Policy, Politics, & Nursing Practice
2022, Vol. 23(1) 32–40

DOI: 10.1177/15271544211065432
journals.sagepub.com/home/ppn


The Nurse Practitioner Workforce in Western Canada: A Cross-Sectional Practice Analysis Comparison

E Duff, PhD, NP[1], Richard Golonka, MSc[2], Tammy O' Rourke, PhD, NP[3] and Abeer A. Alraja, MN, PhD[4]

Abstract

Regular examination of health workforce data is essential given the pace of health system and legislative changes. Health workforce studies pertaining to nurse practitioner (NP) practice are needed to examine the gaps between work activities, policy, human resource supply, or for population needs. Jurisdictional comparison studies can provide essential information about NP practice for governments to respond to health workforce deficiencies or engage in service planning. In Canada, there is limited provincial-territorial jurisdictional NP workforce data to support health planning or policy change. This descriptive cross-sectional study was to examine the similarities and differences in practice patterns of Canadian NPs. In 2016 and 2017, an electronic survey was sent to all 852 registered NPs in three Canadian provinces, yielding a large convenience sample of 375 NP respondents. The results of this study underscore the value of NPs' extensive registered nurse expertize as well as their ability to serve diverse patient populations, work in varied healthcare settings, and provide care to medically complex patients. The study findings also show that NPs in all three jurisdictions work to their full scope of practice, in both rural and urban settings. This study is the first to compare NP workforce data across multiple Canadian jurisdictions simultaneously. Studies of this type are valuable tools for understanding the demographics, education, integration, and employment activities of NPs and can aid governments in addressing workforce planning.

Keywords

nurse practitioner, scope of practice, health workforce, health care planning, Canada

Introduction

Similar to other countries, the Canadian healthcare system leaders seek to provide the right care, by the right provider, at the right time and cost, in the right location (Saunders & Carter, 2017). The Canadian healthcare system is funded through a combination of national and provincial taxation. The differing tax structure results in significant funding variations and the delivery of healthcare services between provinces. Therefore, evidence-based health workforce planning is vital to the successful delivery of healthcare services and the sustainability of health systems. This planning can be undermined by variances in human deployment, issues related to supply and demand, and health expenditures, which are often complicated by differing regulatory frameworks (Lopes et al., 2015). Evidence-based health workforce planning requires some level of certainty in terms of health workforce supply as well as recognition of changing population needs. This study examined the nurse practitioner (NP) workforce practice patterns in three western Canadian provinces (Alberta [AB], Saskatchewan [SK], and Manitoba [MB]) as a fundamental next step to examine alignment with population needs. In examining NP practice, the information can be used to support policy development or inform plans to coordinate human capital to address population health needs.

Background

National health workforce data for Canadian NPs is lacking. In addition, the limited data available has been collated to include both NPs and registered nurses (RNs; Canadian

[1]Health Science, University of Manitoba, Winnipeg, Manitoba, Canada
[2]School of Public Health, University of Alberta, Edmonton, Alberta, Canada
[3]Athabasca University, Athabasca, AB, Canada
[4]Health Science, University of Manitoba, Winnipeg, Manitoba, Canada

Corresponding Author:
E Duff, Health Science, University of Manitoba, 89 Curry PlaceWinnipeg, Manitoba R3T 2N2, Canada.
Email: Els.Duff@umanitoba.ca

Institute of Health Information, 2019a), obscuring the demographics, education, employment settings, and practice activities unique to the NP role. Limited data makes it difficult for decision makers to optimize national health policies and the utilization of NPs across the Canadian health system. Health workforce studies are essential to addressing gaps in utilization of and access to healthcare services and should be used to inform healthcare education and regulation (Buchholz et al., 2018). Health workforce jurisdictional comparisons provide a clearer understanding of the differences and similarities in socio-demographic characteristics, education, integration, and employment activities that inform healthcare services or patient care policies.

Expert health workforce planning is complicated by extensive educational requirements and strict licensing processes (Lopes et al., 2015). For example, NPs in Canada are unique healthcare professionals as RNs who have completed graduate education and have the legal authority to diagnose, order, and interpret diagnostic tests; prescribe pharmaceuticals; and perform specific procedures within their legal scope of practice (Mick & Ackerman, 2000; Pesut et al., 2019). Over the past 20 years, national nursing organizations in Canada have supported the establishment of harmonized scope of practice competencies and standards. Similarly, NP education, accreditation, certification, and licensure have been aligned across the United States (Neff et al., 2018). The results of this study can serve as a resource to inform the development of standardized education and regulation to advance national license portability for the Canadian NP workforce.

NPs practice patterns were assessed in other Canadian provinces (British Columbia, New Brunswick, Nova Scotia and Ontario) with the results presented in executive reports (DiCenso & IBM Corporation, 2003; Hamilton et al., 2017; Martin-Misener et al., 2010; Sangster-Gormley et al., 2012). This study fills a gap in the literature by reporting on the practices of NPs in the prairie provinces (AB, SK, MB). This prairie provinces NP practice study augments the description of practice patterns across Canada. Accordingly, policy makers can identify the jurisdictional gaps for healthcare planning. Moreover, the results of this study has the potential to inform jurisdictional health workforce planning while at the same time addressing priorities for localized population health needs.

Objective

The primary purpose of this research was to examine similarities and differences in NP practice patterns in Alberta (AB), Manitoba (MB), and Saskatchewan (SK).

Methods

This study used a non-experimental, cross-sectional, web-based survey design to collect data from a convenience sample of NPs, who practiced in AB, MB, and SK in 2016 and 2017. Ethical approval was received from academic Research Ethics Review Boards (AB Pro00059595 & SK R-0063). Then, NP regulators, employers and professional organizations in each of the provinces assisted with voluntary recruitment of their respective members, with every tenth respondent eligible to win a coffee gift card ($20). Eligibility criteria for participation included 2016 and 2017 current or previous practice registrants as a NP in one of the three western provinces. The 852 eligible participants, determined by the number of NPs registered with the respective jurisdictional nurse regulator in 2016–2017, received e-mailed invitations and reminders at three intervals 1 week apart. Data were collected and managed using REDCap, a secure web-based application for building and managing survey data (Harris et al., 2009)

The NP practice pattern survey, used in other Canadian provinces with adaptations for provincial context, was modified and piloted with experienced NPs in each jurisdiction for this study (DiCenso & IBM Corporation, 2003; Martin-Misener et al., 2010; Sangster-Gormley et al., 2012). The survey was assessed for legibility and accuracy. The modified survey reflected variations relevant to the AB, SK, or MB context and included questions about respondents' sociodemographics (i.e. age, number of years as a RN, number or years as a NP, education), work setting, role integration, populations served, patient care activities, ordering diagnostics, prescribing, and frequently diagnosed conditions. An analysis of specific survey data pertaining to NPs demographics, education, integration, and patient care activities in the three provinces was used for this study. The analysis of data related to controlled drugs and substances prescribing by NPs was previously published (O'Rourke et al., 2019).

Of the 852 eligible participants in the three jurisdictions, a total of 375 responded (44%) to the survey; a higher response rate than national NP surveys (35%; Canadian Council of Registered Nurse Regulators, 2015). Those not currently practicing in either AB, SK or MB were excluded from this analysis ($n = 26$). Descriptive statistics were used to analyze the data using Stata 13 (StataCorp, 2013), without imputation of missing values. Not all participants answered all questions, therefore, for the purpose of clarity we provide the number responding to the question along with percentage when appropriate.

Results

Sociodemographics, Education, and Integration

All participants were over the age of 29 and 93% (324/348) were female. Forty-five percent (154/344) of NPs reported having over 20 years of nursing experience. However, the majority of participants have less than five years of NP experience (41%, 140/341; Table 1). Most NPs (89%) have an

Table 1. NP Respondents Demographic Characteristics.

Characteristics	AB n (%)	MB n (%)	SK n (%)	ALL n (%)
Gender				
Male	13 (6.8)	6 (6.9)	5 (7.1)	24 (6.9)
Female	178 (93.2)	81 (93.1)	65 (92.9)	324 (93.1)
Total	191 (54.9)	87 (25.0)	70 (20.1)	348 (100)
Age				
Minimum	29	29	30	29
Maximum	60	70	61	70
Mean	48	44	44	44
Years Practiced as RN				
0–5	7 (3.7)	5 (6.0)	4 (5.7)	16 (4.7)
6–10	26 (13.7)	13 (15.5)	12 (17.1)	51 (14.8)
11–15	42 (22.1)	18 (21.4)	12 (17.1)	72 (20.9)
16–20	30 (15.8)	13 (15.5)	8 (11.4)	51 (14.8)
>20	85 (44.7)	35 (41.6)	34 (48.8)	154 (44.8)
Total	190 (55.2)	84 (24.4)	70 (20.3)	344
Years Registered as NP				
0–5	75 (39.3)	36 (42.9)	29 (43.9)	140 (41.1)
6–10	71 (37.2)	32 (38.1)	22 (33.3)	125 (36.7)
11–15	33 (17.3)	13 (15.5)	12 (18.2)	58 (17.0)
16–20	9 (4.7)	3 (3.6)	3 (4.5)	15 (4.4)
>20	3 (1.6)	--	--	3 (0.9)
Total	191 (56.0)	84 (24.6)	66 (19.4)	341

AB: Alberta; MB: Manitoba; SK: Saskatchewan; RN: Registered Nurse; NP: Nurse Practitioner.

educational background that includes a master's degree, and this was more common among NPs in Alberta (96%) and Manitoba (95%) compared to Saskatchewan (60%). Half of the respondents (147/299) were offered an orientation to integrate the NP role in their current setting. It was less common for physicians (24%; 50/208) and other members of the healthcare team (23%; 49/217) to receive orientation to the role of the NP in their workplace. Additionally, just under half (139/321) of the NP respondents felt that their supervisor had only 'some', 'average' or 'no' understanding of the NP's role.

Practice and Population Served Characteristics

Areas of practice prior to becoming an NP were different between the three provinces (Table 2). While critical care (16.2%) and emergency (15.3%) were a common prior area of practice for all, many NPs in MB and SK were also practicing in either Outpost Nursing or Primary Care immediately before becoming an NP compared to very few NPs in Alberta (4.2%, 4.7%, respectively) with these backgrounds. Fifty-five percent (187/339) of NPs described their current role as a primary care category where they provided care to patients of all ages, while 25% provided care to adult populations only (85/339). In terms of the current practice settings, the most common site for NPs included hospitals (28.9%) and family physician offices (18.1%). Overall, NPs in AB were much more likely to work in a hospital (40.1%) while those in MB were more likely to work in a family practice setting (32.2%) or primary care for NPs in SK (34.3%). Another notable difference was that a higher percentage of NPs in SK worked in Indigenous health centers (15.7%). The differences between provincial jurisdictions are reported in more detail in Table 3. Respondents in AB were much less likely to work in a small town of less than 10,000 people (8.6%) when compared to NPs working in MB (37.5% or SK (53.3%).

The most common patient populations served by NPs in all three jurisdictions included adults (59.6%), patients living with a chronic disease (54.2%), and seniors (53.6%; Table 4). There were differences in the types of populations served between provincial jurisdictions. When compared to those working in AB, NPs in both MB and SK more often reported providing care to seniors, women, First Nations people, and patients with low socioeconomic status. Additionally, NPs in MB were more likely to serve newcomer populations (35.6%) than those working in the two other provinces. Respondents in each of the provincial jurisdictions reported diagnosing a variety of conditions. Some of the most frequently diagnosed conditions during normal NP practice included infections, musculoskeletal pain and injuries, and skin disorders (Figure 1). There were differences in the frequency of prescribing in MB and SK in nearly all instances, with the exception of controlled substances which was prescribed more often by Alberta NPs (Table 5).

Table 2. Respondents Population Characteristic Comparisons.

Variable	Levels	AB n (%)	MB n (%)	SK n (%)	ALL n (%)
Area of Practice Prior to NP Role	Emergency	32 (16.8)	12 (13.8)	12 (17.7)	56 (16.2)
	Critical Care	35 (18.3)	11 (12.6)	7 (10.3)	53 (15.3)
	Medical Surgical	22 (11.5)	2 (2.3)	9 (13.2)	33 (9.5)
	Primary Care	9 (4.7)	12 (13.8)	10 (14.7)	31 (9.0)
	Outpost Nursing	8 (4.2)	9 (10.3)	6 (8.8)	23 (6.7)
	Pediatrics	15 (7.9)	5 (5.8)	3 (4.4)	23 (6.7)
	Education	11 (5.8)	4 (4.6)	2 (2.9)	17 (4.9)
	Public Health	7 (3.7)	7 (8.1)	3 (4.4)	17 (4.9)
	Administration	7 (3.7)	1 (1.2)	1 (1.5)	9 (2.6)
	Long Term Care	0 (0.0)	5 (5.8)	3 (4.4)	8 (2.3)
	Maternal	5 (2.6)	1 (1.2)	2 (2.9)	8 (2.3)
	Home Care	5 (2.6)	1 (1.2)	0 (0.0)	6 (1.7)
	Newborn	3 (1.6)	0 (0.0)	2 (2.9)	5 (1.5)
	Mental Health	1 (0.5)	1 (1.2)	0 (0.0)	2 (0.6)
	Government/ Policy	0 (0.0)	1 (1.2)	0 (0.0)	1 (0.3)
	Other	31 (16.2)	15 (17.2)	8 (11.8)	54 (15.6)
	Total	191 (100.0)	87 (100.0)	68 (100.0)	346 (100)
Which Category Best Describes Your NP Role	Primary Care / Family Care	74 (39.6)	63 (75.9)	50 (72.5)	187 (55.2)
	Adult	73 (39.0)	7 (8.4)	5 (7.2)	85 (25.1)
	Pediatric	16 (8.6)	4 (4.8)	0 (0.0)	20 (5.9)
	Specialty	12 (6.4)	8 (9.6)	9 (13.0)	29 (8.6)
	Neonatal	11 (5.9)	0 (0.0)	4 (5.8)	15 (4.4)
	RN and NP	1 (0.5)	1(1.2)	1 (1.4)	3 (0.9)
	Total	187 (100.0)	83 (100.0)	69 (100.0)	339 (100.0)
Population of Municipality of Practice	100,000+	133 (76.0)	44 (53.0)	21 (35.0)	198 (62.3)
	10,000–100,000	27 (15.4)	8 (9.6)	7 (11.7)	42 (13.2)
	<10,000	15 (8.6)	31 (37.3)	32 (53.3)	78 (24.5)
	Total	175 (100.0)	83 (100.0)	60 (100.0)	318 (100.0)

AB: Alberta; MB: Manitoba; SK: Saskatchewan; RN: Registered Nurse; NP: Nurse Practitioner.

Table 3. NP Practice Setting(s) by Province Comparisons.

Variable	Levels	AB n (%)	MB n (%)	SK n (%)	ALL n (%)
Current Practice Setting[a]	Hospital	77 (40.1)	12 (13.8)	12 (17.1)	101 (28.9)
	Family Practice	17 (8.9)	28 (32.2)	18 (25.7)	63 (18.1)
	Community Health center	15 (7.8)	20 (23.0)	20 (28.6)	55 (15.8)
	Primary Care	18 (9.4)	10 (11.5)	24 (34.3)	52 (14.9)
	Ambulatory	38 (19.8)	6 (6.9)	7 (10.0)	51 (14.6)
	Long Term Care	8 (4.2)	10 (11.5)	13 (18.6)	31 (8.9)
	Indigenous Health center	12 (6.3)	3 (3.4)	11 (15.7)	26 (7.4)
	Emergency Department	7 (3.6)	9 (10.30	4 (5.7)	20 (5.7)
	Private Practice	15 (7.8)	3 (3.4)	1 (1.4)	19 (5.40
	University/College	3 (1.6)	3 (3.4)	3 (4.3)	9 (2.6)
	Home Care	3 (1.6)	0 (0.0)	5 (7.1)	8 (2.3)
	Outpost Nursing	2 (1.0)	0 (0.0)	5 (7.1)	7 (2.0)
	Dept. Defense Fac.	2 (1.0)	2 (2.3)	0 (0.0)	4 (1.1)
	First Nations Inuit Health	3 (1.6)	1 (1.1)	0 (0.0)	4 (1.1)
	Government	1 (0.5)	1 (1.1)	1 (1.4)	3 (0.9)
	Public Health	1 (0.5)	0 (0.0)	1 (1.4)	2 (0.6)

AB: Alberta; MB: Manitoba; SK: Saskatchewan; NP: Nurse Practitioner.
[a]Respondents were allowed to choose more than one response.

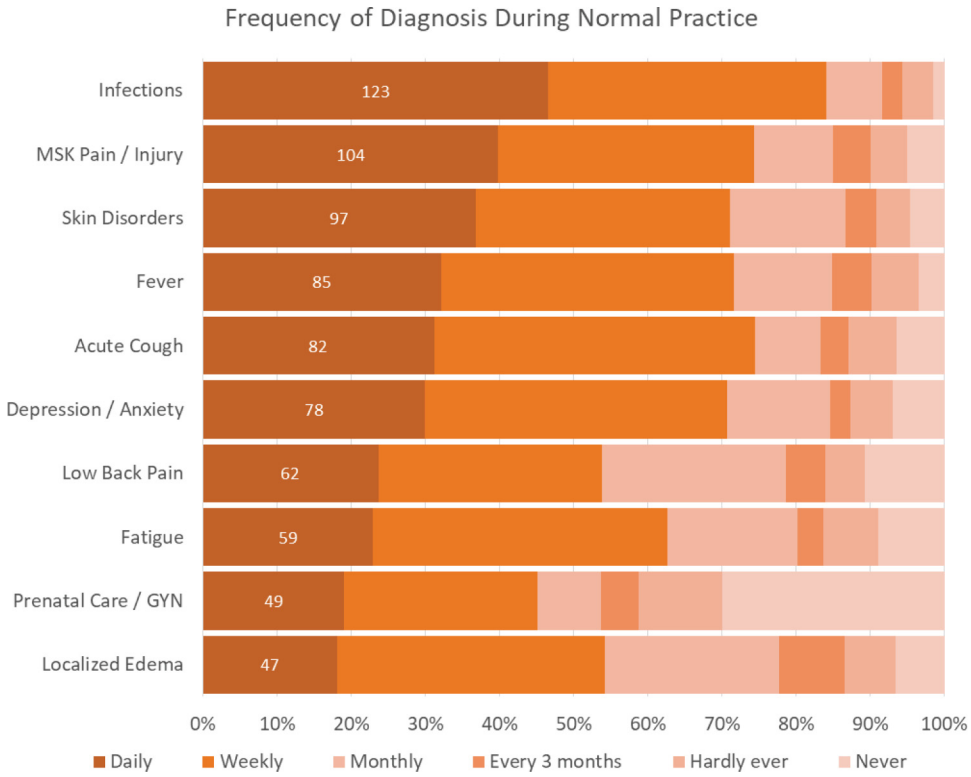

Figure 1. Frequency of diagnosis: Top diagnoses.

Discussion

This study compared the sociodemographic characteristics, work setting, role integration, populations served, patient care activities, ordering diagnostics, prescribing, and frequently diagnosed conditions of NPs practicing in AB, MB, and SK. This was the first jurisdictional comparison study to examine NP practice across Canadian provinces. The NP workforce in the three provincial jurisdictions (AB, MB, & SK) was mostly middle-aged, with a subset approaching retirement. Aging within a group of health professionals is an essential factor to consider in workforce planning. At the time of this study, the NP workforce in these provinces was extremely experienced, with 95% of NP respondents reporting six or more years of RN expertize and 59% with more than five years of NP experience. These results are similar to prior jurisdictional studies that examined single

Table 4. Population(s) Served by NPs Comparisons.

Variable	Levels	AB n (%)	MB n (%)	SK n (%)	ALL n (%)
Population(s) served[a]	Adults	116 (60.4)	52 (59.8)	40 (57.1)	208 (59.6)
	Patients living with a chronic disease	96 (50.0)	52 (59.8)	41 (58.6)	189 (54.2)
	Seniors	90 (46.9)	51 (58.6)	46 (65.7)	187 (53.6)
	Women	80 (41.7)	49 (56.3)	40 (57.1)	169 (48.4)
	Low socio-economic status	61 (31.8)	54 (62.1)	42 (60.0)	157 (45.0)
	Children or youth	75 (39.14)	44 (50.6)	38 (54.3)	157 (45.0)
	First Nations	62 (23.3)	52 (59.8)	37 (52.9)	151 (43.3)
	Newcomers to Canada	42 (21.9)	31 (35.6)	22 (31.4)	95 (27.2)
	Patients with one specific condition	36 (18.8)	25 (28.7)	16 (22.9)	77 (22.1)
	Homeless	40 (20.8)	20 (23.0)	11 (15.7)	71 20.3)
	One ethnic population	3 (1.6)	1 (1.1)	0 (0.0)	11 (3.2)
	Other	0 (0.0)	6 (6.9)	5 (7.1)	6 (1.7)

AB: Alberta; MB: Manitoba; SK: Saskatchewan; NP: Nurse Practitioner.
[a]Respondents were allowed to choose more than one response.

Table 5. Mean Frequency of Prescription Ordering, by Province.

VARIABLE	LEVELS	AB	MB	SK	ALL
PRESCRIPTION	Antimicrobials	2.1	1.8	1.8	*2.0*
	Anti-inflammatory	2.4	1.8	2.0	*2.1*
	Topical agents	2.4	1.9	1.9	*2.1*
	Gastro-intestinal agents	2.3	2.2	2.2	*2.2*
	Cardiac/antihypertensive agents	2.7	2.1	2.2	*2.4*
	Asthma-COPD agents	3.0	2.2	2.1	*2.6*
	Antidiabetics	3.1	2.2	2.3	*2.7*
	Antidepressants	3.1	2.2	2.6	*2.8*
	EENT agents	3.6	2.3	2.3	*3.0*
	Serum lipid reducing agents	3.5	2.8	2.8	*3.2*
	Controlled substances	2.7	4.4	3.3	*3.3*
	Immunizing agents	3.8	3.2	3.4	*3.6*
	Hormonal agents	4.1	3.1	3.0	*3.6*
	Emergency use drugs	3.7	4.1	4.1	*3.9*
	Osteoporosis agents	4.1	3.8	3.4	*3.9*

Note. COPD = Chronic Obstructive Pulmonary Disease; EENT = Ears, Eyes, Nose, and Throat.
Variables are on an ordinal scale from 1 to 6, with 1 being the most frequent (daily) and 6 being the least frequent (never) [1-daily, 2-weekly, 3-monthly, 4-every three months, 5-hardly ever, 6-never].

provinces (DiCenso & IBM Corporation, 2003; Martin-Misener et al., 2010; Sangster-Gormley et al., 2012).

Gender equity is an increasingly important concept to address in healthcare education, research, workforce planning, and delivery. Obstacles and barriers need to be addressed for equitable gender distribution in the NP workforce, as the majority of NPs tend to be Caucasian women (Reuter-Rice et al., 2016). As of 2018, 91% of Canadian NPs were female, in contrast to only 42% of Canadian physicians (Canadian Institute of Health Information, 2019b) and in our study females accounted for 93% of respondents. These numbers are similar to those reported in American studies, where 93% of NPs and 54% of medical doctors were female (Buerhaus et al., 2015). In future research gender considerations within the NP workforce are needed for human resource planning.

Beyond post-secondary education, integration of NPs in health systems requires a solid orientation to the organizations and systems within which they practice. There needs to be a clear understanding of the NP role among healthcare providers, as this clarity can deeply impact job satisfaction (Athey et al., 2016) and NP integration across settings and populations (Heale et al., 2018). In this study, it was not common for physicians or other health team members to receive orientation to the role of NPs in their work setting. In most cases, individual NPs were left to explain their role to the healthcare team. Supervisor's understanding and support of the NP role is also important. When supervisors supported the NP role, there was a higher level of work role satisfaction (Athey et al., 2016). Results from the current study suggest that although most NPs were supported to practice at their full scope, they were not always given an orientation or job description, which are critical to ongoing job satisfaction (Athey et al., 2016). Orientation for NPs, supervisors, and other healthcare team members is crucial for health workforce integration and should be examined in future studies.

In this study, there was an obvious difference in the distribution of NPs across two of the jurisdictions, with most of the NPs in MB and SK working in rural communities with populations of less than 10,000. This data may be explained by the fact that there is a higher proportion of Canadians living in rural MB and SK (28% and 33%, respectively), when compared to the national average (20%) and Alberta (16.9%; Statistics Canada, 2012). This finding is congruent with a previous study that examined rural NP distribution in Nova Scotia, another Canadian province with high number of rural residents (Martin-Misener et al., 2010). In contrast, a study conducted in 2012 showed that 65% of NPs in the province of British Columbia worked in metropolitan areas with populations greater than 100,000 (Sangster-Gormley et al., 2012) where 86.2% of the population live in urban settings (Statistics Canada, 2017). As a result, the number of NPs working in smaller communities seems to be consistent with the overall population distribution (Neff et al., 2018). In this study, more NPs in MB and SK worked in locations with a general population of less than 10,000 people, when compared to those working in AB. The results of this study provide some insight into the gaps and variances between rural and urban human resource supply, which may aid governments in responding to health workforce deficiencies.

It has been well documented in the literature that adequate staffing of healthcare professionals has positive impacts on patient health outcomes (Mowat et al., 2017; Neff et al., 2018). Expanding the supply of NPs substantially increases access to healthcare professionals in rural and urban areas and thus improving health outcomes. Canadian research has shown that NPs are helping to address gaps in primary care in some areas, but access to NPs remains variable even across adjacent provinces (Shah et al., 2017). The variability in NP usage between provinces may be the result of: (a) differences in true population health needs between provinces, which are evident in the observed variations in practice patterns; or (b) differences in provincial legislative and jurisdictional processes.

NPs provide care to numerous vulnerable populations, addressing the varied and complex needs of these populations. The positive contributions of NPs to the health of vulnerable populations is well-recognized (Davis et al., 2018). In particular, access to primary care services is an important contributor to the health of these populations. In all three provincial jurisdictions included in this study, NPs reported providing care to homeless patients. Providing service to this vulnerable population is increasingly becoming a social and public health concern (Seiler & Moss, 2012). In this study, NP respondents

also reported caring for high numbers of patients with chronic diseases, spending a significant amount of their time managing these illnesses. In addition, the care of vulnerable and complex patient populations across all jurisdictions must be supported in a broad NP legal scope of practice to ensure appropriate healthcare for these populations.

NPs in all three jurisdictions were involved in diagnosing, prescribing pharmaceuticals, treating, and managing a variety of medical conditions in this study. Findings such as these are significant as they can inform the educational preparation of NP students and the optimal management of various health conditions. Several pharmaceuticals were commonly prescribed by respondents in this study, including antimicrobial, cardiac or antihypertensive, anti-inflammatory, topical, and antidiabetic agents, demonstrating NPs are prescribing in accordance with the scope of practice (Tranmer et al., 2015). Similarly, knowledge of these prescribing patterns is important to educators, regulators, and employers who are responsible for developing and monitoring NP competence. Although it was not investigated in this study, NPs play a significant role in deprescribing pharmaceuticals and recommending nonpharmacological or over-the-counter treatments (Running et al., 2006). Future studies are needed to examine NPs' deprescribing practices and recommendations for over-the-counter medications.

Strengths and Limitations

The main strength of this study is the relatively large sample size drawn across the three geographically large jurisdictions. Therefore, this research serves as foundational knowledge from which further research can be launched. However, several limitations of this study must be considered when interpreting the findings. The long survey used in this study was administered only to NPs who chose to participate, and reflects their self-reported perceptions. The study design was dependent upon recall of past events so there may be some degree of information and recall bias. The convenience sampling method used in this study limits the generalizability of the findings.

Implications and Recommendations

This study supports existing knowledge of the NP's increasingly important role in providing health services to varied complex vulnerable populations. This was the first known study to examine similarities and differences in NP practice across three Canadian jurisdictions that can be used to facilitate national regulatory reconciliation for workforce portability and to inform healthcare education (Buchholz et al., 2018). This study provides a foundation for future research to include broader NP jurisdictional studies. Jurisdictional comparisons can help inform health workforce recruitment or retention planning and better address population health needs.

The relationship between where nurses are educated and their current place of employment has been identified as a factor that impacts the rural health workforce. One study of RNs identified that 52.5% of nurses work within 40 miles of where they attended high school (Kovner et al., 2011). Unfortunately, this study did not include questions about where the participants had completed their education. The rural health workforce gap is growing where it may be prudent to include detailed questions about education in future studies, given the rural geography of Canada. Recruitment and retention of the health workforce in underserved areas is of particular importance. The location of education in relation to employment setting may be an important factor to support human resource planning. It may be helpful to identify students who are most likely to work in rural areas, or who have rural backgrounds, early in the education process to build a sustainable health workforce in rural areas (Kovner et al., 2011; Mowat et al., 2017).

Conclusions

The findings of this study provide a multi-jurisdictional NP data comparison and are important for education and health workforce planning. The results highlight NPs' extensive RN expertize and high educational attainment, yet reveal that orientation for NPs, supervisors, and health team members is important for integration into the healthcare system. The findings suggest that NPs play an important role in caring for diverse vulnerable patient populations in varied healthcare settings, and possess the skills required to manage complex patient care which aids governments to address population needs and health services.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the Saskatchewan Polytechnic Centre for Health Research, Improvement and Scholarship; University of Alberta Faculty of Nursing, Faculty Development Grant; Enhancing Alberta Primary Care Research Networks.

ORCID iDs

E Duff https://orcid.org/0000-0001-8148-6054
Richard Golonka https://orcid.org/0000-0001-7187-4694

Supplemental material

Supplemental material for this article is available online.

References

Athey, E. K., Leslie, M. S., Briggs, L. A., Park, J., Falk, N. L., Pericak, A., El-Banna, M. M., & Greene, J. (2016). How important are autonomy and work setting to nurse practitioners' job

satisfaction?: Importance of autonomy and work setting for NPs. *Journal of the American Association of Nurse Practitioners*, *28*(6), 320–326. https://doi.org/10.1002/2327-6924.12292

Buchholz, S. W., Klein, T., Cooke, C., Cook, M. L., Knestrick, J., & Dickins, K. (2018). Introduction to four reviews addressing critical topics identified by the 2015 nurse practitioner research agenda roundtable: Priorities for policy, workforce, education, and practice. *Journal of the American Association of Nurse Practitioners*, *30*(12), 667–672. https://doi.org/10.1097/JXX.0000000000000035

Buerhaus, P. I., DesRoches, C. M., Dittus, R., & Donelan, K. (2015). Practice characteristics of primary care nurse practitioners and physicians. *Nursing Outlook*, *63*(2), 144–153. https://doi.org/10.1016/j.outlook.2014.08.008

Canadian Council of Registered Nurse Regulators (2015). *Practice analysis study of nurse practitioners* (pp. 1–46). http://www.ccrnr.ca/assets/ccrnr-practice-analysis-study-of-nurse-practitioners-report—final.pdf

Canadian Institute of Health Information (2019a). *Nursing in Canada, 2018: A Lens on Supply and Workforce* (pp. 1–45). https://www.cihi.ca/sites/default/files/document/regulated-nurses-2018-report-en-web.pdf

Canadian Institute of Health Information (2019b). *Physicians in Canada, 2018* (pp. 1–58). https://www.cihi.ca/sites/default/files/document/physicians-in-canada-2018.pdf

Davis, M. A., Anthopolos, R., Tootoo, J., Titler, M., Bynum, J. P. W., & Shipman, S. A. (2018). Supply of healthcare providers in relation to county socioeconomic and health status. *Journal of General Internal Medicine*, *33*(4), 412–414. https://doi.org/10.1007/s11606-017-4287-4

DiCenso, A., & IBM Corporation (2003). *Report on the integration of primary health care nurse practitioners into the province of Ontario* (pp. 1–278). https://www.health.gov.on.ca/en/common/ministry/publications/reports/nurseprac03/nurseprac03_mn.aspx

Hamilton, A., Rickards, T., Jenkins, J., Legace, R., & Vickers, M. (2017). *Nurse practitioner outcomes in New Brunswick: 15 years in nurse practitioner and patient perspectives—2017* (pp. 1–30).

Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J. G. (2009). Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics*, *42*(2), 377–381. https://doi.org/10.1016/j.jbi.2008.08.010

Heale, R., Dahrouge, S., Johnston, S., & Tranmer, J. E. (2018). Characteristics of nurse practitioner practice in family health teams in ontario, Canada. *Policy, Politics. & Nursing Practice*, *19*(3–4), 72–81. https://doi.org/10.1177/1527154418792538

Kovner, C. T., Corcoran, S. P., & Brewer, C. S. (2011). The relative geographic immobility of new registered nurses calls for new strategies to augment that workforce. *Health Affairs*, *30*(12), 2293–2300. https://doi.org/10.1377/hlthaff.2011.0108

Lopes, M. A., Almeida, ÁS, & Almada-Lobo, B. (2015). Handling healthcare workforce planning with care: Where do we stand? *Human Resources for Health*, *13*(1), 38. https://doi.org/10.1186/s12960-015-0028-0

Martin-Misener, R., DiCenso, A., Akhtar-Danesh, N., Donald, F., Bryant-Lukosius, D., & Kaasalainen, S. (2010). *Survey of the practice patterns of nurse practitioners in primary care in Nova Scotia* (pp. 1–23). https://www.hhr-rhs.ca/en/tools/library/english/a-survey-of-the-practice-patterns-of-nurse-practitioners-in-primary-health-care-in-nova-scotia.html

Mick, D., & Ackerman, M. (2000). Advanced practice nursing role delineation in acute and critical care: Application of the strong model of advanced practice. *Heart & Lung*, *29*(3), 210–221. https://doi.org/10.1067/mhl.2000.106936

Mowat, S., Reslerova, M., & Sisler, J. (2017). Retention in a 10-year cohort of internationally trained family physicians licensed in manitoba. *Canadian Journal of Rural Medicine: The Official Journal of the Society of Rural Physicians of Canada*, *22*(1), 13–19. https://srpc.ca/resources/Documents/CJRM/vol22n1/pg13.pdf

Neff, D. F., Yoon, S. H., Steiner, R. L., Bejleri, I., Bumbach, M. D., Everhart, D., & Harman, J. S. (2018). The impact of nurse practitioner regulations on population access to care. *Nursing Outlook*, *66*(4), 379–385. https://doi.org/10.1016/j.outlook.2018.03.001

O'Rourke, T., Kirk, J., Duff, E., & Golonka, R. (2019). A survey of nurse practitioner controlled drugs and substances prescribing in three Canadian provinces. *Journal of Clinical Nursing*, *28*(23–24), 4342–4356. https://doi.org/10.1111/jocn.15008

Pesut, B., Thorne, S., Stager, M. L., Schiller, C. J., Penney, C., Hoffman, C., Greig, M., & Roussel, J. (2019). Medical assistance in dying: A review of Canadian nursing regulatory documents. *Policy, Politics. & Nursing Practice*, *20*(3), 113–130. https://doi.org/10.1177/1527154419845407

Reuter-Rice, K., Madden, M. A., Gutknecht, S., & Foerster, A. (2016). Acute care pediatric nurse practitioner: The 2014 practice analysis. *Journal of Pediatric Health Care*, *30*(3), 241–251. https://doi.org/10.1016/j.pedhc.2016.01.009

Running, A., Kipp, C., & Mercer, V. (2006). Prescriptive patterns of nurse practitioners and physicians. *Journal of the American Academy of Nurse Practitioners*, *18*(5), 228–233. https://doi.org/10.1111/j.1745-7599.2006.00120.x

Sangster-Gormley, E., Canitz, B., Schreiber, R., Borycki, E., Frisch, N., Sawchenko, L., McLachlan, D., & Biagioni, K. (2012). *A survey of nurse practitioner practice patterns in British Columbia*. https://silo.tips/download/a-survey-of-nurse-practitioner-practice-patterns-in-british-columbia

Saunders, C., & Carter, D. J. (2017). Right care, right place, right time: Improving the timeliness of health care in New south wales through a public–private hospital partnership. *Australian Health Review*, *41*(5), 511. https://doi.org/10.1071/AH16075

Seiler, A. J., & Moss, V. A. (2012). The experiences of nurse practitioners providing health care to the homeless. *Journal of the American Academy of Nurse Practitioners*, *24*(5), 303–312. https://doi.org/10.1111/j.1745-7599.2011.00672.x

Shah, T. I., Milosavljevic, S., & Bath, B. (2017). Determining geographic accessibility of family physician and nurse practitioner services in relation to the distribution of seniors within two Canadian prairie provinces. *Social Science & Medicine*, *194*, 96–104. https://doi.org/10.1016/j.socscimed.2017.10.019

StataCorp (2013). *Stata Statistical Software: Release 13*. StataCorp LP.

Statistics Canada (2012). *The Canadian population in 2011: Population counts and growth : population and dwelling counts, 2011 Census*. https://www12.statcan.gc.ca/census-recensement/2011/as-sa/98-310-x/98-310-x2011001-eng.pdf

Statistics Canada (2017). *Census profile, 2016 census*. https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/index.cfm?Lang=E

Tranmer, J. E., Colley, L., Edge, D. S., Sears, K., VanDenKerkhof, E., & Levesque, L. (2015). Trends in nurse practitioners' prescribing to older adults in ontario, 2000-2010: A retrospective cohort study. *CMAJ Open*, *3*(3), E299–E304. https://doi.org/10.9778/cmajo.20150029

Author Biographies

Dr. Elsie Duff, an Assistant Professor in the College of Nursing, University of Manitoba, is a research scientist and nurse practitioner. Dr. Duff has completed large and small scale studies related to nurses and nurse practitioners in Canada and Internationally. Her research interests include nurse practitioner practice and substance use, nurse education, or health human resources, GIS geographical data visualization, developing infographics, qualitative methods, quantitative methods, and content mapping analysis.

Richard Golonka is the PhD candidate in Epidemiology at the University of Alberta School of Public Health and has over 10 years experience working for Alberta Health Services in the areas of quality improvement and health services research. Richard has published work in the field of injury prevention, communicable disease control, health workforce planning and primary care continuity. His current research interests include the impact of chronic disease on the risk of injury among older adults as well as the impact of the health systems response to Covid-19 pandemic with respect to the delivery and quality of primary health care, including implications for workforce planning.

Dr. Tammy O'Rourke is an Assistant Professor at Athabasca University. She is a NP-Family/All Ages and led the development of one of the initial NP-Led Clinics in Belleville, Ontario and served as the clinic's Chief NP/Clinic Director for 4 years. She is an expert in the implementation and evaluation of Nurse Practitioner care. More recently she co-led the development of a new primary care model for seniors in Edmonton, Alberta. Tammy has also held appointments at University of Alberta in Edmonton, Dalhousie University in Halifax, and Loyalist College in Belleville, Ontario.

Abeer A. Alraja is a research coordinator at the College of Nursing, University of Manitoba. Her research interest focuses on creating healthy work environments for nurses and nurse practitioners and healthy clinical practice settings for undergraduate nursing students. Currently, she is working under the supervision of Dr. Duff to conduct research on substance use, nursing education, and health human resources.