

**The Impact of Provider Characteristics on Selected Primary Health Care Indicators**

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## ABSTRACT

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While the physician population in Canada is growing at a higher rate than the overall population, there has been a noticeable decline in the comprehensiveness of primary health care services provided by general practitioners/family physicians. This study aims to assess the impacts of physician characteristics such as physician age, gender and location (rural or urban practice) on selected primary health care indicators including whether or not physicians deliver babies, make home visits or are accepting new patients. There were a total of 42 discrete studies included; they addressed the impact of physician age, gender and location of practice on the provision of home visits, obstetrical care and access. The literature suggests that older physicians, male physicians and rural physicians are more likely to provide home visits, that younger physicians, female physicians and rural physicians are more likely to provide obstetrical care and based on the limited research to date, that younger physicians, male physicians and rural physicians are more likely to be accepting new patients.

Statistical analysis was also performed on available data to verify findings from the literature review on the Alberta physician population. Information on physician characteristics was obtained through the College of Physicians and Surgeons of Alberta and Ministry of Health. A quantitative approach was taken to analyze the physician data. Univariate and multivariate analyses were performed using multiple logistic regression. The statistical analysis found that in Alberta, although location and decades in practice are both significant predictors of whether or not physicians provide home visits, gender was not statistically significant when all other variables were controlled for. This is likely because of the relationship between gender and age, considering that older physicians were more likely to be male. This study has also confirmed that age, gender and location were all significant predictors of whether physicians delivered babies. Importantly physicians involved in Primary Care Networks (PCNs) were 3.6 times more likely to deliver babies than their non-PCN colleagues, even with all other variables adjusted for.

Lastly, this study has found that gender and location were significant predictors of whether or not physicians were accepting new patients, but that with all other variables considered, decades in practice was no longer statistically significant. Again PCN physicians were 1.6 times more likely to be accepting new patients than their colleagues. The relationship between gender and age may be the reason previous studies have concluded that older physicians were more likely to be accepting new patients. As female physicians are on average younger, and female physicians are less likely to be accepting new patients, gender was acting as an effect modifier on the relationship between age and the likelihood of a physician to be accepting new patients. The most important finding of this study is that compared to non-PCN physicians, PCN physicians are 3.9 times more likely to make home visits, 3.6 times more likely to deliver babies and 1.6 times more likely to be accepting new patients. Because physicians who provide a full scope of practice may be more likely to join a PCN, this study cannot assert a causal relationship between the outcomes and explanatory variables. That being said, there may be an incentive for PCN physicians to accept new patients, due to the per capita funding they receive. That funding may also allow physicians the flexibility to provide a full scope of practice, by utilizing other health care professional in the management of patient care. Furthermore, the values and goals of the PCN are designed to promote the coordination of comprehensive primary health care. The evidence presented in this paper may support a conclusion that the PCNs in Alberta have been successful.

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## PREFACE

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This thesis is an original work by Ashley Stacewicz. The research project, of which this thesis is a part, received research ethics approval from the University of Alberta Ethics Board, Pro00029559 February 17, 2012.

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## INTRODUCTION

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It is widely accepted that primary health care is the corner stone of the health care system and a key member of the primary health care team is the general practitioner/family physician (GP/FP)

A GP/FP serves as a gatekeeper to all specialized services and is usually a patient's main provider of care, forming a long term relationship over the patient's life.

A common complaint from the public is adequate access to physician services, as well as the declining comprehensiveness of services provided by GP/FPs. A 2005 Health Council of Canada report stated:

Recent Canadian studies show that family physicians in practice today provide different services than their colleagues of ten years ago. Fewer deliver babies. They are providing more psychosocial counselling and less hospital based care. Consistently, the rate of family physician participation in surgical services, anesthesia and obstetrical care is declining. In a recent national survey of physicians, 13.1 per cent reported that they plan to reduce the range of services they provide within the next two years. (1)

Two major questions policy makers need to answer is with the abundance of primary care physicians in Alberta (1GP/FP for every 1155 Albertans (2)), why there continues to be issues with access and why GP/FPs are seemingly providing a reduced scope of practice.

Many studies around the world have looked at the declining comprehensiveness of primary care, trying to quantify and understand factors that may be influencing this trend. Several studies assessed whether or not there is a relationship between physician characteristics

and primary health care service provision. Physician characteristics that have frequently been researched include physician age, gender, and location (rural or urban practice location).

With the changing profile of Alberta physicians, including more female physicians, and new graduates entering the workforce, it is important to consolidate the work done in other jurisdictions and test those findings against the Alberta physician population, in order to both understand the current state of primary health care service provision, but also be able to better predict its future state.

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### CHANGING PHYSICIAN DEMOGRAPHICS

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Based on the report *Supply, Distribution and Migration of Canadian Physicians, 2012* produced by the Canadian Institute for Health Information (CIHI), physician growth rates outpaced population growth rates threefold between 2008 and 2012 and this ratio is expected to increase for the next several years (3). Specifically, the Canadian population increased by 4.6% between 2008 and 2012 while the overall physician population increased by 14.8% (3).

#### *Age*

The average age of physicians in Alberta in 2012 was 48.4 and the change in average age over the previous five years was an increase of 1.2 years or a 2.5% increase in age (3).

According to the National Physician Survey results from 2004 compared to 2013, there has been an increase in physicians in the two upper age categories (Over 65 and 55-64) and a decrease in the middle two age categories (45-54 and 35-44). Physicians in the 65 and over age category have increased from 6.9% of the physician population in 2004 to 9.7% in 2013, and in the 55–64 age category from 17.7% in 2004 to 22.5% in 2013 (4).

#### *Gender*

The percentage of female family physicians in Alberta in 2012 was 40.3%. The change in overall proportion of female physicians (both family physicians and specialists) in Alberta was 33% in 2008 and 35% in 2012. The change in numbers by gender from 2008-2012 was 12.8% growth in male physicians versus 25.3% growth in female physicians (3).

According to CIHI the gender change in Canada is due to a sharp decline in the number of male physicians in the 35-44 age category and in the under 35 age category; in fact, since 1999 female GPs have outnumbered males in the under 35 category (3).

### *Location*

The percentage of family physicians in rural practice in Alberta in 2012 was 15.6% and the change in numbers by location between 2008 and 2012 were 9.5% (urban) versus 17.5% (rural) overall. In Canada, the number of physicians in rural areas increased by 10.3% between 2008 and 2012 while at the same time the population in rural areas only increased by 1.7% (3).

In summary, the physician population in Canada is growing at a higher rate than the overall population. There are an increasing number of female physicians, physician growth in rural areas is considerably greater than overall population growth in rural areas, and even though there are a large number of new graduates, the average age of physicians continues to increase.

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## THE CANADIAN CONTEXT

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On the national level, primary health care has been a topic of great interest in recent years. In fact, the Government of Canada established an \$800 million dollar Primary Health Care Transition Fund in 2000, which included a funding envelope that directly supported provinces and territories in their own primary health care reform activities (5).

The Romanow report brought light to the significance of primary health care as it relates to the overall sustainability of the Canadian Health Care system by asserting that there is “almost universal agreement that primary health care offers tremendous potential benefits to Canadians and to the health care system. [There is] no other initiative [that] holds as much potential for improving health and sustaining our health care system” (6).

Based on the recommendations of the Romanow report, the 2003 Ministers Health Accord on Health Care Renewal developed a target of 50% of Canadians having full access to an appropriate primary health care provider by 2011 (1).

In 2006 CIHI developed a set of Pan-Canadian Primary Health Care indicators to measure and compare primary health care performance at multiple levels within and between different jurisdictions in Canada. Subsets of the indicators have been identified for policy makers in order to:

- Support population-based policy development and planning;
- Assess the performance of the primary health care system;
- Monitor changes over time and variations across health care regions;
- Provide evidence to inform health programs, policies and funding decisions; and
- Identify levels of and gaps in health and well-being of a population or community. (7)

## PRIMARY HEALTH CARE IN ALBERTA

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In response to the support provided by the Primary Health Care Transition Fund, and in recognition of the benefits of a strong primary health care system, policy makers in Alberta have been focusing on improving primary health care since at least 2003. One of the most successful initiatives is the Primary Care Initiative.

In 2003 Alberta Health along with the Alberta Medical Association and the province's regional health authorities<sup>1</sup> established this initiative, designed to create Primary Care Networks (PCNs; groups of family physicians and other health care providers) to meet the following objectives:

- *Increase the proportion of Albertans with ready access to primary care*
- *Provide coordinated 24-hour, 7-day-per-week management of access to appropriate primary care services*
- *Increase the emphasis on health promotion, disease and injury prevention, care of the medically complex patient and care of patients with chronic diseases*
- *Improve coordination and integration with other health care services including secondary, tertiary and long-term care through specialty care linkages to primary care*
- *Facilitate the greater use of multi-disciplinary teams to provide comprehensive primary care (8)*

When a group of physicians join together to form a PCN, they receive per capita funding, that is, \$62 for each attached patient they see (9). This funding is supposed to both incent physicians to create a long-term relationship with patients, as well as offset overhead costs and allow the clinics to hire additional health care providers. At the time of this study there were over 40 PCNs in the province of Alberta (9).

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<sup>1</sup> In 2008, the 9 regional health authorities were amalgamated into Alberta Health Services, which became responsible for health service delivery across the province.

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## OBJECTIVE

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The objectives of this study are threefold:

1. To review existing literature on the impact of physician characteristics such as age, gender and location (rural/urban) on the provision of primary health care services. Specially three of the CIHI Pan-Canadian indicators have been selected: the provision of home visits, obstetrical care (GP/FPs who deliver babies) and access (GP/FPs who are accepting new patients).
2. To verify findings from the literature review on the Alberta physician population.
3. To test whether or not physician involvement in PCNs had an impact on the provision of the selected indicators.

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## CHAPTER 1 SYSTEMATIC LITERATURE REVIEW

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### METHODOLOGY

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A systematic review of evidence from existing research of physician characteristics and selected outcomes was performed following Cochrane Collaboration guidelines and the PRISMA statement (10,11).

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### SEARCH FOR RELEVANT STUDIES

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A search was conducted for published and unpublished studies of physician characteristics and selected outcomes before Spring 2013. Search terms included controlled vocabulary terms such as MEDLINE's Medical Subject Headings (MeSH), in combination with additional terms (see Appendix A). Nine separate search strategies were run, one for each combination of explanatory variables and outcomes. The searches were run on PUBMED, without date limits; however, only English language studies were included in this review. For

completeness, the electronic search was supplemented with a manual search of the reference lists of selected studies and articles.

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#### RESULTS OF RELEVANT STUDIES

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Results of the electronic and manual search were imported into a bibliographic software program (Reference Manager 12). After removing duplicate entries, citations were reviewed for possible inclusion. First, titles and abstracts (where available) were screened. Second, full manuscripts for those articles deemed to be potentially relevant were retrieved and assessed.

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#### SYNTHESIS AND CRITICAL APPRAISAL OF SELECTED STUDIES

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The following information from studies was extracted: study objective, methodology, study population, and results across any relevant variables. Extracted data were tabulated to facilitate analyses of the content and findings from reviews and primary studies.

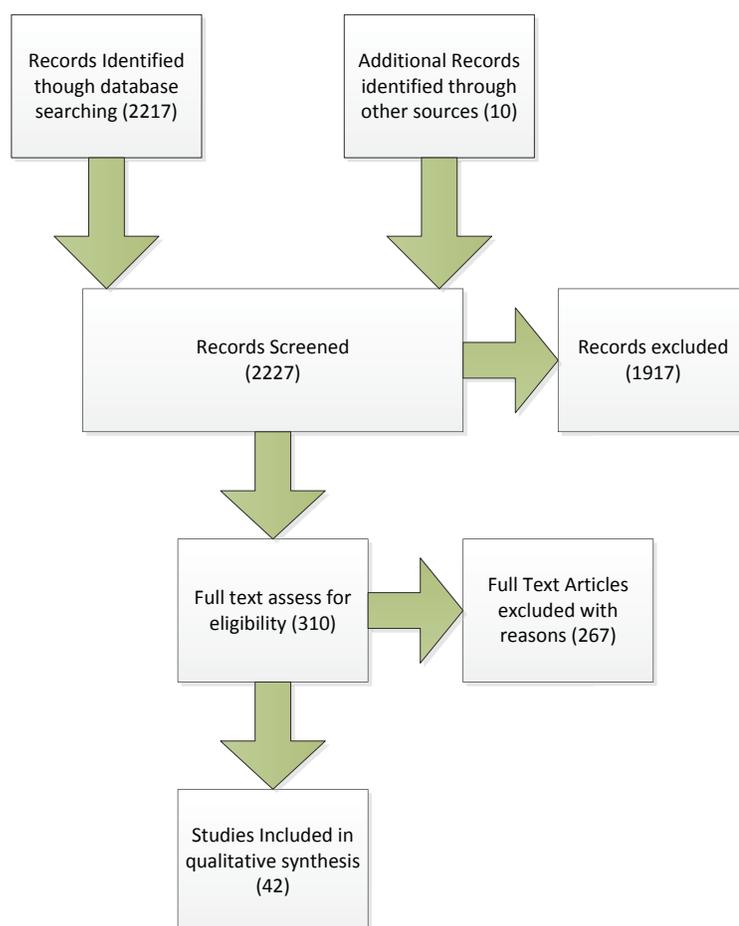
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#### RESULTS OF LITERATURE SEARCH

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2,216 discrete citations were identified through the literature search, of which 83 potentially relevant articles were selected for full review (Figure 1). Of these, 42 met the inclusion criteria. Excluded studies and their reasons for exclusion are listed in Table 1. Methodological elements and results of each included study are summarized in Tables 2-4.

**Figure 1**



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#### OVERALL DESCRIPTION OF INCLUDED STUDIES

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There were a total of 42 discrete studies included; as described below, they addressed the impact of physician age, gender and location of practice on the provision of home visits, obstetrical care and access. Twenty-nine of the studies presented findings on the impact of the above variables on the provision of home visits, 15 on obstetrical care and six on access.

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#### HOME VISITS

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A total of 29 studies provided data on the provision of home visits. Of these, nine were based on data from the United States, nine from Canada, three from the United Kingdom, one each from Slovenia, the Netherlands, Lithuania, Germany, Australia and Europe (32 different countries included). Data was gathered by survey or questionnaire for 18 of the studies,

administrative/billing data for seven, interviews for one, a combination of surveys and interviews for one and other methods for two. All studies were published between 1980 and 2012 and were available in English.

#### HOME VISITS AND AGE

Of the 14 studies which described the impact of physician age on the provision of home visits, eight found that older physicians were more likely to perform home visits than younger ones; in all eight studies, the difference was statistically significant (12-19) . Two of the other six studies found younger physicians more likely to perform home visits (20,21), and four of the other six studies found no significant difference between the provision of home visits and age of the physicians(22-25).

#### DISCUSSION

Theile et al. found that physicians making home visits were more likely to have been 5 years or less in their occupation compared to those with 20 or more years (20). There was no statistical analysis in this study, and only descriptive statistics taken from a sample of 24 physicians were reported. These results may not be statistically significant and may not be generalizable to larger populations. Theile states that "although most international studies reveal higher home visiting rates for experienced GPs, in our sample the younger doctors conducted many more house calls than their older colleagues —probably because German practice owners tend to delegate home visits to their vocational trainees" (20).

The work done by Chan et al. in 1998 in Canada, found that, older physicians were less likely than those under age 65 to perform home visits (21). Chan's more recent work (2002) identifies that the difference between provision of home visits for physicians under 65 and over 65 is no longer statistically significant (14). His more recent work however does show that recent graduates (those who have graduated within 5 years) are less likely than non-recent graduates to do home visits (14). Chan also identifies that "the patterns of practice of older physicians that we

observed are based on behaviour during the early 1990s, a particularly turbulent period in physician remuneration policy. These observed patterns may not be generalizable to future periods" (14). Taking the limitation Chan has identified into consideration, as well recognizing that more recent findings are in line with the current body of knowledge, it may not be prudent to draw conclusions from the 1998 study around the relationship of physician age and the provision of home visits.

Two of the four studies that found no significant relationship between physician age and the provision of home visits assessed the impact of physician attitude towards home visits (23, 24). In their descriptive statistics they did identify that younger physicians were less likely to provide home visits, but when they had performed logistical regression the age variable was no longer statistically significant. These findings present an opportunity for further study in Alberta around physician attitude as these themes were also uncovered in the open-ended question component of the Ingram (1999) survey. Unfortunately Ingram did not transform responses regarding attitude and quantitatively assess them through statistical analysis. All things considered, it stands to reason that adding a variable around physician attitude may change the results for many studies.

## CONCLUSIONS

Some studies hypothesized on why older physicians were more likely to provide home visits. A common theme was that older physicians tended to treat older patients (21); the correlation is that typically older patients and those with severe chronic conditions were more likely to require home visits due to multiple reasons including reduced mobility. One study asserted that "Older physicians may perform their job in a more traditional manner, feel closer to their patients and may have personal and/or professional values that make them more inclined to perform home visits" (13). This concept ties back to some findings around the impact of provider attitude towards home visits: Ingram (1999) suggests that as "Some physicians

reported making house calls for their own personal satisfaction. If house calls are to continue, personal satisfaction with house calls may be an important element for older physicians to model for younger physicians, residents and students"(16).

#### HOME VISITS AND GENDER

Of the 21 studies that described the impact of physician gender on the provision of home visits, 18 found that male physicians were more likely to perform home visits than female physicians; in 15 of these, the difference was statistically significant (12, 14-17, 22, 26-34), three studies did not perform statistical analysis (16,20,35) and three studies found no significant difference between the provision of home visits and the gender of the physician (23,24,36).

#### DISCUSSION

The objective of the work done by Peterson et al. was to determine the number and distribution of home visits by physician specialty over time and assess the impact of physician and area level characteristics (12). The findings of the study showed that male physicians were more likely to perform home visits in 2000 and 2003 but not in 2006 (OR 1.28 95% CI 1.00-1.62). As the multilevel regression was only performed on data from 2006, it is not clear as to whether or not the significance in previous years would have been impacted by other physician characteristics like age (12).

These results are similar to what Boiling and Keenan had concluded about the relationship between age and home visiting (23). They found that it appeared there was a relationship between gender and home visits when looking at univariate associations. However, when they added in variables for physician attitude and performed multiple regression, gender was no longer statistically significant. Again these findings present an opportunity for further study in Alberta. All things considered, it stands to reason that adding a variable around physician attitude may change the results for many studies.

Hooper (1989) found no significant difference between the provision of home visits between male and female physicians but the analysis was descriptive and did not consider the effect of confounding variables (36).

## CONCLUSIONS

There is significant evidence to suggest that male physicians are more likely to provide home visits than their female counterparts. Further work needs to be done in order to confirm that the differences found are not confounded by other variables such as age, location, attitude, education, or other physician or practice differences.

## HOME VISITS AND LOCATION

Of the 15 studies that provided information on the impact of location of practice on the provision of home visits, 13 found that rural physicians were more likely to provide home visits; in 11 of these the difference was noted as statistically significant (12-18, 23, 25, 37, 38), the remaining two were descriptive in nature and no statistical tests were performed (20, 39). In one study there was no significant difference between the provision of home visits by physicians located in rural or urban areas (24) and in one other study that was descriptive in nature, the amount of home visits reported by rural physicians was similar to those reported by urban physicians(40).

## DISCUSSION

The one study that found no significant difference between location and home visits was the work done by Boiling et al. (24). Similar to the discussion above, Boiling found that after adjusting for variables that capture physician attitude, the association between physician location and the provision of home visits was no longer statistically significant (the same result for the association between age and home visits and gender and home visits).

The only other study that provided contradictory findings was that done by Fearn et al. This study was descriptive in nature, did not perform univariate or multivariate analysis and

also had a population that included only physicians from one county in England; therefore, the findings may not be generalizable to broader populations and should not have an impact on the overall interpretation of evidence about the association between these two variables (24). Fearn recognizes this inconsistency by stating “It has always been accepted that rural general practitioners carry out more home visits than urban doctors because of the problems of distance and patient accessibility, but [...] in this sample rural and urban doctors on average estimated similar levels of house calls”(40).

### CONCLUSIONS

It can be hypothesized generally that rural physicians are more likely to provide home visits than their urban counterparts based on the current body of evidence. There may be a number of reasons why this is the case, one of which may be the fact that rural areas may have an older population on average, which may result in sicker patients, or more palliative patients, who would be more likely to require home visits. Combining this notion with the assertion by Burge et al. that palliative care programs in urban centres may provide a more collaborative, team-based approach to home care may explain the finding that home care visits by physicians are less likely in urban centres (37). Another factor that may influence this relationship may be related to patient accessibility, such as the absence of public transportation in rural areas as compared to urban ones, making the home visit a necessity.

### OBSTETRICS

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A total of 15 studies provided data on the provision of obstetrical care. Of these, 10 were based on data from Canada, three from the United States, and two from the United Kingdom. Data was gathered by survey or questionnaire for 10 of the studies, administrative/billing data for four and one study gathered data from other methods. All studies were published between 1987 and 2002 and were available in English.

## OBSTETRICS AND AGE

Of the 15 papers that provided information on the provision of obstetrical care, five described the impact of physician age. Four of these studies found that younger physicians were more likely to provide obstetrical care than older ones; in two of the four, the difference was statistically significant (14, 21); the remaining two were descriptive only (41, 42). One study found that older physicians were more likely to perform obstetrical care, but it was not noted whether this was statistically significant (43).

## DISCUSSION

The work done by Bain et al. found that of the percentage of physicians that reported never performing obstetrics decreased in each progressively older age category (49% of those born after 1954, 36% of those born between 1946 and 1954 and 22% of those born before 1946), concluding that younger physicians are more likely to have never performed obstetrical services (43). This is at odds with the findings from the four other studies identified; the reasons for this may be both the way that age was categorized and also the nature of the research question.

First of all, the age categories chosen in Bain's work group all physicians born after 1946 together, which would, at the time of the study make those physicians 40 years of age and older. By contrast, in the other relevant research, two studies looked at physicians under and over 65 years of age, one looked at 10-year age cohorts and one looked at 5-year age cohorts. The results and conclusions of Bain's study may have been more in line with the rest of the evidence if the higher-end age cohort was broken down differently.

Furthermore, the research question presented by Bain was whether or not physicians had ever provided obstetrical services, versus the other studies which were looking at whether or not physicians were currently providing obstetrical care. The findings from the four other studies draw conclusions about the aging physician population and a potential issue— that as the average age of physicians increase, there may be an overall drop in the provision of

obstetrical care. We can assume, though, that Bain's data does reflect some of this attrition when looking at a second finding from Bain. The study found that of those physicians who at one time provided obstetrical care and now have ceased to provide it, the percentage increased with age cohort (6% of those born after 1954, 22% of those born between 1946 and 1954 and 40% of those born before 1946) (43). It could be reasoned that if Bain had looked at the second question by a different age cohort (either by intervals or by over and under 65), the findings may have been more in line with the general consensus of evidence to date.

### CONCLUSIONS

Based on the design of the research to date examining the relationship of physician age and the provision of obstetrical care, it looks as though as physicians age, at some point, they begin to limit their scope of practice. This is particularly important to policy makers as older physicians account for a growing proportion of the pool of physicians in Canada.

According to the findings presented by Reid, the percentage of FP/GPs providing intrapartum care dropped with age but among those younger than 35, the percentage was slightly higher in 2001 compared to 1997 (41). This finding is encouraging, however, as lifestyle issues as well as interruptions in office schedules are among the key reasons why physicians chose to abstain from the provision of obstetrical care. Policy makers could encourage models of practice where GP/FPs work in supportive groups as a solution to key barriers. The second part of this research will assess whether or not Primary Care Networks have had a positive influence on the provision of obstetrical care.

### OBSTETRICS AND GENDER

Of the 12 studies that described the impact of physician gender on the provision of obstetrical care, seven found that female physicians were more likely to do so; in six of these the difference was noted as being statistically significant (14,36,42,44-46). Two studies found male physicians were more likely to provide obstetrical care, one noted the difference was statistically

significant (41) and one did not report on statistical significance (32). One study found that there was no difference between the provision of obstetrical care based on gender (29), one study found the same conclusion but only for those physicians born after 1954 (43) and one found that men were more likely to provide obstetrical care but female physicians were more likely to provide prenatal care , both of those results were statistically significant (33).

## DISCUSSION

Bain et al. found that of all physicians born before 1954 significantly more female physicians had never practiced obstetrics (43). However, there was no significant difference between male and female physicians born after 1954 (43). Interestingly enough, among the female family physicians, regardless of age, the proportion (approximately 50%) of those choosing not to practice obstetrics has remained more or less the same. The younger male physicians however, have steadily approached the same rate (46%) (43).

The work by Bass et al. found that there was no significant difference between male and female physicians when it came to obstetrical practice, however the results may not be generalizable as the study sample was small and only consisted of urban physicians from London, Ontario; furthermore, there may have been some volunteer bias, as those who agreed to participate may have been more likely to provide obstetrical care than those who did not agree to participate (29).

Norton also found no significant difference between gender and the provision of obstetrical services; however, the research methodology chosen looked at the number of obstetrical visits per week, and overall female physicians had fewer visits per week and saw fewer patients (32). However, they spent longer with each patient. The lack of significant difference may be at odds with the rest of the literature; however, if the research question was directed more about scope of practice and less about workload or productivity, there may have been a different result.

Keane et al found that physicians providing obstetrical care were more likely to be male but that physicians providing prenatal care were more likely to be female (33). Keane is unwilling to generalize these findings to the larger or general population of physicians due to the limitations of the study and past findings.

## CONCLUSIONS

The body of literature surrounding the impact of physician gender on the provision of obstetrical care are somewhat inconsistent, although only one statistically significant study is at odds with the overall evidence, and there are a few studies which show no significant differences or conflicting results. This inconsistency may reflect both differences in the populations of interest and research questions. For example Norton's work looking at the number of weekly obstetrical visits is more about practice/workload than career intentions and overall scope of practice. The one statistically significant study that was at odds with the general evidence is quite dated now (1987) and did show a slow progression to no significant difference; with this in mind, more recent studies should be given greater consideration.

## OBSTETRICS AND LOCATION

Of the five studies that described the impact of location of practice on the provision of obstetrical care, four found that rural physicians were more likely to provide it(42,43,47), only one of which was statistically significant (14). One study found that urban physicians were more likely to provide obstetrical care than rural physicians and these results were statistically significant (40).

## DISCUSSION

The research by Fearn et al. (1988) looked at whether or not physicians provided certain types of clinics, and not whether or not physicians are delivering babies (40). Although they found that urban physicians were more likely than rural physicians to run antenatal clinics, they also found that rural physicians were more likely to be running family planning clinics (i.e.

sexual and reproductive health clinics). It is important to note that these results may or may not speak to whether or not the physicians actually delivered more babies or the involvement of obstetricians in the patient's care. Furthermore, this study may not be generalizable to a larger population, as it was comparing an urban and rural population within one region in the United States that were only 20 miles apart from each other. The patient population may even be an interaction in this analysis as there may be more women living in the coastal (rural) region that have already had their family versus the larger city centre, where there may be more women of childbearing age.

The research completed by Reid et al. (2000) in Canada, found that more family doctors serving rural areas are providing intra-partum care, compared with doctors in urban areas, although those in urban areas tend to perform more deliveries (42). This study differs from other studies that focus on billing information, which underestimate the family doctors contribution. For instance, in births where an obstetrician's intervention is required to perform a caesarean section or forceps delivery, the administrative data often attributes delivery to the obstetrician only, ignoring the care of the family doctor. As well the use of billing information does not measure the contribution of the family physician to maternity care in providing prenatal and shared care.

It is important to note one aspect of the work done by Barclay et al. (1996), which found that rural physicians are more likely to deliver babies: they studied the provision of obstetrical services by recent graduates (47). This is one way to control for the interaction of age or years in practice on the outcome, and therefore should hold weight in generalizability of their findings (assuming that all recent graduates are young or at least of a similar age).

## CONCLUSIONS

Based on the studies reviewed, one can form a preliminary hypothesis that rural physicians are more likely to be involved in obstetrical care than those of their urban

counterparts. Furthermore, that urban physicians who deliver babies are on average delivering more babies than rural physicians. This most likely has more to do with the specialization of some urban GPs in maternity care, as well as the gaining of hospital privileges to work alongside obstetricians to deliver normal or low-risk pregnancies in high-volume hospitals. Family physicians are distributed throughout larger and smaller communities in Canada, while specialists are concentrated in the larger centres. Therefore, rural areas with little or no access to specialist services (obstetricians) are particularly reliant on GPs/FPs maintaining practice in multiple settings. Although Chan (2002) found that decreases in comprehensiveness of care occurred even in rural areas where GPs/FPs do not have the same latitude to shift patients to specialists, cities with teaching facilities registered the lowest levels of comprehensiveness (14). One reason for this that was offered by Chan was that such areas have high concentrations of specialists, resulting in both ease of referral and greater patient expectations to be seen by a specialist (14).

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#### ACCESS

A total of seven studies provided data on access. Of these, six were based on data from the United States, and one from Europe. Data was gathered by survey or questionnaire for six of the studies, and one study gathered data through an observational study. All studies were published between 2003 and 2011 and were available in English.

#### ACCESS AND AGE

Of the two studies that described the impact of physician age on access, one study found that younger physicians were more likely to be accepting new patients, and was statistically significant (48). One study found that practices with an older average age of physicians scored higher on a number of factors related to access; the results were only statistically significant when stratified by country (49).

## DISCUSSION

The work done by Wensing et al. (2008) examined whether or not characteristics of general practice organizations had an impact on patient evaluations of accessibility. The findings showed that practices with a higher average age of physicians received more positive evaluations of most questionnaire items in Wales and one item in the Netherlands (getting through on the phone). However, when the aggregate measures were analyzed, there was no relationship between age and patient evaluations of access. The mean age of physicians across the countries was quite similar (49).

The research done by Ehman et al. (2003) found that recent graduates or less experienced physicians were more likely to have an appointment available; this finding was statistically significant and controlled for other factors such as gender (48). However, the population studied was small, being primary care physicians in the San Francisco Bay area (48).

## CONCLUSIONS

At this point there is limited research conducted to date on the impact of physician age and access within primary care settings. It may be an a priori hypothesis that newer physicians would be more likely to be accepting new patients as older physicians would more likely already have a full patient panel. This can be supplemented by the only study that showed statistical significance, even though the study population was small and should not be used to create a general hypothesis alone.

## ACCESS AND GENDER

Of the two studies that described the impact of gender on access, one found males were more likely to be accepting new patients (48), and one found males scored higher on a number of factors related to access (49). Both results were statistically significant.

## DISCUSSION

In the work done by Wensing et al. (2008) practices with a higher percentage of female GPs received less positive patient evaluations of a number of items related to access in Wales, England, Israel and Switzerland (49). When aggregate measures were analyzed, the relationship between physician gender and patient evaluations was almost significant at  $p=0.07(49)$ . The authors adjusted for working hours per week in their multivariate analysis and so these findings were not due to female physicians working fewer hours (49). The authors offered two potential explanations for the results including those female physicians may self-select into specific types of practice that provide poorer accessibility and coordination, or that patients have specific expectations of female physicians regardless of how many hours they actually work (49).

## CONCLUSIONS

Based on the information provided in the Ehman et al. (2003) work, the most common reason for primary care physician unavailability was “full-practice” (meaning that the physician’s roster of patients was full) (48). Based on some of the findings related to obstetrical care and physician gender, female family physicians are potentially more likely to have a full panel of patients and/or have a higher proportion of obstetrical patients who require more time, and therefore if you adjust for hours per week, there may be an overall lack of extra space in the week of a female family physician. Related again to the potential explanation offered by Wensing, there may be a significant practice difference between female and male physicians on average, such as specialising in obstetrical care that may reduce the overall aspect of access to female family physicians.

## ACCESS AND LOCATION

Of the 6 studies that provided information on the impact of location of practice on access, two studies found that rural physicians were more likely to be accepting new patients, and results from both were statistically significant (50,51). Two studies found that patients in

urban areas were more likely to have no usual source of care, again both statistically significant (52,53). One study found that urban practices scored higher on a number of factors as they relate to access; the results were only statistically significant when stratified by country (49). One study found no difference between urban and rural children in regards to having a usual source of care (54).

## DISCUSSION

DeVoe et al (2009) found that before adjusting for special health care needs of their population, patients in rural areas were more likely to have unmet health needs (e.g. medical care not received, prescriptions not refilled due to cost, and significant problems getting dental care)(54). After controlling for this there was no longer a significant difference, indicating that a higher percentage of special health care needs among some populations of rural children may explain, in some part, previous reports of higher unmet medical needs. Regardless, even in the univariate analysis there was no significant difference in usual source of care between rural and urban children (54).

The work by Wensing et al. found that practices in towns and cities received less positive evaluations of a number of items in Wales and one item in the Netherlands, compared to practices in villages; however, when aggregate measures were analyzed (not separating out responses by country) there was no relationship between level of urbanization and patient evaluations (49).

## CONCLUSIONS

The work by Litaker showed that patients in rural areas were more likely to report having a usual source of care but also examined associations between the characteristics of an individual's context and their potential access to health care (52). Litaker "challenge[s] health policy planners to adopt a more sociological perspective of the individual within society... that one's characteristics, whether related to risk behaviors, health attitudes, or perceived needs, do

not arise at random or in a vacuum, but are shaped, in part, by exposures, both beneficial and harmful, in one's context"(52). Litaker further asserts that "The persistence of disparities in many areas, including healthcare access, suggests the need for a more comprehensive approach that looks beyond the individual. Failure to do so is akin to treating symptoms rather than underlying disease"(52).

Litaker alludes to some of the messages provided in the Rural Policy Brief produced by Mueller (51), insofar as in rural areas physicians may have a moral obligation to accept new patients, since they may be the only physician practicing within the community. This provides some additional contextualization of the findings that rural physicians are more likely to accept new patients, even though there seems to be a systemic assumption that access to health care services is worse in rural areas.

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## CHAPTER 2 STATISTICAL ANALYSIS

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### METHODOLOGY

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College of Physician and Surgeons of Alberta (CPSA) data from the fall of 2012 was examined. This data was linked with information from the Government of Alberta Ministry of Health from fall 2012. The CPSA database contained information such as physician name, date of graduation, gender, published city, whether they were foreign trained, whether they had a certificate of family medicine from the College of Family Physicians of Alberta, and whether they: were accepting new patients, deliver babies, make home visits or had a special practice interest or approval.

Information on physician enrolment within a Primary Care Network was requested from the Government of Alberta, Ministry of Health. This data set was linked with that received from the CPSA.

A quantitative approach was taken to analyze the physician data provided from the transformed data. The quantitative analyses were conducted using the statistical software STATA/MP version 11.0.

The main outcomes of interest are summarized using percentages. Continuous variables such as decades in practice are summarized using means and standard deviations. Categorical variables such as gender and PCN attachment are summarized using percentages. The relationship between the outcomes and each of the explanatory variables were explored using cross tabs for categorical explanatory variables and box plots for continuous explanatory variables. Categorical explanatory variables were coded using indicator variables. Logistic regression models were used to investigate the univariate associations between the binary outcomes and each of the explanatory variables. Multiple logistic regression models included variables with p values less than 0.15. Multicollinearity among explanatory variables was investigated via person correlations and chi-square tests of two by two tables, and taken into consideration in the multiple logistic regression model building. Results of the regression models are reported as odds ratios, together with confidence intervals and p-values.

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## RESULTS

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### DESCRIPTIVE STATISTICS

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In fall 2012, there was a total of 3204 FP/GP physicians in Alberta according to the CPSA. The average number of years in practice for those physicians was 21 years (12.60 SD). 57% were male, 64% were located in a Edmonton or Calgary, 34% were foreign trained, 63% held a certificate of family medicine from the College of Family Physicians of Alberta, 20% were accepting new patients, 12% delivered babies, 26% made home visits and 60% were enrolled in a PCN.

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TABLE 1 DESCRIPTIVE STATISTICS OF PHYSICIANS IN ALBERTA

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Total Number	3204
Average# number of years since graduation	21 (12.60)^
Gender Female	1393 (43%)
Gender Male	1811 (57%)
Urban*	2064 (64%)
Rural	1140 (36%)
Foreign Trained	1100 (34%)
Certificate of Family Medicine	2032 (63%)
Accepting New Patients	634 (20%)
Delivers Babies	369 (12%)
Makes Home Visits	836 (26%)
Enrolled in a PCN	1938 (60%)

*UNLESS OTHERWISE SPECIFIED NUMBERS ARE EXPRESSED IN TOTALS AND PERCENTAGES*

*#YEAR OF GRADUATION MINUS 2012*

*^AVERAGE AND STANDARD DEVIATION*

*\*URBAN CODED AS EDMONTON OR CALGARY*

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#### UNIVARIATE COMPARISONS

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Logistic regression was performed to estimate the relationship between the outcome variables (whether physicians provide home visits, delivered babies and/or were accepting new patients) and selected physician characteristics such as whether they were enrolled in a PCN, whether they were male or female, whether they were located in rural or urban areas, as well as how many decades they had been in practice.

The odds of making home visits was found to be .72 (.61, .84) times lower for female physicians, compared to male ( $p < .0001$ ), .45(.39, .53) times lower for urban physicians, compared to rural ( $p < .0001$ ), 3.8 (3.2, 4.7) times higher for PCN physicians versus non PCN physicians ( $p < 0.0001$ ), and 1.5(1.4, 1.6) times higher for each additional decade in practice ( $p < .0001$ ).

TABLE 2 UNIVARIATE REGRESSION RESULTS FOR HOME VISITS

Exposure	Odds ratio (95% CI)	P Value
Gender	.72 (.61, .84)	(p<.0001)
Location	.45(.39, .53)	(p<.0001)
PCN	3.8 (3.2, 4.7)	(p<.0001)
Decades in practice	1.5(1.4, 1.6)	(p<.0001)

The odds of delivering babies was found to be 1.5(1.2, 1.9) times higher for female physicians compared to male (p<.0001), .21(.17, .27) times lower for urban physicians compared to rural (p<.0001), 4.2 (3.1, 5.6) times higher for PCN physicians versus non PCN physicians (p<.0001) and .77(.70,.85) times lower for each additional decade in practice (p<.0001).

TABLE 3 UNIVARIATE REGRESSION RESULTS FOR DELIVERING BABIES

Exposure	Odds ratio (95% CI)	P Value
Gender	1.5(1.2, 1.9)	(p<.0001)
Location	.21(.17, .27)	(p<.0001)
PCN	4.2 (3.1, 5.6)	(p<.0001)
Decades in practice	.77(.70, .85)	(p<.0001)

The odds of accepting new patients was found to be .61(.51, .73) times lower for female physicians compared to male (p<.0001), .52(.44, .62) times lower for urban physicians versus rural (p<.0001), 1.7(1.4, 2.0) times higher for PCN physicians versus non PCN physicians (p<.0001) and 1.1(1.0, 1.2) times higher for each additional decade in practice (p<.05).

TABLE 4 UNIVARIATE REGRESSION RESULTS FOR ACCEPTING NEW PATIENTS

Exposure	Odds ratio (95% CI)	P Value
Gender	.61(.51, .73)	(p<.0001)
Location	.52(.44, .62)	(p<.0001)
PCN	1.7(1.4, 2.0)	(p<.0001)
Decades in practice	1.1(1.0, 1.2)	(p<.05)

TESTS FOR MULTICOLLINEARITY

Multicollinearity among explanatory variables was investigated via Pearson correlations and Chi-Square tests of two by two tables. The results showed a significant relationship between gender and location, gender and PCN status, location and PCN status, and gender and age. The relationships between age and location and age and PCN status were not significant.

TABLE 5 RESULTS FOR MULTICOLLINEARITY TESTS

Explanatory Variables	Pearson Chi2 (P Value)	T Test Statistic (P Value)
Gender and Location	69.1 (<.0001)	
Gender and PCN	3.99 (<.05)	
Location and PCN	70.8 (<.0001)	
Age and Gender		10.7 (<.0001)
Age and Location		.804 (0.4213)
Age and PCN		-1.52 (0.1274)

MULTIVARIATE COMPARISONS

Due to the relationships between the explanatory variables, multivariate regression was performed to adjust for the explanatory variables simultaneously. PCN status (p<0.001), location (P<0.001), and decades in practice (P<0.001) were all found to be significant predictors of whether or not physicians provided home visits. With all variables taken into consideration gender was no longer statistically significant.

The odds of physicians making home visits within a PCN compared to those not within a PCN moved from 3.8 (3.2, 4.7) to 3.9 (3.2, 4.7) in the multivariate model. The odds moved from

.45(.39, .53) to .50 (.42, .60) for physicians within an urban setting versus those in a rural setting and from 1.5(1.4, 1.6) to 1.6 (1.5, 1.7) for each additional decade in practice (1.5, 1.7).

The overall model had a likelihood ratio (LR) chi square test statistic of 457.39 with a probability of  $P > 0.00001$  which identifies that the model was statistically significant.

TABLE 6 MULTIVARIATE RESULTS FOR OUTCOME= HOME VISITS

Explanatory Variable	Univariate Odds Ratio (95% CI)	P value		Multivariate Odds Ratio (95% CI)	P value	
PCN Status	3.8 (3.2, 4.7)	<.0001		3.9 (3.2, 4.7)	<.0001	
Gender	.72 (.61, .84)	<.0001		.94 (.79, 1.1)	.51	
Location	.45(.39, .53)	<.0001		.50 (.42, .60)	<.0001	
Decades in Practice	1.5(1.4, 1.6)	<.0001		1.6 (1.5, 1.7)	<.0001	

PCN status ( $p < 0.001$ ), gender ( $p < 0.001$ ), location ( $p < 0.001$ ), and decades in practice ( $p < 0.001$ ) were all found to be significant predictors of whether or not physicians delivered babies.

In the Multivariate model, the odds of physicians delivering babies within a PCN compared to those not within a PCN moved from 4.2 (3.1, 5.6) to 3.6 (2.7, 4.9), from 1.5(1.2, 1.9) to 1.7 (1.4, 2.2) for female physicians compared to male, and from .77(.70, .85) to .76 (.68, .84) for each additional decade in practice. The odds of physicians delivering babies in urban locations versus rural locations remained constant at 0.21 (.17, .27).

The overall model had a likelihood ratio (LR) chi square test statistic of 362.52 with a probability of  $P > 0.00001$  which identifies that the model was statistically significant.

TABLE 7 MULTIVARIATE RESULTS FOR OUTCOME= DELIVER BABIES

Explanatory Variable	Univariate Odds Ratio (95% CI)	P value		Multivariate Odds Ratio (95% CI)	P value	
PCN Status	4.2 (3.1, 5.6)	<.0001		3.6 (2.7, 4.9)	<.0001	
Gender	1.5(1.2, 1.9)	<.0001		1.7 (1.4, 2.2)	<.0001	
Location	.21(.17, .27)	<.0001		.21 (.17, .27)	<.0001	
Decades in Practice	.77(.70, .85)	<.0001		.76 (.68, .84)	<.0001	

PCN status ( $p < 0.001$ ), gender ( $p < 0.001$ ) and location ( $p < 0.001$ ), were all found to be significant predictors of whether or not physicians were accepting new patients. With all variables taken into consideration decades in practice was no longer statistically significant.

In the Multivariate model, the odds of physicians accepting new patients within a PCN compared to those not within a PCN moved from 1.7(1.4, 2.0) to 1.6 (1.3, 1.9), from .61(.51, .73) to .66 (.55, .80) for female physicians compared to male, and from .52(.44, .62) to .59 (.49, .71) for physicians located within urban locations versus rural locations.

The overall model had a likelihood ratio (LR) chi square test statistic of 96.59 with a probability of  $P > 0.00001$  which identifies that the model was statistically significant.

TABLE 8 MULTIVARIATE RESULTS FOR OUTCOME= ACCEPTING NEW PATIENTS

Explanatory Variable	Univariate Odds Ratio (95% CI)	P value		Multivariate Odds Ratio (95% CI)	P value	
PCN Status	1.7(1.4,2.0)	<.0001		1.6 (1.3, 1.9)	<.0001	
Gender	.61(.51, .73)	<.0001		.66 (.55, .80)	<.0001	
Location	.52(.44,.62)	<.0001		.59 (.49, .71)	<.0001	
Decades in Practice	1.1(1.0,1.2)	.019		1.0 (.98, 1.1)	.202	

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## DISCUSSION

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### HOME VISITS

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PCN physicians are almost four times more likely to provide home visits than non-PCN physicians. The association increased slightly from the univariate to multivariate analysis; however, this is most likely because it was the first variable introduced into the model. Putting the PCN variable into the model second instead of first resulted in the same ORs and CI as was found in the univariate analysis.

In the multivariate analysis gender remained a significant impact on the likelihood of the provision of home visits, until the decades in practice variable was introduced in the model. This is likely because decades in practice was confounding the association between gender and home visits. In the end there is no relationship between gender and home visits simply that older physicians are more likely to provide home visits, and also that older physicians tend to be male (a test for homogeneity resulted in a p value of 0.167 confirming there was no interaction between gender and decades in practice).

The association between location and the odds of providing home visits decreased in the multiple model, most likely as it was confounded by the PCN variable, as more PCNs are located within rural areas. Even with the adjustment, the ORs and CIs still remained significant, so as to say that location, adjusting for PCN status, still has an impact on the odds of providing home visits (a test for homogeneity resulted in a p value of 0.165 confirming there was no interaction between primary care networks and location).

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### OBSTETRICS

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PCN physicians are 3.6 times more likely to deliver babies than non-PCN physicians. This association decreased from an OR of 4.2 to 3.6 as location was added into the model as

both rural physicians and PCN physicians are more likely to deliver babies. Adjusting for confounding, both remained associated with the outcome.

The location variable is also related to the gender variable (a test for homogeneity resulted in a  $p < 0.0001$  identifying that there is an interaction between these two variables). Until the age variable was added in, the OR of female physicians delivering babies compared to male physicians increased from 1.5 to 2.0. This is because female physicians are more likely to deliver babies but also be located in urban areas and so adjusting for location increased the relationship between gender and the provision of home visits. However, once the decades in practice variable was added the OR moved from the adjusted OR of 2 to the final OR of 1.7. This is because older physicians are less likely to deliver babies, and female physicians are on average younger. This relationship was confounding the OR (a test for homogeneity resulted in a p value of 0.8047 confirming there was no interaction between location and gender).

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#### ACCESS

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In the multivariate model, all ORs reduced in magnitude slightly. Because female physicians were less likely to be accepting new patients, and urban physicians were also less likely to be accepting new patients and that there are more female physicians in urban areas the ORs in the univariate analysis were inflated. The adjusted ORs reduce the impact of gender and location on whether or not physicians are accepting new patients, but only slightly, and the relationship remains significant.

The only explanatory variable that is no longer significant is decades in practice. If decades in practice is placed into the model first, the most significant impact on the OR results with the introduction of the gender variable. As female physicians are on average younger, and female physicians are less likely to be accepting new patients, gender was confounding the relationship between age and the likelihood of a physician to be accepting new patients (a test

for homogeneity resulted in a p value of .7687 confirming there was no interaction between age and gender).

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## CONCLUSIONS

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### HOME VISITS

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The literature suggests that older physicians, male physicians and rural physicians are more likely to provide home visits. The statistical analysis presented in this study has found that in Alberta, although location and decades in practice are both significant predictors of whether or not physicians provide home visits, gender was not statistically significant when all other variables were controlled for. This is likely because of the relationship between gender and age, considering that older physicians were more likely to be male.

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### OBSTETRICS

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Literature suggests that younger physicians, female physicians and rural physicians are more likely to provide obstetrical care. This study has confirmed these findings in Alberta, finding that age, gender and location were all significant predictors of whether physicians delivered babies. Again importantly PCN physicians were 3.6 times more likely to deliver babies than their non-PCN colleagues, even with all other variables adjusted for.

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### ACCESS

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Based on the limited research to date, literature suggests that younger physicians, male physicians and rural physicians are more likely to be accepting new patients. This study has found that gender and location were significant predictors of whether or not physicians were accepting new patients, but that with all other variables considered, decades in practice was no longer statistically significant. Again PCN physicians were 1.6 times more likely to be accepting

new patients than their colleagues. The relationship between gender and age may be the reason previous studies have concluded that older physicians were more likely to be accepting new patients. As female physicians are on average younger, and female physicians are less likely to be accepting new patients, gender was acting as an effect modifier on the relationship between age and the likelihood of a physician to be accepting new patients.

## PRIMARY CARE

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The most important finding of this study is that compared to non-PCN physicians, PCN physicians are 3.9 times more likely to make home visits, 3.6 times more likely to deliver babies and 1.6 times more likely to be accepting new patients. Because physicians who provide a full scope of practice may be more likely to join a PCN, this study cannot assert a causal relationship between the outcomes and explanatory variables. That being said, there may be an incentive for PCN physicians to accept new patients, due to the per capita funding they receive. That funding may also allow physicians the flexibility to provide a full scope of practice, by utilizing other health care professionals in the management of patient care. Furthermore, the values and goals of the PCN are designed to promote the coordination of comprehensive primary health care. The evidence presented in this paper may support a conclusion that the PCN in Alberta has been successful.

## FUTURE POLICY IMPLICATIONS

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There are many themes that have been identified in the research to date that can be used to assist policy makers in enabling the best possible environment for the sustainability of primary health care in the long term.

As previously discussed, some reasons offered as to why physicians are limiting their scope of practice include: a focus on maintaining a positive work life balance, managing lifestyle

issues such as a family as well as limiting interruptions in office schedules or after hours. These concerns can be mitigated in models of practice where physicians work in networks such as the PCNs, where responsibility can be shared and appropriate coverage can be provided to patients within the group of physicians, shifting the burden of care from one physician to the team.

Many of the studies reviewed identified opportunities to further explore the impact of physician attitude on their scope of practice. As was noted earlier, some older physicians reported personal satisfaction, altruism or moral obligations as to why they provided a full scope of care for their patients. Although currently the PCN model in Alberta does not make specific reference to blending physician networks with both older and newer physicians, this may be a great opportunity for the older physicians to model certain desired behaviours to their successors.

In his 2002 work, Chan states, "The increasing complexity of medical care demands greater specialization and the ideal of the "super-FP" who can do everything is unrealistic"(14). Chan goes on to cite a position paper written by The College of Family Physicians of Canada (CFPC) which proposes the "Family Practice Network" model, which appears similar in nature and principle as the Primary Care Networks of Alberta. The CFPC explains that within these networks "some family physicians would offer a broad range of services while others would provide expertise in areas of special interest"(55).

Due to this potential fragmentation of care, it is extremely important for the PCN model to focus on communication and information sharing within the primary health care team.

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## LIMITATIONS

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### CHAPTER 1

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The body of evidence that was analyzed varied widely in study design including different populations of interest (physician versus patient) as well as different type of analysis performed (descriptive versus inferential statistics).

Additionally many studies employed different evaluation techniques including different categorization and different measurement of explanatory and outcome variables.

Lastly due to the limited nature of the available evidence, poorly designed studies were not excluded; rather, the quality of the studies were weighed in the discussion sections of the paper and recommendations were provided on whether generalizations could be made, especially when the conclusions were contrary to the rest of the evidence.

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### CHAPTER 2

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Information on whether a physician made home visits, delivered babies or was accepting new patients was collected from the CPSA database and was self-reported in order to be published on the CPSA's physician directory. The information may not actually reflect the provision of services (e.g. a physician may be accepting new patients, may not want to advertise it, they may make home visits when necessary, however it is not their standard practice model, etc.).

The study population included all actively licensed GP/FPs in Alberta; therefore any physicians who provide uninsured services or perform little clinical work but are still registered were included.

The rural/urban location was derived by the physician address on file. In some cases this may not reflect the actual location where services are provided. It could be the case that a

physician could use their personal address instead of their business address and they have an office in a different location.

Physicians were coded as urban when their address on file was located within Edmonton or Calgary and rural for all other towns or cities in Alberta. There is an opportunity to conduct a more sensitive analysis breaking the location category into multiple categories.

Physician age was coded as years in practice, which was calculated by taking the difference between the individual's year of graduation and the date the data was collected (2012).

The two data sets were merged by calculating the match of letters between first and last names, taking into account the order of matching. However due to the significant variation in the spelling and potential typographical errors between the two data sets, only 1948 of the total 2656 individuals identified by the Ministry of Health as being part of a PCN were matched with the CPSA dataset. After a manual review, the total number of physicians found on both data sets was 1938. The remaining 700 were manually searched within the CPSA data and the individuals were not able to be matched with confidence. The potential reasons for the discrepancy include the fact that physicians may have registered with the CPSA and the Ministry with different first names, one being their legal name and one being a preferred name. In addition to this the Ministry data set did not only include GP/FPs. The original data request did not ask that the information be restricted to only GP/FPs as PCNs were designed for GP/FPs and it was not contemplated at the time that that a number of pediatricians and other general specialists were receiving per capita PCN funding. In the end there is a potential that a higher proportion of the study population were part of a PCN.

Lastly, this analysis did not account for different physician compensation models in Alberta, which include fee for service, salary and capitation. There is further opportunity to assess the impact of compensation models on the results.

LIST OF ABBREVIATIONS

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PCN	Primary Care Network
GP/FP	General Practitioner/Family Physician
CIHI	Canadian Institute of Health Information
CPSA	College of Physicians and Surgeons of Alberta
CFPC	College of Family Physicians Canada

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**The Impact of provider and practice characteristics on selected Primary Care Indicators**

Ashley Stacewicz

Literature search strategy

January 2013

**Research questions:**

1. Does panel size vary with compensation model?

**Limits: No date limits- Only English language papers**

CONCEPT 1	CONCEPT 2	CONCEPT 3	CONCEPT 4	CONCEPT 5	CONCEPT 6	CONCEPT 7	CONCEPT 8
MeSH	MeSH	MeSH	MeSH	MeSH	MeSH	MeSH	MeSH
House Calls	Delivery, Obstetric	Health Services Accessibility			Rural Health Services	Primary Health Care	Physician , Primary Care
Non-MeSH	Non-MeSH	Non-MeSH					
House call*			Age*	Female*	Rural*		Physician *
Home visit*				Male*	Urban*		Family Physician *

**Databases:**

1. PubMed (See next page for Search strategies)

**Grey literature:**

1. Google.ca [www.google.ca](http://www.google.ca)
2. Search the web sites of key organizations in this area (if you identify any from the earlier search, maybe the American Medical Association, Canadian Medical Association, etc....?)
3. Scan the reference lists of all the relevant papers you find.

## Appendix A

1a) ("House Calls"[MAJR] OR home visit\*[Title/Abstract] OR house call\*[Title/Abstract]) AND (age\*[Title/Abstract] AND physician\*[Title/Abstract])

1b) ("House Calls"[MAJR] OR home visit\*[Title/Abstract] OR house call\*[Title/Abstract]) AND (male\*[Title/Abstract] OR female\*[Title/Abstract])

1c) ("House Calls"[MAJR] OR home visit\*[Title/Abstract] OR house call\*[Title/Abstract]) AND (Rural Health Services\*[MAJR] OR rural [Title/Abstract] OR urban [Title/Abstract])

Also

"House Calls"[MAJR] OR home visit\*[Title/Abstract] OR house call\*[Title/Abstract] AND "Primary Health Care\*[MeSH Terms]

2a)"Delivery, Obstetric"[MeSH Terms] AND (age\*[Title/Abstract] AND physician\*[Title/Abstract])

2b)"Delivery, Obstetric"[MeSH Terms] AND (male\*[Title/Abstract] OR female\*[Title/Abstract]) AND physician\*[Title/Abstract])

2c)"Delivery, Obstetric"[MeSH Terms] AND "Primary Health Care\*[MeSH Terms] AND (Rural Health Services\*[MAJR] OR rural [Title/Abstract] OR urban [Title/Abstract])

Also

"Delivery, Obstetric"[MeSH Terms] AND "Primary Health Care\*[MeSH Terms]

3a)"Health Services Accessibility"[MAJR] AND (age\*[Title/Abstract] AND physician\*[Title/Abstract]) AND "Primary Health Care\*[MeSH Terms]

3b)"Health Services Accessibility"[MAJR] AND (male\*[Title/Abstract] OR female\*[Title/Abstract]) AND physician\*[Title/Abstract])

3c)"Health Services Accessibility"[MAJR] AND (Rural Health Services\*[MAJR] OR rural [Title/Abstract] OR urban [Title/Abstract])

## **Exclusionary Criteria**

### General:

Are the studies available in English? Y/N

Is the publication a systematic review or an observational study? Y/N

### Outcomes:

Are the outcomes of interest (obstetrics, home visits and access) the primary or additional outcomes? Y/N

### Explanatory Variables:

Did the study assess the impacts of provider characteristics including (age, gender, location or other related practice characteristics? Y/N

Table 1

## Excluded Studies

Studied Selected for Review	Reason why they were Excluded
Abelin T, Bosch F, Klein M. [Ambulatory medical care of the over-65 patient]. <i>Soz Praventivmed</i> 1983;28(6):274-81.	This study was only available in German.
Aelvoet W, Windey F, Molenberghs G, Verstraelen H, Van Reempts P, Foidart JM. Screening for inter-hospital differences in cesarean section rates in low-risk deliveries using administrative data: an initiative to improve the quality of care. <i>BMC Health Serv Res</i> . 2008 Jan 4;8:3.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
al Shammari SA. Home visits to elderly patients in Saudi Arabia. <i>J R Soc Health</i> 1997 Jun;117(3):174-9.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Alessi CA, Stuck AE, Aronow HU, Yuhas KE, Bula CJ, Madison R, et al. The process of care in preventive in-home comprehensive geriatric assessment. <i>J Am Geriatr Soc</i> 1997 Sep;45(9):1044-50.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Anders J, Profener F, Dapp U, Golgert S, Daubmann A, Wegscheider K, et al. [Health and competence: detection and decoding using comprehensive assessments in the Longitudinal Urban Cohort Ageing Study (LUCAS)]. <i>Z Gerontol Geriatr</i> 2012 Jun;45(4):271-8.	This study was only available in German.
Anetzberger GJ, Stricklin ML, Gauntner D, Banozic R, Laurie R. VNA HouseCalls of greater Cleveland, Ohio: development and pilot evaluation of a program for high-risk older adults offering primary medical care in the home. <i>Home Health Care Serv Q</i> 2006;25(3-4):155-66.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Aseltine RH Jr, Katz MC, Geragosian AH. Connecticut 2009 Primary Care Survey: physician satisfaction, physician supply and patient access to medical care. <i>Conn Med</i> . 2010 May;74(5):281-91.	The study did not assess the impacts of provider characteristics on the outcome of interest (access).
Atting IA, Egwu IN. Indicators of accessibility to primary health care coverage in rural Odukpani, Nigeria. <i>Asia Pac J Public Health</i> 1991;5(3):211-6.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Awad L, Traboulsi O, Abu-habib L. Climb every mountain. <i>Links (Oxford)</i> 1998 Mar;1-2.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Azeredo CM, Cotta RM, Schott M, Maia TM, Marques ES. [Assessment of sanitation and housing conditions: the importance of home visits in the Family Health Program context]. <i>Cien Saude Colet</i> 2007 May;12(3):743-53.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Baechler R, Ortiz M. [Primary health care: the cost of delivery of health care at a rural outpatient clinic]. <i>Rev Med Chil</i> 1988 Nov;116(11):1207-11.	This study was only available in Spanish
Balaban DJ, Goldfarb NI, Perkel RL, Carlson BL. Follow-up study of an urban family medicine home visit program. <i>J Fam Pract</i> 1988 Mar;26(3):307-12.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Balasubramanian H, Banerjee R, Denton B, Naessens J, Stahl J. Improving clinical access and continuity through physician panel redesign. <i>J Gen Intern Med</i> . 2010 Oct;25(10):1109-15.	The study did not assess the impacts of provider characteristics on the outcome of interest (access).
Barnsley J, Williams AP, Kaczorowski J, Vayda E, Vingilis E, Campbell A, Atkin K. Who provides walk-in services? Survey of primary care practice in Ontario. <i>Can Fam Physician</i> . 2002 Mar;48:519-26.	The study did not assess the impacts of provider characteristics on the outcome of interest (access).
Barzgar MA, Sheikh MR, Bile MK. Female health workers boost primary care. <i>World Health Forum</i> 1997;18(2):202-10.	This was an article not a research study
Bastos GA, Duca GF, Hallal PC, Santos IS. Utilization of medical services in the public health system in the Southern Brazil. <i>Rev Saude Publica</i> . 2011 Jun;45(3):475-54. Epub 2011 Apr 20. English, Portuguese.	The study did not assess the impacts of provider characteristics on the outcome of interest (access).
Bayerl B, Mielck A. [Egalitarian and individualistic perceptions of fairness in health care provision: results from a survey of patients and students]. <i>Gesundheitswesen</i> . 2006 Dec;68(12):739-46. German.	This article was only available in German
Bayne CG. A mobile emergency room: a new option in comprehensive home care. <i>Caring</i> 1988 Jul;7(7):24-7.	This was an article not a research study
Beck RA, Arizmendi A, Purnell C, Fultz BA, Callahan CM. House calls for seniors: building and sustaining a model of care for homebound seniors. <i>J Am Geriatr Soc</i> 2009 Jun;57(6):1103-9.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Belos G, Lionis C, Fioretos M, Vlachonicolis J, Philalithis A. Clinical undergraduate training and assessment in primary health care: experiences gained from Crete, Greece. <i>BMC Med Educ</i> 2005;5(1):13.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Bergsten C. A house call for rural America. <i>HMO</i> 1995 Jul;36(4):33-8.	The study did not assess the impacts of provider characteristics on the outcome of interest (Home Visits).

Table 1

Berkowitz GS, Fiarman GS, Mojica MA, Bauman J, de Regt RH. Effect of physician characteristics on the cesarean birth rate. <i>Am J Obstet Gynecol.</i> 1989 Jul;161(1):146-9.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Berman S, Armon C, Todd J. Impact of a decline in Colorado Medicaid managed care enrollment on access and quality of preventive primary care services. <i>Pediatrics.</i> 2005 Dec;116(6):1474-9.	The study did not assess the impacts of provider characteristics on the outcome of interest (access).
Bertera RL, Green LW. Cost-effectiveness evaluation of a home visiting triage program for family planning in Turkey. <i>Am J Public Health</i> 1979 Sep;69(9):950-3.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Bhardwaj N, Yunus M, Hasan SB, Zaheer M. Role of traditional birth attendants in maternal care services -- a rural study. <i>Indian J Matern Child Health.</i> 1990 Jan-Mar;1(1):29-30.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Birnbaum ML. Another way. <i>Prehosp Disaster Med.</i> 2010 Nov-Dec;25(6):485-6.	This was an article not a research study
Bissonnette L, Wilson K, Bell S, Shah TI. Neighbourhoods and potential access to health care: the role of spatial and aspatial factors. <i>Health Place.</i> 2012 Jul;18(4):841-53.	The study did not assess the impacts of provider characteristics on the outcome of interest (access).
Blewett LA, Casey M, Call KT. Improving access to primary care for a growing Latino population: the role of safety net providers in the rural Midwest. <i>J Rural Health.</i> 2004 summer;20(3):237-45.	The study did not assess the impacts of provider characteristics on the outcome of interest (access).
Blumenstock G, Balke K, Gibis B, Stillfried D, Walter A, Selbmann HK. [Statutory ambulatory medical care through the eyes of the health insurance beneficiaries-- methods and results of the 2006 NASHIP Health Insurance Beneficiary survey: care utilisation, primary care, and emergency medical services]. <i>Gesundheitswesen</i> 2009 Feb;71(2):94-101.	This study was only available in German.
Bonorden S, Roewer N, Gluck S, Mohr CP. [Indications for house calls. Experiences of the organized emergency service of a structured rural district]. <i>MMW Munch Med Wochenschr</i> 1983 Jun 17;125(24):529-30.	This study was only available in German
Bop C. [Social mobilization]. <i>Vie Sante</i> 1990 Apr;(3):32-3.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Bousquat A, Alves MC, Elias PE. Utilization of the Family Health Program in metropolitan regions: a methodological approach. <i>Rev Saude Publica</i> 2008 Oct;42(5):903-6.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Brazier E, Andrzejewski C, Perkins ME, Themmen EM, Knight RJ, Bassane B. Improving poor women's access to maternity care: Findings from a primary care intervention in Burkina Faso. <i>Soc Sci Med.</i> 2009 Sep;69(5):682-90.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Brieger WR. Developing service-based teaching in health education for medical students. <i>Health Educ Monogr</i> 1978;6(4):345-58.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Broomberg J, Rees H. What does primary health care cost and can we afford to find out? Rationale and methodology for a cost analysis of the Diepkloof Community Health Centre, Soweto. <i>S Afr Med J</i> 1993 Apr;83(4):275-82.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Brown MS, Burns CE, Hellings PJ. Health care in China. <i>Nurse Pract</i> 1984 May;9(5):39, 42-4, 46.	This was an article not a research study
Buckle D. Obstetrical practice after a family medicine residency. <i>Can Fam Physician.</i> 1994 Feb;40:261-8.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Buehler JW, McCarthy BJ, Holloway JT, Sikes RK. Infant mortality in a rural health district in Georgia, 1974 to 1981. <i>South Med J.</i> 1986 Apr;79(4):444-50.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Buhler L, Glick N, Sheps SB. Prenatal care: a comparative evaluation of nurse-midwives and family physicians. <i>CMAJ.</i> 1988 Sep 1;139(5):397-403. Erratum in: <i>Can Med Assoc J</i> 1988 Nov 15;139(10):930-1.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Bulut A, Uzel N, Kutluay T, Neyzi O. Experiences of a health team working in a new urban settlement area in Istanbul. <i>J Community Health</i> 1991 Oct;16(5):251-8.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Cabezas Cruz E. [Profile of health care in Latin America: perinatal services in Cuba]. <i>Rev Latinoam Perinatol.</i> 1990;10(2):57-63. Spanish.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Caprio TV, Karuza J, Katz PR. Profile of physicians in the nursing home: time perception and barriers to optimal medical practice. <i>J Am Med Dir Assoc</i> 2009 Feb;10(2):93-7.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).

Table 1

Carpenter I, Gambassi G, Topinkova E, Schroll M, Finne-Soveri H, Henrard JC, et al. Community care in Europe. The Aged in Home Care project (AdHOC). <i>Aging Clin Exp Res</i> 2004 Aug;16(4):259-69.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Carrin G, Ron A, Hui Y, Hong W, Tuohong Z, Licheng Z, Shuo Z, Yide Y, Jiaying C, Qicheng J, Zhaoyang Z, Jun Y, Xuesheng L. The reform of the rural cooperative medical system in the People's Republic of China: interim experience in 14 pilot counties. <i>Soc Sci Med</i> . 1999 Apr;48(7):961-72.	The study did not assess the impacts of provider characteristics on the outcome of interest (access).
Chang HT, Lai HY, Hwang IH, Ho MM, Hwang SJ. Home healthcare services in Taiwan: a nationwide study among the older population. <i>BMC Health Serv Res</i> 2010;10:274.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Chapleski EE, Dwyer JW. The effects of on- and off-reservation residence on in-home service use among Great Lakes American Indians. <i>J Rural Health</i> 1995;11(3):204-16.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Chaulagai CN. Urban community health volunteers. <i>World Health Forum</i> 1993;14(1):16-9.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Chela CM, Siankanga ZC. Home and community care: the Zambia experience. <i>AIDS</i> 1991;5 Suppl 1:S157-S161.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Cherry DK, Burt CW, Woodwell DA. National Ambulatory Medical Care Survey: 2001 summary. <i>Adv Data</i> 2003 Aug 11;(337):1-44.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Christopher E. Welcome visitors. <i>Entre Nous Cph Den</i> 1992 May;(20):13.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Clarfield AM, Bergman H. Medical home care services for the housebound elderly. <i>CMAJ</i> 1991 Jan 1;144(1):40-5.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Clark SL, Xu W, Porter TF, Love D. Institutional influences on the primary cesarean section rate in Utah, 1992 to 1995. <i>Am J Obstet Gynecol</i> . 1998 Oct;179(4):841-5.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Cohen D, Guirguis-Blake J, Jack B, Chetty VK, Green LA, Fryer GE, Phillips RL. Family physicians make a substantial contribution to maternity care: the case of the state of Maine. <i>Am Fam Physician</i> . 2003 Aug 1;68(3):405.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Comino EJ, Zwar NA, Hermiz O. The Macarthur GP After-hours Service: a model of after-hours care for Australia. <i>Aust Health Rev</i> 2007 May;31(2):223-30.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Cook A, Grady A, Milton L. Experiences implementing a 6-month pilot of a 7-day community CNS service in an urban hospice in Scotland. <i>Int J Palliat Nurs</i> 2012 Aug;18(8):407-12.	The study did not assess the impacts of provider characteristics on the outcome of interest (Home Visits).
Crispin N, Wamae A, Ndirangu M, Wamalwa D, Wangalwa G, Watako P, et al. Effects of selected socio-demographic characteristics of community health workers on performance of home visits during pregnancy: a cross-sectional study in Busia District, Kenya. <i>Glob J Health Sci</i> 2012 Sep;4(5):78-90.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Cunningham RJ. Night calls in a single-handed rural practice. <i>J R Coll Gen Pract</i> 1980 Dec;30(221):745-7.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Da Silva RB, Pineault R. Impact of physician distribution policies on primary care practices in rural Quebec. <i>Can J Rural Med</i> . 2012 Summer;17(3):92-8.	The study did not assess the impacts of provider characteristics on the outcome of interest (access).
da Silva TM, Alvarenga MR, Oliveira MA. Evaluation of the vulnerability of families assisted in primary care in Brazil. <i>Rev Lat Am Enfermagem</i> 2012 Sep;20(5):935-43.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Dathe R, Werner K. [Selected results of a study of family practice patient care]. <i>Offentl Gesundheitswes</i> 1991 Dec;53 Suppl 3:224-9.	This study was only available in German
Dini L, Sarganas G, Boostrom E, Ogawa S, Heintze C, Braun V. German GPs' willingness to expand roles of physician assistants: a regional survey of perceptions and informal practices influencing uptake of health reforms in primary health care. <i>Fam Pract</i> 2012 Aug;29(4):448-54.	The outcome of interest was not the provision of home visits but rather then delegation of home visits to physician assistants.
Dini L, Sarganas G, Heintze C, Braun V. Home visit delegation in primary care: acceptability to general practitioners in the state of Mecklenburg-Western Pomerania, Germany. <i>Dtsch Arztebl Int</i> 2012 Nov;109(46):795-801.	The outcome of interest was not the provision of home visits but rather then delegation of home visits to physician assistants.

Table 1

Djernes JK, Gulmann NC, Foldager L, Olesen F, Munk-Jorgensen P. 13 year follow up of morbidity, mortality and use of health services among elderly depressed patients and general elderly populations. <i>Aust N Z J Psychiatry</i> 2011 Aug;45(8):654-62.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Donaldson LJ, Hill PM. The domiciliary consultation service: time to take stock. <i>BMJ</i> 1991 Feb 23;302(6774):449-51.	The study did not assess the impacts of provider characteristics on the outcome of interest (Home Visits).
Douglas S, Cervin C, Bower KN. What women expect of family physicians as maternity care providers. <i>Can Fam Physician</i> . 2007 May;53(5):875-9, 874.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Drugs for the doctor's bag: 2--children. <i>Drug Ther Bull</i> 2005 Nov;43(11):81-4.	This was an article not a research study
du PE, Koen MP, Bester P. Exploring home visits in a faith community as a service-learning opportunity. <i>Nurse Educ Today</i> 2012 Jul 12.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Duong DV, Binns CW, Lee AH. Utilization of delivery services at the primary health care level in rural Vietnam. <i>Soc Sci Med</i> . 2004 Dec;59(12):2585-95.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Egwu IN. The use of selected interventions in monitoring primary health care implementation in rural Nigeria. <i>Scand J Prim Health Care</i> . 1992 Mar;10(1):30-5.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Eichler K, Imhof D, Chmiel C, Zoller M, Senn O, Rosemann T, et al. The provision of out-of-hours care and associated costs in an urban area of Switzerland: a cost description study. <i>BMC Fam Pract</i> 2010;11:99.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Eitel DR, Yankowitz J, Ely JW. Videotaping obstetric procedures. Assessment of obstetricians and family physicians. <i>Arch Fam Med</i> . 2000 Jan;9(1):89-91.	The study did not assess the impacts of provider characteristics on the outcome of interest (obstetrics).
Ejlertsson G, Jansson AK. The district nurse and the district physician in health care teams. An analysis of the content of primary health care. <i>Scand J Prim Health Care</i> 1987 May;5(2):73-8.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
Ellaway A, Wood S, Macintyre S. Someone to talk to? The role of loneliness as a factor in the frequency of GP consultations. <i>Br J Gen Pract</i> 1999 May;49(442):363-7.	The study did not assess the impacts of provider characteristics on the outcome of interest (home visits).
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Fitzpatrick AL, Powe NR, Cooper LS, Ives DG, Robbins JA. Barriers to health care access among the elderly and who perceives them. <i>Am J Public Health</i> . 2004 Oct;94(10):1788-94.	The study did not assess the impacts of provider characteristics on the outcome of interest (access).
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**Table 1 Home Visits and Selected Provider Characteristics**

Study Authors (Year Published)	Objective	Method	Population	Findings		
				Age	Gender	Rural
1 Peterson et al. (2012)	To determine the number and distribution of home visits by physician specialty over time and assess the impact of physician and area level characteristics	Three independent and representative cross sectional samples of physicians were taken from all data from all Medicare Part B claims for those timeframes.	U.S. physicians in 200, 2003 and 2006	Physicians making home visits were more likely to be older Odds Ratios (OR) 1.03; 95% CI, 1.02-1.04	Physicians making home visits were more likely to be male OR, 1.28 95% CI, 1.00-1.62	Physicians making home visits were more likely to be located in rural areas OR, 2.54 95% CI, 1.75-3.67
2 Liseckiene et al. (2012)	To assess organizational change in Lithuanian Primary Health Care between 1994 and 2010 and highlight the differences with respect to the background of family physicians and the level of urbanization and the type of primary health care centres.	Three cross-sectional comparative questionnaire surveys. Anonymous questionnaires were sent via mail to district physicians.	The initial survey (1994) consisted of 232 paediatricians and 363 internists. These were randomly selected in pre-selected regions of different levels of urbanization, cities, towns and rural areas. For the survey of family physicians in 2004 and 2010 328 family physicians in 2004 and 330 in 2010 were randomly selected according to their distribution in Lithuanian regions of different levels of urbanization and additionally, according to the type of primary health care.			Physicians making home visits were more likely to be located in rural areas Median (minimum-maximum values) - Number of Home Visits per week 1994 - Cities 20(0-70), towns 15(0-65), rural areas 7(0-50) 2004 - Cities 10(0-50), towns 15(0-75), rural areas 15(5-50) 2010 - Cities 4(1-24), towns 4.5(1-15), rural areas 5(2-16)
3 Theile et al. (2011)	To explore German general practitioners attitudes with regard to the feasibility, burden and outlook of home visits in Germany.	Qualitative semi-structured interviews were carried out. Data was analyzed using qualitative content analysis.	24 General Practitioners from the city of Hannover Germany and rural surroundings.	Physicians making home visits were more likely to have been 5 years or less in their occupation, compared to those with 20 or more years.  Median number of home visits per week (IQR) - 20 Years or more of occupation 5.0 (2.0-15.0) - 5 years or less in occupation 10.0(6.5-25.5)	Physicians making home visits were more likely to be male.  Median number of home visits per week (IQR) - Female GPs 3.0 (1.5-15.5) - Male GPs 7.5 (5.0-20.0)	Physicians making home visits were more likely to be located in rural areas.  Median number of home visits per week (IQR) - Rural area 7.5(3.0-15.5) - Urban area 5.5 (2.0-20.0)

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
4	Ingram et al. (2009)	To compare rates of referrals to the hospital for doctors working out of hours (OOH) before and after a new medical services contract was introduced in Bristol in 2005; to explore the attitudes of GPs to referral to hospital OOH; and to develop an understanding of the factors that influence GPs when they refer patients to the hospital.	Referral rates for OOH providers were extracted from the OOH database and questionnaires explored their attitudes to risk.	496 GPs who were attached to three OOH providers in Bristol, England.		Physicians making home visits were more likely to be male.  % of visits in home vs. primary care centre Female – 16% , Males- 21%	
5	Burge et al. (2005)	To examine the association between patient income and residence and the receipt of home visits during end of life among patients with cancer.	Data was extracted from the administrative health data base from Nova Scotia and from Statistics Canada census records.	All patients who had died of lung, colorectal, breast or prostate cancer death from 1992-1997.			Physicians making home visits were more likely to be located in rural areas.  Patients residing outside of the metropolitan area tend to receive fewer home visits in general (mean 1.75, SD 4.1; median 0, range 0-89) than those living within the metropolitan region (mean 2.53, SD 4.4; median 1, range 0-56) (P<0.00001)
6	Svab et al. (2003)	To examine the factors influencing home visiting by General Practitioners in Slovenia.	A questionnaire given to general practitioners gathered data on 10 consecutive home visits made during office hours, data on his/her practice and number of consultations during the registration period. Multivariate modeling of home visits per working week as the dependant variable was performed.	A random sample of 165 Slovenian General Practitioners.	Physicians making home visits were more likely to be older		Physicians making home visits were more likely to be located in a rural area. Location of practice: 0=Rural and Semi-rural; 1=Urban OR 0.329 B-1.110 p 0.043
7	Carek (2003)	To examine physician	A questionnaire was	All family physician		Physicians making home visits were	

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
	practice characteristics according to sex.	designed and mailed to participants. Descriptive statistics were used to characterize and summarize the data. Inferential techniques included the Fisher's exact test and Student's t test.	graduates of South Carolina training programs since 1971 a total of 714 (53%) were returned and analyzed.		more likely to be male. 49.0% versus 33.8%; P=0.001		
8	Chan (2002)	To assess the declining comprehensiveness of primary care among different physician types.	Billing claim records were used to determine proportions of physicians who provided emergency, inpatient, nursing home, home visit, anesthesia or obstetrical services. The relationship between physician characteristics and comprehensiveness of care was tested with multivariate analysis.	All general practitioners in Ontario from 1989/90-1999/00 except those with very low fee for service billings.	Physicians making home visits were more likely to be older and less likely to be recent graduates. Recent graduate OR 0.46 (0.40-0.53) Age ≥ 65 yr OR 1.01 (0.85-1.19)	Physicians making home visits were more likely to be male. OR 0.43 (0.39- 0.48)	Physicians making home visits were more likely to be located in a rural area. OR 1.97 (1.69-2.31)
9	Kersnik (2000)	To evaluate a number of patient and provider characteristics in general practice patients visited at home at least once in a study year.	A cross sectional survey was performed using a self-administered questionnaire.	2160 patients from a representative sample of Slovene general practitioners (15 male and 21 female).	Physicians making home visits were slightly older and had been practicing for longer. Age Visited – 42.7 years Not Visited – 42.3 years (not significant) Years in practice Visited -13.0 Not Visited- 11.9 (P= 0.001)	Physicians making home visits were more likely to be male. OR 1.58 (1.21-2.07) P<0.001	Physicians making home visits were more likely to be located in rural areas. OR .43 (.32-.57) P<0.001 Distance to nearest specialist Visited -10.9km Not Visited -9.4km P= 0.06 (NS)
10	Boerma et al. (2000)	To describes differences between male and female general practitioners from 32 European countries as it relates to the provision of curative and preventative services.	A multivariate analysis was performed on data collected from the European Study of Task Profiles of General Practitioners	8,183 general practitioners in 32 European countries		Physicians making home visits were more likely to be male. Male GPs 15.2% (P<0.001) Female GPs 12.7% (P<0.001)	

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
11	Bergeron et al. (1999)	To identify the major factors influencing physicians' home care practices in the Quebec City area.	A self-administered questionnaire was sent by mail to all general practitioners working in Quebec City, Quebec. The questionnaire was designed to gather information on personal and professional characteristics of physicians as well as characteristics of their home care practices. Univariate and bivariate analyses were conducted on information gathered.	696 general practitioners working in Quebec city. A questionnaire was sent to all 686 with a total of 487 respondents (70%).		Male practitioners made more home visits than their female counterparts (mean 12.8 v. 8.3 per week), although they spend an almost equal amount of time on the activity (mean 5.7 v 5.2 hours per week ; p =0.10) Physicians making home visits were more likely to be male. Female 79/177 44.6% Male 204/310 65.8%	
12	Ingram et al. (1999)	To describe physician's attitudes about home visits and their practice of making them.	A 30 item, self-administered questionnaire was mailed to participants.	617 of 936 practicing family physicians from Colorado, U.S.A during the summer of 1997.	Physicians making home visits were more likely to be older. % of physicians making home visits Age <40 – 43.8% ≥40 – 57.4% P<0.001	Physicians making home visits were more likely to be male % of physicians making home visits Gender Women – 40.6% Men – 57.5% P<0.008	Physicians making home visits were more likely to be located in rural areas. % of physicians making home visits Size of Community <10,000 – 79.3% 10,000-100,000 – 58.0% >100,000 – 44.0% P<0.000
13	Bass et al. (1998)	To identify trends in family practice in London, Ontario between 1974 and 1994	Interview study of participants in 1974. Questionnaire surveys in 1984 and 1994. Categorical responses were displayed in percentage frequencies. Statistical tests to assess the statistical significance of the differences were completed and trends were analyzed to determine if they followed a linear trend.	In 1994, 237 family physicians were surveyed, in 1984, 180 were surveyed and in 1974, 128 were interviewed.		Physicians making home visits were more likely to be male. (P<0.001)	

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
14	Chan et al. (1998)	To analyze the practice patterns of Ontario physicians aged 65 and older.	A cross sectional and longitudinal analysis of physician claims data was conducted.	All general practitioners in Ontario from 1989/90 to 1995/96 classified by age, rural/urban status, and specialty.	Among GP/FPs, older physicians were less likely than those under age 65 to perform home visits (38.7% v. 60.4%)		
15	Meyer et al. (1997)	To analyze the characteristics of physicians who performed home visits to elderly U.S. patients in 1993.	Medicare Part B claims data was analyzed with supplemental information from the Area Resource File and the American Medical Association's Physician Master file. Distributions were assessed as well as logistic regression to identify independent predictors of practice characteristics.	A random sample of Medicare Part B claims for beneficiaries over 65 years of age.	Physicians making home visits were less likely to be under the age of 40. (OR .59; CI, 0.50 to 0.70)	Physicians making home visits were more likely to be male. (OR, 2.0; CI, 1.7 to 2.5)	Physicians making home visits were more likely to be located in a rural area. (OR, 1.2; 95%CI, 1.1 to 1.3)
16	Schwartzberg et al. (1997)	To evaluate the effectiveness of continuing medical education seminars in changing physician attitudes and practice approaches to the provision of home visits.	Questionnaires were administered to the experimental group before the start of the seminar, immediately following the seminar and 3 months later. The control group completed baseline and follow up questionnaires but did not attend the seminars.	355 primary care physicians who attended Continuing Medical Education seminars. Control subjects were a proportionate sample of 249 primary care physicians randomly selected from the American Medical Association Masterfile matched for age, sex, location of training and		Physicians making home visits were more likely to be male (P<.001)	
17	Britt et al. (1996)	To examine the difference between female and male general practitioners in practice style.	A secondary analysis of data from the Australian Morbidity and Treatment Survey 1990-1991. Univariate analysis was performed, followed by multivariate analysis.	A random sample of 495 Australian general practitioners		Physicians making home visits were more likely to be male 4.8% of encounters versus 3.6 % (P<0.0001)	
18	Groenewegen et al.	To assess a number of	Data was collected as part	168 Dutch general	There was no difference in the rate of	Physicians making home visits were	

Tables 2-4

Study Authors (Year Published)		Objective	Method	Population	Findings		
					Age	Gender	Rural
	(1995)	variables on the workload of Dutch general practitioners.	of the Dutch National Survey of Morbidity and Interventions in General Practice. Two step multiple regression analysis was performed to identify the relative influence of supply and demand related variable.	practitioners including all 161 GPs in the Netherlands as well as 7 permanent locum physicians.	home visits provided by general practitioners with <6 years of practice and >6 years in practice. Home Visit Rate <6 yrs 0.14 >6 yrs 0.14	more likely to be male Home Visit Rate Male 0.15 (P<0.05) Female 0.11	
19	Norton et al. (1994)	To analyze the relationships between physician demographics and changes in practice patterns.	Analyses of variance, an analysis of covariance were employed for multivariate analysis on data from the College of Physicians and Surgeons of Ontario (CPSO) Peer Assessment Program.	The study population consisted of 456 Ontario general practise physicians aged 69 or younger, that have an office practice, and that had been in practice for more then 5 years.		Physicians making home visits were more likely to be male. Average home visits per week = 72.3 versus 40.2 (p<0.001)	
20	Keenan et al. (1992)	To present descriptive data on the current home visiting practice and related attitudes of physicians.	Data was gathered through telephone surveys	A nationally representative, randomly selected sample of 2200 family physicians and internal medicine physicians across the united states.	The mean age and standard deviation of physicians who provided home visits was 44.3(10.8) versus 43.8(11.6) who do not make home visits. Age was not a significant predictor of whether a physician made home visits or not when all variables were considered.	80% of physicians who did not make home visits were male in comparison to 90% of physicians who did make home visits. Gender was not a significant predictor of whether a physician make home vists or not when all variables were considered.	Physicians making home visits are more likely to be located in rural areas. Makes Home visits % of rural = 49 Does not make home visits % of rural = 33 OR 0.49 (0.29, 0.82)
21	Boling et al. (1991)	To evaluate factors associated with the frequency of home visits by primary care physicians.	Data was gathered through a mailed survey. Univariate analysis using two tailed t-test for continuous variables, the Mann- Whitney U test for ranked. non-parametric	751 primary care physicians from Virginia who cared for Medicaid patients. This sample was drawn randomly from Medicaid active provider file.	There was no significant different between the age of physicians making home visits. Regular home visits Mean age 46yrs SD 12 yrs Occasional home visits Mean age 44yrs SD 11vrs	There was no significant different between the gender of physicians making home visits. Sex-Female Regular home visits 11% Occasional home visits 18%	There was no significant different between physicians making home visits in rural locations. Small town location Regular home visits 44% Occasional home visits 38%

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
			variables. Furthermore a logistic regression was performed to assess the effects of multiple independent variables on dependant variables.				
22	Cohen et al. (1991)	To examine the extent to which gender influences physician practice patterns.	Ontario Hospital Insurance Plan billing data was analyzed.	All general practitioner and family medicine graduates of McMaster University School of Medicine.		Physicians providing home visits are more likely to be male.	
23	Keane et al. (1991)	To determine whether or not male and female physicians have different ways of practicing medicine.	Both a descriptive and statistical analysis was performed on data from the Ontario Health Insurance Plan system.	All McMaster University graduates (212 women and 432 men) and matched pairs from the other four medical schools in Ontario.		Physicians making home visits were more likely to be male. 88.2% of all visits versus 76.9% (p=0.003)	
24	Keenan et al. (1991)	To assess home care practice and attitudes of Minnesota family physicians.	A stepwise discriminant function analysis was performed on data gathered from a mailed survey.	80% of practicing family physicians in the state of Minnesota.	Older physicians were more likely to provide home visits .460 r2 53.30 f p <0.001		Physicians making home visits were more likely to be located in rural areas. .414 r2 66.63 f P<0.001
25	Hooper (1989)	To compare the workload of male and female physician.	Data from a mailed was analyzed.	146 full time general practitioners from the Northern and Oxford region of England.		No significant difference between the provision of home visits between male and female physicians.	

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
26	Fearn et al. (1988)	To compare the characteristics of town and country general practice in Norfolk, England.	Data from a mailed survey was compared with a previous national survey of general practitioners and national data from the department of Health and Social Security, The results were analysed using the chi-square test.	All 395 principles on the Norfolk family practitioner committee list, a questionnaire was sent to all 395 (final response rate of 85%).			Physicians making home visits were neither more nor less likely to be located in rural areas. Percentage pf GPs Home Consultations Up to 10% of all Rural- 54 Urban- 56 10% to 20% of all Rural- 36 Urban - 33
27	Maheux et al. (1988)	To determine whether there was any difference in male and female general practitioner professional activities.	Data from a mailed survey was analyzed; statistical tests included chi squared tests for categorical variables and t-tests for continuous variables. Log linear models and analysis of variance were used when controlling for age.	616 general practitioners from Quebec, Canada. Identified through a random stratified sample was taken from the Federation of General Practitioners of Quebec.			Physicians making home visits were more likely to be male. % of physicians providing care at a patient's home Fee for Service- 64% versus 37% (P≤0.01) Salary - 53% versus 34% (P≤0.01)
28	Schueler et al. (1987)	To learn the criteria	Data from a mailed survey	A random sample of 50%	Physicians making home visits were more		Physicians making home visits were more likely to
29	Cate (1980)	To investigate the ways	Data was gathered from	36 physicians practicing in	There was no significant difference		Physicians making home visits were more likely to

Table 2 Obstetrics and Selected Provider Characteristics

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
30	Chan (2002)	To assess the declining comprehensiveness of primary care among different physician types.	Billing claim records were used to determine proportions of physicians who provided emergency, inpatient, nursing home, home visits, anesthesia or obstetrical services. The relationship between physician characteristics and comprehensiveness of care was tested with multivariate analysis.	All general practitioners in Ontario from 1989/90-1999/00 except those with very low fee for service billings.	Physicians providing obstetrical services are more likely to be less then 65 years of age and not recent graduates. Recent graduate OR 0.72 (0.60-0.88) Age ≥ 65 yr OR 0.42 (0.29-0.62)	Physicians providing obstetrical services are more likely to be female. Female OR 1.39 (1.21-1.61)	Physicians providing obstetrical services are more likely to be located in rural areas. Rural OR 2.32 (1.95-2.77)

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
31	Reid et al. (2002)	This is a follow up survey to the Reid et al (2000). Three years after the initial study to observe any changes in service provision by general practitioners.	A mailed survey was sent to all participants as well as two follow-up mailings to non-responders.	All general practitioners in Canada in 2001 with an overall response rate of 51.2%.	Physicians that provided intra-partum care were more likely to be younger. In comparison with the 1997 study the group under 35 was slightly higher. Age <30 23% of physicians in 1997 versus 25% in 2001 30-34 23% of physicians in 1997versus 26% in 2001 35-39 20% of physicians in 1997versus 21% in 2001 40-54 20% of physicians in 1997 versus 19% in 2001 55-64 14% of physicians in 1997 versus 12% in 2001 65+ 8% of physicians in 1997 versus 5% in 2001	Physicians that provided intra-partum care were more likely to be female. In the 2001 study it was found that younger female physicians more frequently attended births then younger men. <30 26% of female physicians versus 23% of male physicians 30-34 28% of female physicians versus 23%of male physicians 35-39 22% of female physicians versus 21% of male physicians 40-54 18% of female physicians versus 20% of male physicians 55-64 10% of female physicians versus 13% of male physicians 65+ 3% of female physicians versus 5% of male physicians	
32	Reid et al. (2000)	To describe the contribution of family physicians to maternity care in Canada as well as the factors that influence the provision of maternity care such as age, sex, region and practice population.	An anonymous questionnaire was sent to all participants. Three follow up mailings were done for non-responders. Statistical analysis was performed using a number of non-parametric tests.	All general practitioners/family physicians in Canada. A random sample was taken from all 10 provinces and two territories in Canada, in 1997, with an overall response rate of 58.4%.	Physicians under the age of 35 had the highest percentage of providing intrapartum care, and that percentage decreased with age. ≤34 Proportion 23.2%- Mean number of deliveries 38.2 35- 44- Proportion 20.9%- Mean number of deliveries 46.7 45-54 Proportion 19.1%- Mean number of deliveries 30.9 55-64- Proportion 13.5%- Mean number of deliveries 37.2 65+ - Proportion 7.9%- Mean number of deliveries 17.0	Physicians providing obstetrical services are more likely to be female. Some maternity- Male 49.5% Female 58.6% (P value <.000) Prenatal Only- Male 31.0% Female 38.1% (P value <.000) Intrapartum- Male 18.5% Female 20.5% (NS) Postpartum- Male 32.4% Female 42.4% (P value <.000)	More rural physicians perform intrapartum care but rural GPs that do, perform more deliveries, on average. Inner city – Proportion 13.2%- Mean number of deliveries 41.6 Urban– Proportion 13.5%- Mean number of deliveries 46.6 Suburban– Proportion 17.5%- Mean number of deliveries 44.5 Small Town– Proportion 29.6%- Mean number of deliveries 37.7 Rural– Proportion 25.6%- Mean number of deliveries 28.1 Remote/Isolated– Proportion 43.3%- Mean number of deliveries 27.0
33	Bass et al. (1998)	To identify trends in family practice in London, Ontario between 1974 and 1994	Interview study of participants in 1974. Questionnaire surveys in 1984 and 1994. Categorical responses were displayed in percentage frequencies. Statistical tests to assess the statistical significance of the differences were completed and trends were analyzed to determine if they followed a linear trend.	In 1994, 237 family physicians were surveyed, in 1984, 180 were surveyed and in 1974, 128 were interviewed.		There was no significant difference in obstetric practice between men and women.	

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
34	Chan et al. (1998)	To analyze the practice patterns of Ontario physicians aged 65 and older.	A cross sectional and longitudinal analysis of physician claims data was conducted.	All general practitioners in Ontario from 1989/90 to 1995/96 classified by age, rural/urban status, and specialty.	Among GP/FPs, older physicians were less likely than those under age 65 to perform obstetric deliveries 4.6% v. 16.9% (P<0.001)		
35	Woodward et al. (1997)	To examine whether male and female physicians provided maternity care the same, particularly regarding a specific maternal serum screening program.	A mailed survey was sent to participants between 1994 and 1995.	A random sample of 2000 members of the College of Family Physicians of Canada, with more than 90% response rate.		Female physicians (39.0%) were less likely to attend births than male physicians (47.3%). However female physicians reporting caring for more pregnant women (38.1) than male physicians (27.6) *Not significant Furthermore among physicians who do provide obstetrical care, female physicians delivered significantly more babies (48.8) than their male colleagues (32.8) (P=0.001)	
36	Rosenfeld et al. (1996)	To examine the practice patterns of male and female Appalachian family residency graduate.	A mailed survey was sent to participants as well as a reminder card, a second mailing and finally an attempt to contact non responders by phone. This concluded with 54% response rate.	640 graduates from residencies that were part of the Southern Highlands Appalachian Research Project (SHARP) from five states (Kentucky, Tennessee, North Carolina, Virginia, and West Virginia).		Physicians providing prenatal care, vaginal deliveries and assists at caesarean sections were more likely to be female. Prenatal Care- Female 28%, Male 15% (P<0.01) Vaginal Deliveries- Female 20%, Male 10% (P<0.05) Assist at caesarean section- Female 15%, Male 7% (P<0.05)	
37	Barclay et al. (1996)	To examine the provision of labour and delivery services by Graduates of four Kansas Family Practice Residencies to determine how services vary according to specific practice variables.	A questionnaire was mailed in 1992 to all University of Kansas School of Medicine- Wichita graduates with a 72% response rate. Statistical significance was calculated using chi squared and t-test analyses.	370 University of Kansas School of Medicine- Wichita graduates.			Physicians that deliver babies are more likely to be located in rural areas. Community Size and % of physicians who deliver babies <5,000 (78%) 5,000-10,000 (77%) 10,000-25,000 (67%) 25,000-100,000 (64%) >100,000 (31%)

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
38	Norton et al. (1994)	To analyze the relationships between physician demographics and changes in practice patterns.	Analyses of variance, an analysis of covariance were employed for multivariate analysis on data from the College of Physicians and Surgeons of Ontario (CPSO) Peer Assessment Program.	The study population consisted of 456 Ontario general practise physicians aged 69 or younger, that have an office practice, and that had been in practice for more then 5 years.		Physicians providing obstetrical care were more likely to be male but this finding was not statistically significant. Average obstetrical visits per week= 30.1 versus 22.8 (P=0.17)	
39	Cohen et al. (1991)	To examine the extent to which gender influences physician practice patterns.	Ontario Hospital Insurance Plan billing data was analyzed.	All general practitioner and family medicine graduates of McMaster University School of Medicine.		Physicians providing intra-partum services are more likely to be male.	
40	Keane et al. (1991)	To determine whether or not male and female physicians have different ways of practicing medicine.	Both a descriptive and statistical analysis was performed on data from the Ontario Health Insurance Plan system.	All McMaster University graduates (212 women and 432 men) and matched pairs from the other four medical schools in Ontario.		Physicians providing obstetrical care were more likely to be men while physicians providing prenatal care were more likely to be women. Obstetrical 45.3% of female physicians versus 60.0% of male physicians (p=0.044) Prenatal 81.6% of female physicians versus 78.9% of male physicians (p= 0.019)	
41	Hooper (1989)	To compare the workload of male and female physician.	Data from a mailed was analyzed.	146 full time general practitioners from the Northern and Oxford region of England.		Female physicians were more likely to provide specialized clinics including antenatal care. Female- 73% Male- 52%	
42	Fearn et al. (1988)	To compare the characteristics of town and country general practice in Norfolk, England.	Data from a mailed survey was compared with a previous national survey of general practitioners and national data from the department of Health and Social Security, The results were analysed using the chi-square test.	All 395 principles on the Norfolk family practitioner committee list, a questionnaire was sent to all 395 (final response rate of 85%).			Physicians that deliver babies are more likely to be located in urban areas. Percentage of GPs Antenatal Clinics Rural – 75% Urban- 90%

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
43	Bain et al. (1987)	To investigate family/general practitioners obstetrical practice patterns and attitudes towards it.	A survey was mailed to participants as well as follow up mailings, with a total response rate of 74%.	The study population consisted of 1802 randomly selected GP/FP of the 8000 in the province of Ontario.	Physicians who deliver babies are more likely to be older. % Of physicians never performing obstetrics Born before 1946- 22%, Born between 1946 and 1954- 36%, Born after 1954- 49% % of physicians who used to practice obstetrics but have now stopped Born before 1946- 40%, born between 1946 and 1954- 22%, All respondents born after 1954- 6%	Of all physicians born before 1946 or between 1946 and 1954, significantly more female physicians never practiced obstetrics. There was no significant difference between those born after 1954. % Of physicians never performing obstetrics Born before 1946 male 17% vs female 49% (p<.001), Born between 1946 and 1954 male 31% vs female 50% (P<.01), Born after 1954 male 46% vs female 56% (not significant)	Physicians who deliver babies are more likely to be located in rural areas. % Of physicians never performing obstetrics, Less than 10,000- 13%, 10,001-50,000- 16% , 50,001-100,000- 11% 100,001-500,000- 33% 500,001 or more- 24%
44	Hojat et al. (1987)	To compare male and female physicians practice patters, professional activities and perception of professional problems	A mailed questionnaire was sent to participants and multivariate analysis of variance techniques were employed to assess relationships between the dependant and independent variables.	450 physicians who graduated from one medical school in the United States, between 1977 and 1981 (364 men and 86 women).		Female physicians were more likely to practice obstetrics gynecology- 4% of men versus 12% of women (P<0.05)	

**Table 3 Access and Selected Provider Characteristics**

Study Authors (Year Published)	Objective	Method	Population	Findings		
				Age	Gender	Rural

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
45	MacKinney et al. (2011)	To assess U.S. primary care physician and general surgeon willingness to accept Medicare patients as well as identify reasons for not accepting Medicare patients.	An analysis was performed on responses to the Center for Studying Health System Change 2008 Health Tracking Physician Survey (HTPS).	The survey included information from more than 4,700 physicians and was conducted by mail. 1,937 responses from the specialties of family medicine, general practice, general internal medicine, obstetrics/gynecology, and geriatric medicine were selected. Also included was general surgery due to the specialty's importance to rural communities. General pediatrics was excluded because very few Medicare beneficiaries are less than 19 years old. <sup>3</sup>			Urban physicians were more likely than rural physicians to accept no new Medicare patients (11% for urban versus 8% for rural, p<0.01). Rural physicians were more likely than urban physicians to accept all new Medicare patients (65% for rural versus 52% for urban, p<0.01)
46	DeVoe et al. (2009)	To determine whether rural residence is independently associated with access to health care services for children.	A mail return survey with a return rate of 31%. Multivariable logistic regression models were used to assess relationships between independent variables.	Low income families in Oregon. A mail-return survey of 10,175 families randomly selected from Oregon's food stamp population (46% rural and 54% urban)			Compared with urban children rural children were more likely to have unmet medical needs (OR 1.48, 95% CI 1.07-2.04). After adjusting for special health care needs, there was no rural urban difference in unmet medical needs.  There was no difference between urban and rural children in regards to having a usual source of care.

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
47	Wensing et al. (2008)	To examine whether or not characteristics of general practice organizations had an impact on patient evaluations of accessibility.	Data from the European Practice Assessment study, an observational study originally done in 2004.	Patients of general practices from 10 countries in 2004. A total of 284 general practices were selected from 10 countries with a total of 30 patient surveys per practice.	Practices with a higher average age of physicians received more positive evaluations of most items in Wales and one item in the Netherlands. On the other hand practices with older doctors received less positive evaluations of preparation for hospital care in Belgium. Getting an appointment to suit you b= 0.092(WA) Getting through the practice on the phone b= 0.042(NE) Being able to speak to the GP on the phone b= 0.075(WA) Waiting time in the waiting room b= 0.062 (WA) Providing quick service for urgent needs b= 0.047 (WA) Preparing you for hospital care b= -0.011(BE) When aggregate measures were analyzed (not separating out responses by country) there was no relationship between age and patient evaluations.	Practices with a higher percentage of female physicians received less positive evaluations of a number of items in Wales, England, Israel and Switzerland. Getting an appointment to suit you b= -2.495 (WA) -0.461 (IS) Getting through the practice on the phone b=-0.411(SW) -2.072(WA) Being able to speak to the GP on the phone b= -2.784(WA) - 0.602(IS) Waiting time in the waiting room b=-0.843 (EN) -2.223(WA) Providing quick service for urgent needs b= -1.450(WA) When aggregate measures were analyzed (not separating out responses by country) the relationship between physician gender and patient evaluations was almost significant - 0.098 (P=0.07)	Practices in towns and cities received less positive evaluations of a number of items in Israel and one item The Netherlands, compared to practices in villages. But practices in towns and cities received more positive evaluations of preparation for hospital care in The Netherlands, Germany and Slovenia. Getting an appointment to suit you b=-0.543(IS) Getting through the practice on the phone b= -0.351(NE) -0.560(IS) Being able to speak to the GP on the phone b= -0.589(IS) Waiting time in the waiting room b= -0.592 (IS) Providing quick service for urgent needs b= -0.679(IS) Preparing you for hospital care b= 0.226(NE) 0.158(GE) 0.222 (SL) When aggregate measures were analyzed (not separating out responses by country) there was no relationship between level of urbanization and patient evaluations.
48	Litaker et al. (2005)	To assess the association between contextual characteristics and an individual's report of having a usual source of care.	The study utilized data from the Ohio Family Health Survey (1998) a cross sectional study, linked with country-level data from the 1998 Area Resource File and the 1990 US Census. Bi and multivariate techniques were used to examine the association between the variables.	Weighted samples of adult residents of Ohio, U.S. Approximately 60 households were samples each from rural and suburban counties as well as 400 households from urban counties. In total there were 16,261 adults between the ages of 18 and 98 years old.		Patients in less urbanized counties were less likely to have no usual source of care. Rural urban continuum code *(per unit increase) OR= 0.95 95% CI (0.91-0.99) p-value, 0.05	
49	Mueller et al. (2004)	To describe the trends for family physicians who no longer accept new patients.	Data collected from published studies and the most recent national sample surveys were studied to examine trends over time.			The percentage of physicians accepting new Medicare patients is highest in rural areas not adjacent to urban areas. It was noted these findings were statistically significant. Medicare acceptance has only declined modestly since 2000 and not consistently.	

Tables 2-4

Study Authors (Year Published)	Objective	Method	Population	Findings			
				Age	Gender	Rural	
50	Ehman et al. (2003)	To assess factors associated with new patient appointment availability.	A cross sectional survey was provided to the primary care physician offices for a total of 438 subjects. Multivariate logistic regression was used to asses relationships between the different variables.	Primary care physician offices in 2 San Francisco Bay area counties.	Appointments were more likely available with physicians that have been in practice for 10 years or less(OR=4.2; 95% CI 1.7-10.3))	Appointments were less likely available with female primary care physicians (OR=0.4;95% CI 0.2-0.7).	
51	Larson et al. (2003)	To examined the relationship between place of residence and having access and utilization of ambulatory health care.	Data from the Medical Expenditure Panel Survey (MEPS) conducted in 1996. Linear and logistic regression analyse were performed to assess the relationships between the different variables.	A representative sample from all regions of the United States.			Residents in counties that were totally rural were more likely to report having a usual source of care (adjusted OR: 1.98; CI 1.01-3.98) Also those residents of places without a city but adjacent to a metropolitan area were also more likely to report having a usual source of care (adjusted OR 1.92, CI 1.16-3.22)