Year	Title	Country	Method	Data Collection	Sample	Sampling
								2007-2010
20	Degni	2014	Reproductive and maternity health care services in Finland: perceptions and experiences of Somaliborn immigrant women	Finland	Qualitative	Focus groups (five focus groups)	70 (multiparous female Somali-born Immigrants with experiences of maternity health care in Finland)	Purposeful sampling strategy
21	Almeida	2014	Migrant Women's Perceptions of Healthcare During Pregnancy and Early Motherhood: Addressing the Social Determinants of Health	Portugal	Qualitative	Semi-structured interviews	25 migrant women from low socioeconomic backgrounds (and 6 Portuguese native women for comparison)	Not well outlined
22	Rousseau	2014	Perinatal health care for undocumented women in Montreal: When substandard care is almost the rule	Canada	Mixed Methods	Retrospective chart review and semi-structured interviews	Chart review (591), interviews with 18 undocumented women	Quantitative: clinical records from a major hospital and two community health centres for all patients without insurance (either uninsured or covered by Interim Federal Health Program (IFHP). Qualitative: Targeted or informant sampling and snowball sampling
23	Stapleton	2013	Women from refugee backgrounds	Australia	Mixed	Surveys,	Interviews	Convenience

			and their experiences of attending a specialist antenatal clinic. Narratives from an Australian setting		Methods (Qualitative data relevant)	interviews, clinical chart audit	included 42 service users, chart audit included 190 migrant women compared to 4158 women of the broader population giving birth at the same hospital	sample
24	Barona-Vilar	2013	Perceptions and experiences of parenthood and maternal health care among Latin American women living in Spain: A qualitative study	Spain	Qualitative	Focus groups	26 (women from Bolivia and Ecuador)	Voluntary
25	Martinez-Garcia	2012	Inadequate prenatal care and maternal country of birth: a retrospective study of southeast Spain	Spain	Quantitative	A retrospective case series in a public hospital in southern Spain	6873 total including 1146 from Maghreb countries (Morocco, Tunisia, Algeria) and 1184 from Eastern Europe (Romania, Russia, Bulgaria)	All prenatal files from one public hospital
26	Korinek	2011	Prenatal care among immigrant and racial-ethnic minority women in a new immigrant destination: Exploring the impact of immigrant legal status	United States	Quantitative	Birth certificate records issued for all live, singleton births occurring in the state of Utah. Maternal records can be linked to Utah Population database which contains	~390 000 births (inmcluding ~55 000 foreign births)	All birth records

							information on driver licence (which explains status as only documented can apply for regular driver's licence)	
27	Jarvis	2011	Retrospective Review of Prenatal Care and Perinatal Outcomes in a Group of Uninsured Pregnant Women	Canada	Quantitative	Retrospective case comparison study	71 uninsured migrants and 72 controls (insured)	Convenience sample representing only uninsured women who presented to a family medicine obstetric group for prenatal care, random sample for controls
28	Kingston	2011	Comparison of Maternity Experiences of Canadian-Born and Recent and Non-Recent Immigrant Women: Findings From the Canadian Maternity Experiences Survey	Canada	Quantitative	Cross-sectional survey (Canadian Maternity Experiences Survey of the Public Health Agency of Canada)	6421 women	A stratified random sample of women who had recently given birth was drawn from a sampling frame (n = 58 972) based on the 2006 Canadian Census of Population.
29	Hoang	2009	Having a baby in the new land: a qualitative exploration of the experiences of Asian migrants in rural Tasmania, Australia	Australia	Qualitative	Semi-structured interviews and grounded theory methodology to collect data	10	Convenience sample
30	Brar	2009	Perinatal Care for South Asian Immigrant Women and Women Born	Canada	Quantitative	Interviews	60 women (30 born in South	Convenience sample

			in Canada: Telephone Survey of Users				Asia, 30 Canadian-born)	
31	Reitmanova	2008	"They Can't Understand It": Maternity Health and Care Needs of Immigrant Muslim Women in St. John's, Newfoundland	Canada	Qualitative	Interviews	6	Purposive sampling (used mailing list and also snowball technique)
32	Bollini	2007	Pregnancy outcomes and migration in Switzerland: results from a focus group study	Switzerland	Qualitative	Focus groups	Eight focus groups: Total of 40 participants including 14 Turkish, 17 Portuguese, 9 Swiss.	Convenience
33	Fuentes-Afflick	2006	Use of Prenatal Care by Hispanic Women After Welfare Reform	United States	Quantitative	45 minute structured interview	3242	Convenience sample
34	Berggren	2006	Being Different and Vulnerable: Experiences of Immigrant African Women Who Have Been Circumcised and Sought Maternity Care in Sweden	Sweden	Qualitative	Interviews	22 women	Snowball
35	Loue	2005	Welfare and Immigration Reform and Use of Prenatal Care Among Women of Mexican Ethnicity in San Diego, California	United States	Quantitative	Interviews	157 women (10 pregnancies)	Convenience sample
36	Herrel	2004	Somali Refugee Women Speak Out About Their Needs for Care During Pregnancy and Delivery	United States	Qualitative	Focus groups	14 women total (2 focus groups)	Convenience (recruited by a community health worker)
37	Shaffer	2002	Factors Influencing the Access to Prenatal Care by Hispanic Pregnant Women	United States	Qualitative	Interviews	46 Hispanic pregnant women	Convenience
38	Joyce	2001	Welfare Reform and the Perinatal Health and Health Care Use of Latino Women in California, New York City, and Texas	United States	Quantitative	Birth files		All birth files from Latino mothers
39	Davies	2001	The maternity information concerns of Somali women in the United Kingdom	United Kingdom	Qualitative	Focus groups and semi-structured	13 women	Purposive and convenience sampling

								interviews	
40	Essen	2000	Qualitative study of pregnancy and childbirth experiences in Somalian women resident in Sweden	Sweden	Qualitative	Interviews	15 women born in Somalia	Convenience sample
41	Rice	1998	The experience of pregnancy, labour and birth of Thai women in Australia	Australia	Qualitative	Interviews	30 Thai women living in Melbourne	Convenience and snowball sampling. Data collection continued until saturation
42	Blondel	1998	Poor antenatal care in 20 French districts: risk factors and pregnancy outcome	France	Quantitative	Chart review (all birth records between January and June 1993)	1607 (including 561 foreigners)	All birth records in 20 districts
43	Sherraden	1996	Prenatal care experiences and birth weight among Mexican immigrant women.	United States	Qualitative	In-depth interviews	41 women	Not a random sample (one hospital) - 19 normal weight 22 low birth weight
44	Zambrana	1996	Prenatal care and medical risk in low-income, primiparous, Mexican-origin and African American women.	United States	Quantitative	Chart review and structured interview (with instrument)	1544 total (including 764 immigrants)	Convenience
45	Beine	1995	Conceptions of Prenatal Care Among Somali Women In San Diego	United States	Qualitative	Focus groups	14 women total (4 focus groups)	Convenience
46	Bell	1987	Tai Dam health care practices: Asian refugee women in Iowa	United States	Quantitative	Interviews	52 adult women	Convenience sample
47	Chavez	1986	Utilization of Health Services by Mexican Immigrant Women in San Diego	United States	Mixed Methods	Interviews	248 women born in Mexico but who delivered in a US hospital in the past 5 years	Snowball (but with effort to reduce bias by by dispersing initial contact points over as wide a geographic area as possible, and by broadening the sources of

								initial contacts to include many different types of community-based organizations with diverse clienteles)
48	Gaviria	1982	Sociocultural factors and perinatal health in a Mexican-American community	United States	Mixed Methods (Quantitative data relevant)	Interviews	80 women of Mexican background in Chicago (age 16 to 41) - 60 of whom born in Mexico - participants were currently pregnant or had delivered a child within the previous six months	Not specified