

Workforce Demands of Rural Nurse Practitioners: A Descriptive Study

Jody Toerber-Clark, DNP, FNP-BC ¹

Marian Jamison, PhD, RN ²

Monica Scheibmeir, PhD, RN ³

¹Assistant Professor, School of Nursing, Washburn University, jody.toerber-clark@washburn.edu

²Professor, School of Nursing, Washburn University, marian.jamison@washburn.edu

³Retired Dean, School of Nursing, Washburn University, monica.scheibmeir@gmail.com

Abstract

Purpose: Nurse practitioners (NPs) are rendering health care services in rural areas in increasing numbers, yet little is known about clinical skills and patient care management activities performed by these advanced practice nurses in the rural environment. The purpose of this descriptive study of rural NPs was to identify skills and patient care management activities that they have performed and considered critical to Kansas rural practice.

Sample: A convenience sample of 208 nurse practitioners (NP) in rural and frontier Kansas were emailed a survey that asked about skills and activities they perform in their rural practice. Sixty-three responded for a response rate of 30%.

Findings: The analysis produced a list of 26 skills and 37 patient care management activities critical to Kansas rural NP practice. Most of the skills/procedures were learned after graduation. Almost all the respondents reported additional training/certifications in advanced life support and trauma. The majority of respondents were family nurse practitioners who practiced in a variety of rural settings. “I grew up in a rural setting” and “Autonomy of practice” were the two top factors that influenced their decision to practice in a rural setting.

Conclusion: The analysis produced a list of skills and patient care management activities critical to rural NP practice. Schools of nursing may find these lists useful as they prepare NPs for the rural workforce.

Keywords: rural, nurse practitioner, training, education, skills, and patient care management activities

Workforce Demands of Rural Nurse Practitioners: A Descriptive Study

The United States has experienced rapid growth in the nurse practitioner (NP) workforce in the last several decades (Auerbach et al., 2020). Many NPs are choosing to practice in rural communities, thus filling the gap created by the shortage of physicians (Xue et al., 2019). Following a trend analysis of 50 states and Washington, DC, from 2010 to 2016, Xue, Smith et al. reported that the increase in supply of primary care NPs in rural areas was greater than the increase in physician supply in rural areas. As such there is a growing presence of NPs in rural primary care practice settings (Barnes et al., 2018).

Once NP students graduate and begin practicing in an advanced practice role, they not only use the skills they learned in their educational program, they also use additional skills obtained through training programs and activities provided by their employer. Over time, the skills performed by NPs can become extensive and can vary depending on the type of practice site, needs of patients, and expectations of employers. The increased utilization of NPs in rural settings requires a critical examination of skills and patient care management activities that NPs are using in those settings.

A review of the literature revealed few articles related to rural workforce requirements of NPs in the United States. Some evidence exists that rural NP practice patterns differ from their urban counterparts. Rural NPs not only provide primary care services, but also manage a variety

of acute illnesses and injuries while attending to the needs of patients. Rural NPs, for example, are more likely to practice to the fullest of their scope of practice, have their own patient panels, work longer hours, see more patients, and have hospital admitting privileges (Spetz et al., 2017). Rural and frontier NPs in Wyoming practice in a variety of settings, such as primary care, hospital, emergency room (ER), acute care, urgent care, nursing home, and mental health (Brown et al., 2009). No articles could be found that addressed skills and activities performed by Kansas rural NPs.

Faculty and staff at one nursing school in northeast Kansas conducted a descriptive study to help them better understand the training needs of NP students who plan to live and work in Kansas rural settings after graduation. The study was part of a larger project, funded by the Health Resources and Services Administration, to improve the NP curriculum to ensure that NP graduates who desire a Kansas rural practice are ready for that practice upon graduation. The investigators sought to answer the following research questions:

What are the characteristics of NPs who practice in rural Kansas settings?

What are the characteristics of practice settings of NPs who work in Kansas rural areas?

What skills and patient care management activities are critical to rural NPs in Kansas?

The results of this study were used to inform the faculty about gaps in the curriculum for family nurse practitioner (FNP) students who plan to live and work in rural settings after graduation.

Methods

Kansas has a total area of 82,276 square miles. In 2019, Kansas had an estimated population of 2.9 million people, with close to 912,000 living in rural areas of the state (United States Department of Agriculture Economic Research Service, n.d.). Of the 105 counties in Kansas, the

Kansas Department of Health and Environment (n.d.) has classified 19 as densely-settled rural (20 to 39.9 persons per square mile), 34 as rural (6 to 19.9 persons per square mile), and 36 as frontier (less than six persons per square mile). Nurse practitioner practice in Kansas requires a collaborative practice agreement with a physician, which can limit full scope of practice in rural and medically underserved areas. The physician need not be present when care is provided by the NP.

A convenience sample of Kansas rural and frontier NPs was invited to complete a survey that asked them to identify their skills and patient care management activities performed on a frequent basis or were deemed important to practice. A list of Kansas rural and frontier NPs with email addresses was obtained from the school of nursing database of alumni, preceptors, and rural organizations. A total of 235 rural and frontier NPs from across the state were invited to participate via email.

The survey instrument was a modified version of the “Clinical Skills and Procedures Used by NPs” instrument, which Laustsen (2013) developed and used in a study of skills performed by Oregon NPs who practiced in a variety of settings. Permission was granted for the use and modification of the instrument for the current study. Consultation with several rural practice providers (which included both NPs and physicians) led to several modifications of the survey to include questions specific to rural practice.

The revised survey consisted of three parts: (a) demographic and practice questions, (b) clinical skills and patient care management activity questions, and (c) a place for respondents to make written comments. Additional demographic and practice questions addressed reasons for practicing in a rural setting, additional training/certifications obtained after graduation, zip code of practice, type of practice, access to telemedicine, and proximity to the collaborating physician. The

zip code of the practice setting was requested so that the investigators could verify that the practice was located in a rural setting. Using the zip code finder (zip-codes.com) the zip codes were matched to the 89 counties that were listed as densely-settled rural, rural, or frontier by the Kansas Department of Health and Environment.

The list of clinical skills was assessed for applicability to rural NPs. Skills that are typically delegated to support staff, such as venipuncture and nebulizer administration, were removed. Some skills were added and others were condensed. “Extremity casting” and “Splinting” were replaced with a single entry called “Fracture care.” Patient care management activities were added and limited to urgent, emergent, complex patient scenarios, pain management, and mental health. Respondents were asked about the management of patients with specific health conditions (such as diabetes), management of patients with specific symptoms (such as acute stroke symptoms), and management of certain types of patients (such as frail elderly).

Respondents were asked to select whether the NP performed the skill or patient care management activity by answering “yes” or “no.” They were also asked how often the skill or activity was performed by selecting “performed routinely” (once per week or more), “frequently” (more than once per month), “rarely” (less than 3 times per year), or “not applicable.” In addition, respondents were asked to identify the skills and activities as “very important, important, moderately important, minimally important or not important” to their practice. Next the respondents were asked to select where they learned the skill or activity (NP program, continuing education, colleague training, or on-the-job). Skills and patient care management activities were identified as “critical to practice” if they were reported as performed by 50% or more of the respondents or reported as moderately or very important to practice by 50% of respondents.

The revised survey was piloted by members of the NP faculty, who confirmed face validity,

ease of use, and an average time of 20 minutes to complete. After University IRB approval was granted (IRB #17-19), the study commenced March 2018 with the sending of emails which included a link to the survey via a free web-based survey platform. After two weeks an email reminder was sent to the rural NPs to remind them of the opportunity to participate. Data were analyzed using descriptive statistics.

Results

Of the 235 NPs who were invited to participate via email, 27 email addresses were identified as *undeliverable*. Of the 208 valid email addresses, 63 surveys were returned for a response rate of 30%. The majority of the 63 respondents self-identified as FNPs (61), white (60), non-Hispanic (62), female (57), and between 35 and 64 years of age (52). The most frequent response regarding educational program attended was a master's degree (44) followed by doctorate (11), post-master's certificate (5), and "other" certificate (3). When the respondents were asked to pick the top three to five reasons that influenced them to practice in a rural setting, the most frequent response was "I grew up in a rural setting." The second most common response was "autonomy of practice." Other frequent responses are listed in Table 1. Most of the NPs (53, 84%) reported having been a preceptor for NP students in the past.

Almost all the respondents reported additional training/certifications. For example, 61 (97%) reported they were certified in basic cardiac life support (BCLS), 55 (88%) in advanced cardiac life support (ACLS), 40 (63%) in pediatric advanced life support (PALS), 30 (48%) in advanced trauma life support (ATLS), 14 (22%) in neonatal resuscitation, and 10 (16%) in "other" certification. The most common certification in the "other" category was the trauma nursing core course offered through the Emergency Nurses Association.

Table 1*Top Thirteen Factors that Influenced Rural NPs to Practice in a Rural Setting*

Factor	Number (%) of Respondents
“I grew up in a rural setting”	49 (78%)
“Autonomy of practice”	28 (44%)
“I trained in a rural setting”	26 (41%)
“Proximity of friends and family”	22 (35%)
“Rural way of life”	21 (33%)
“A sense of mission to serve in a rural setting”	20 (32%),
“Better quality of life”	20 (32%),
“Spouse/significant other from a rural setting and/or willing to live in rural area”	18 (29%)
“Sense of belonging”	16 (25%)
“Financial reasons”	14 (22%)
“Spouse/significant other work opportunities”	9 (14%)
“Sense of challenge”	8 (13%)
“Loan forgiveness/scholarship”	7 (11%)
“Flexible work schedule”	6 (10%)

Note: % = Percentage

Most of the 63 respondents reported practicing in more than one setting. Family practice was the most frequently reported setting (50 NPs, 79%), followed by emergency room (36, 57%), inpatient (26, 41%), urgent care (23, 37%), nursing home (19, 30%), and “other” 12, 19%). About a fifth (13, 21%) reported having their own patient panel.

When asked about the estimated annual patient visits to their practice, 17 of the 61 rural NPs who responded to this question reported 2,500 or less, 21 reported 2,500 to 5,000, 11 reported 5,000 to 10,000, and 12 reported greater than 10,000. More than half of the rural NPs (34) reported having a collaborating physician on-site, seven (7) reported a collaborating physician less than five miles away, 15 reported a collaborating physician five to 50 miles away, and six (6) reported a collaborating physician greater than 50 miles away.

When asked about the availability of a 24-hour provider-staffed ER, 61 NPs responded. Fifty (50) reported the 24-hour provider-staffed ER was available within 5 miles, 10 reported 5 to 50 miles, and one reported greater than 50 miles away. The availability of specialists varied from

local (< 5 miles) to regional (5 to 50 miles); respondents indicated most specialists travel to their community. Access to general surgery services tended to be available locally, whereas access to ophthalmology, dermatology, orthopedic, cardiology, and obstetrics and gynecology services tended to be available regionally.

Respondent's reports on the availability of telemedicine were mixed; half (31) of the 62 NPs who responded to this question reported it was not available, a fourth (16) reported it was available in the ER only, slightly more than a tenth (7) reported it was available both in the ER and clinic, a tenth (6) reported it was available in the clinic only, and a small number (2) reported availability as unknown.

The analysis produced a list of 26 skills and procedures that the majority of respondents performed and reported as important to their practice. Table 2 provides a list of these skills, the percentage of NPs who reported having performed them, and the percentages of NPs who reported the skill as moderately to very important to their clinical practice. Because the respondents did not respond to every question, the total number that responded to each item varied. The skills that most of the respondents identified as performed were treatment of bites (cat, dog, insect, and human; performed by 98% of NPs) and incision and drainage of abscess (performed by 95% of the NPs). All of the 26 skills and procedures were performed by 50% or more of the NPs.

Of the 26 skills identified as critical to practice, four were reported by the majority of the 63 rural NPs as being learned in their educational program. These were breast exam, Pap smear, rectal/prostate, and laceration repair. The percentages of NPs that reported learning these skills in their educational program were 87%, 87%, 65% and 55% respectively. The other skills identified as critical to practice were reported by most NPs as learned after graduation either on the job or at workshops.

Table 2*Skills and Procedures Identified as Critical to Kansas Rural NP Practice*

Skills and/or Procedures	Percentage of rural NPs Who Reported Performing Skill (and how it was calculated*)	Percentage of NPs Who Reported Skill as Moderate to Very Important (and how it was calculated*)
Treatment of bites**	98% (58/59)	88% (49/56)
Abscess incision & drainage	95% (58/61)	93% (52/56)
Laceration repair	93% (56/60)	95% (53/36)
Epistaxis control	93% (40/43)	83% (30/36)
Electrocardiogram interpretation	93% (40/43)	94% (34/36)
Papanicolaou (Pap) smear	93% (50/54)	91% (41/45)
Rectal/prostate exam	92% (33/36)	76% (25/33)
Breast exam	91% (50/55)	91% (41/45)
Foreign body removal	91% (48/53)	86% (38/44)
Skin lesion removal	90% (54/60)	84% (47/56)
Fracture care	86% (51/59)	93% (52/56)
X-Ray interpretation	85% (46/54)	93% (42/45)
Fishhook removal	85% (50/59)	73% (41/56)
Sebaceous cyst removal	83% (50/60)	79% (44/56)
Nail removal	78% (45/58)	76% (42/55)
Digital nerve block	76% (45/59)	82% (45/55)
Ring removal	76% (45/59)	75% (41/55)
Wood's light examination	70% (41/59)	71% (39/55)
Subungual hematoma excision	69% (40/58)	58% (32/55)
Genital wart treatment	66% (36/55)	56% (25/45)
Pilonidal cyst drainage	64% (23/36)	47% (15/32)
Soft tissue aspiration	59% (35/59)	50% (27/54)
Joint injection	59% (35/59)	62% (34/55)
Dislocation reduction	57% (33/58)	69% (37/54)
Bartholin cyst abscess I & D	57% (30/53)	50% (22/44)
Ulcer debridement	54% (31/58)	52% (29/56)

Notes: NP = nurse practitioner,

*Each ratio in parentheses was multiplied by 100 to obtain the percentage.

**Treatment of bites included cat, dog, insect, human, etc.

About half of the skills and procedures deemed critical to rural NP practice included those that were performed once a month or more; the other half of the items were rarely performed however they were identified as moderately to very important to practice (results not shown). Table 3 provides a list of 12 skills and procedures that 50% of NPs reported as performed routinely or frequently in their rural clinical practice. Electrocardiogram and X-Ray interpretation were the two most frequently performed skills.

Table 3*Routinely and Frequently Performed Skills by Kansas Rural NPs*

Most frequently performed skills/procedures	Performed routinely (> once per week)	Performed frequently (> once per month)	Performed rarely (few times per year)	N/A	Percentage of NPs who performed skill/procedure routinely or frequently
ECG interpretation	21	13	2	1	92%
X-Ray interpretation	32	8	2	2	91%
Pap smear	22	14	8	0	82%
Laceration repair	19	20	12	2	74%
Abscess I & D	14	25	13	2	72%
Fracture care	16	18	14	4	65%
Skin lesion removal	13	19	17	2	63%
Digital nerve block	7	20	14	3	61%
Breast exam	4	19	21	0	52%
Foreign body removal	3	20	19	2	52%
Nail removal	2	22	20	4	50%
Wood's light exam	4	20	14	10	50%

Notes: ECG = Electrocardiogram; I & D = Incision and Drainage; N/A = Not applicable.

Thirty-seven (37) patient care management activities were identified as critical to practice (Table 4). Thirty-six of these activities were performed by 50% or more of the NPs. One practice activity, complex mental health problem, was performed by less than 50% of respondents, however, 55% (18/33) deemed it moderate to very important to practice, thus, it was added to the list of patient care management activities critical to Kansas rural NP practice.

Table 4*Patient Care Management Activities Identified as Critical to Kansas Rural NP Practice*

Patient Care Management Activities (i.e., management of a patient with the following conditions, symptoms, or characteristics)	Percentage of Rural NPs Who Reported Performing Activity (and how it was calculated*)	Percentage of NPs Who Reported Skill as Moderate to Very Important (and how it was calculated*)
High blood pressure	98% (42/43)	97% (35/36)
Frail elderly	97% (34/35)	97% (32/33)
Urinary complaints	95% (40/42)	95% (35/37)
Chest pain	95% (41/43)	97% (35/36)
COPD/asthma with/out exacerbation	94% (34/36)	94% (31/33)
Acute abdominal pain	94% (34/36)	94% (31/33)
Mental health conditions	94% (34/36)	91% (30/33)
Diabetes	94% (32/34)	94% (31/33)
Acute/chronic pain	93% (56/60)	94% (31/33)

Patient Care Management Activities (i.e., management of a patient with the following conditions, symptoms, or characteristics)	Percentage of Rural NPs Who Reported Performing Activity (and how it was calculated*)	Percentage of NPs Who Reported Skill as Moderate to Very Important (and how it was calculated*)
Sexual concerns	93% (51/55)	93% (41/44)
Sexually transmitted infections	93% (51/55)	93% (41/44)
Acute/chronic arrhythmias	93% (40/43)	94% (34/36)
DVT and/or PE	93% (40/43)	92% (33/36)
Pelvic pain and/or discharge	93% (39/42)	92% (34/37)
Congestive heart failure	93% (40/43)	94% (34/36)
Burns	92% (54/59)	91% (51/56)
Croup and/or bronchiolitis	92% (35/36)	85% (28/33)
Breast concerns	91% (50/55)	89% (40/45)
Concussion	91% (32/35)	91% (30/33)
Weight changes	91% (32/35)	88% (29/33)
Anaphylaxis	86% (31/36)	85% (28/33)
Seeking contraception	84% (46/55)	84% (38/45)
Mental health crisis	83% (30/36)	82% (27/33)
Acute stroke symptoms	83% (30/36)	82% (27/33)
Perimenopausal/menopausal symptoms	83% (35/42)	81% (29/36)
Victim of abuse (or suspicion of)	83% (29/35)	85% (28/33)
Vision changes	81% (35/43)	81% (30/37)
Heart murmur	81% (35/43)	83% (30/36)
Hypertensive crisis	81% (29/36)	85% (28/33)
Respiratory distress/intubation	81% (29/36)	79% (26/33)
Delirium and/or intoxication	81% (29/36)	79% (26/33)
Attention deficit hyperactivity disorder	75% (27/36)	69% (22/32)
Acute trauma/stabilization	74% (26/35)	79% (26/33)
Hearing changes	70% (30/43)	69% (24/35)
Pediatric developmental concerns or FFT	69% (24/35)	70% (23/33)
Substance abuse/addictions	56% (20/36)	61% (20/33)
Complex mental health problems	47% (17/36)	55% (18/33)

Notes: Chronic obstructive pulmonary disease (COPD), Deep vein thrombosis (DVT), Failure to thrive (FFT), Pulmonary embolism (PE).

*Each ratio in parentheses was multiplied by 100 to obtain the percentage

Some rural NPs reported on education and training needs in the comments section of the survey. One respondent made the following comment:

An NP in a rural setting needs to be an expert generalist...Needs to know something about everything, since we treat birth to death, acute and chronic; urgent and emergent. Often a collaborative physician is not available in person—so if taking ER call, one must be quite confident in skills. A rural NP must have expanded training other than is given in typical FNP program.

Another made the following comment:

I learned a lot of the “basics” or “fundamentals” in NP school, but have expanded on skill sets with on the job training [and] seeking colleague assistance/training in specialty fields. I suggest more specialty clinical hours such as cardiology, ortho, ob/gyn, radiology etc., than just FNP hours.

Discussion

The analysis produced a list of 26 skills/procedures and 37 patient care management activities critical to rural NP practice in Kansas. Only four of the skills (breast exam, Pap smear, rectal/prostate, and laceration repair) were reported as learned in the NP’s educational program. The other skills identified as critical to practice were learned either on the job or at workshops. The analysis also produced a list of 12 skills and procedures that the majority of Kansas rural NPs performed routinely or frequently in their clinical practice.

Few existing studies examined the range, frequency, and critical nature of skills and practice activities performed by NPs. Laustsen (2013) identified 23 skills that Oregon NPs performed on a regular basis or deemed critical to their practice, however, the Oregon sample included urban and suburban NPs in addition to rural and frontier NPs. Laustsen reported only two critical skills (Pap smears and microscopy) as learned in more than 50% of respondent’s NP educational programs, however, the survey used in that study did not include breast exam or rectal/prostate exam, which were added to the survey for the current study. The current study did not specifically ask about microscopy.

Brown et al. (2009) reported that rural and frontier Wyoming NPs performed procedures such as electrocardiogram interpretation, X-ray interpretation, suturing, casting, incision and drainage, Pap smear, and intrauterine device placement/removal. All of these were identified as

critical skills in the current study, with the exception of intrauterine device placement/removal, which only 16 of 55 NPs (29%) reported performing and only 15 of 44 (34%) reported as very important, important, or moderately important to their rural practice.

Compared to the studies by Laustsen (2013) and Brown et al. (2009), the results of this study identified similar skills routinely performed by NPs or identified as critical to practice. However, this study identified additional skills that were not previously identified. The additional skills or procedures identified as critical to practice include breast exam, fracture care, fishhook removal, sebaceous cyst removal, nail removal, digital nerve blocks, ring removal, subungual hematoma excision, genital wart treatment, pilonidal cyst drainage, soft tissue aspiration, joint injection, dislocation reduction, Bartholin cyst abscess incision and drainage, and ulcer debridement. Differences in NP practice patterns across states and over time may occur in response to variations in patient needs, limited access to care, regional differences in care, and increased experiences and competency in performing skills and procedures by rural NPs.

No studies were found that specifically identified patient care management activities performed by rural NPs. One explanation is that patient care management activities are included in the FNP certification examination Test Blue Prints produced by the American Academy of Nurse Practitioners and the American Nurses Credentialing Center. Because knowledge of patient care management activities is required for certification, schools of nursing include them in their curricula to prepare students to pass one of these FNP certification examinations.

Although half of the rural and frontier NPs in the current study reported that telemedicine was not available at their clinical site, that result may be changing rapidly. Shortly after data were collected, Kansas passed its telemedicine parity law in May of 2018. The law requires private payers to cover telehealth services and allows telehealth coverage under the state

Medicaid program. The Kansas Telemedicine Act, which took effect January 1, 2019, includes NPs as eligible providers. With the passage of the Act, telemedicine training has become an essential component of NP curricula in Kansas. Because it protects both the patient and provider from physical contact, the growth of telemedicine has been accelerated by the COVID-19 pandemic (Rengers, 2020). Evidence exists that rural Medicaid beneficiaries are more likely to utilize telehealth services than urban Medicaid beneficiaries, especially for mental health conditions (Talbot et al., 2019). Although Kansas has not yet adopted the Medicaid expansion as of May 2020, it has had a lot of expansion activity (Medicaid, 2020) and will likely address it again in the 2021 legislative session.

This study addressed additional certifications that NPs have completed to meet the workforce demands of rural settings. Almost all the respondents reported additional training/certifications in BCLS, ACLS, PALS, ATLS, and/or neonatal resuscitation. Nurse Practitioner educational programs for primary care roles typically do not provide these certifications as a part of the curricula. For the NPs who participated in this study, the additional training was obtained through employers. These skills are important for rural practice as most NPs work in multiple settings that include emergency and urgent care as well as primary care.

The overwhelming majority of rural NPs in the current study identified as FNPs (96.8%), white (95.2%), non-Hispanic (98.4%), female (90.5%), and between 35 and 64 years of age (82.5%). The respondents included a higher percentage of FNPs and were somewhat less diverse compared to national data on the NP workforce. According to the American Association of Nurse Practitioners (n.d.), for example, 65.4% of NPs in the United States are certified as FNPs and the average age of NPs is 47 years. Nurse Practitioner Schools (2020) reported that NPs and nurse midwives in the United States are predominately white (85.7%) and female (89.5%).

The factors that influenced the respondents to practice in a rural setting were consistent with those identified in a policy brief provided by the National Rural Health Association (2015). These factors included “rural background, family practice specialty, rural training, rural-oriented curriculum, having family in the rural area, professional opportunities, economic incentive, practice relief, interest in working with underserved populations, and opportunities for family members” (p. 3). The finding that autonomy of practice was the second most common factor that influenced practice in a rural setting in the current study suggests that autonomy in practice is an important factor influencing the recruitment of NPs into rural Kansas settings. Spetz et al. (2017), in their national sample of NPs, reported that rural NPs have greater practice autonomy than urban NPs, especially among NPs working in small isolated rural settings.

The finding that autonomy is important to rural NPs is consistent with studies that have focused on the relationships between state regulations regarding NP scope of practice and the supply of NPs and location of NP practices. Xue, Kannan et al. (2018), for example, reported that full scope of practice regulation was associated with higher NP supply in rural counties and those counties designated as primary care health professions shortage areas. Neff et al. (2018) reported that restricted NP practice limits the ability of NPs to provide care in areas that lack access to primary care providers because NPs are often providing care in locations that are geographically located within close proximity to supervising physicians. This is consistent with the current study in which over half of the rural NPs (34) reported having a collaborating physician on-site with an additional seven reporting a collaborating physician less than five miles away.

The generalizability of the results is limited to rural and frontier Kansas NP practice. The data were based on provider self-report and did not reflect actual numbers of procedures or

patient care management activities performed. Because the original survey developed by Laustsen (2013) was modified for this study, direct comparisons should be interpreted with caution. The survey was rather long and several respondents who completed the survey commented on the length of the survey. The authors noted that items nearer the beginning of the survey were more likely to be completed by all participants, whereas items near the end of the survey had more missing data. Reliability and validity of the survey was difficult to assess due to the absence of psychometric testing for either the original or modified instrument.

In summary, the analysis produced a list of skills and patient care management activities critical to Kansas rural NP practice. Many of the skills and patient care management activities performed by Kansas rural NPs were learned after graduation. To increase practice readiness of NP graduates for the rural workforce, a critical examination of FNP curricula is needed. Although the current study is specific to Kansas, the results could be used by faculty of other NP programs as they prepare graduates for rural practice.

References

- American Association of Nurse Practitioners. (n.d.). *NP Facts*.
https://storage.aanp.org/www/documents/NPFacts_080420.pdf
- Auerbach, D. I., Buerhaus, P. I., & Staiger, D. O. (2020). Implications of the rapid growth of the nurse practitioner workforce in the US. *Health Affairs*, 39(2), 273-279.
<https://doi.org/10.1377/hlthaff.2019.00686>
- Barnes, H., Richards, M. R., McHugh, M. D., & Martsolf, G. (2018). Rural and nonrural primary care physician practices increasingly rely on nurse practitioners. *Health Affairs*, 37(6), 908-914. <https://doi.org/10.1377/hlthaff.2017.1158>
- Brown, J., Hart, A. M., & Burman, M. E. (2009). A day in the life of RURAL advanced practice

nurses. *The Journal for Nurse Practitioners*, 5(2), 108-114,
<http://doi.org/10.1016/j.nurpra.2008.10.013>

Kansas Department of Health and Environment (n.d.). *Health professional underserved area report*. https://www.kdheks.gov/olrh/download/2019_Underserved_Areas_Report.pdf

Laustsen, G. (2013). What do nurse practitioners do? Analysis of a skills survey of nurse practitioners. *Journal of the American Association of Nurse Practitioners*, 25(1), 32-42.
<http://doi.org/10.1111/j.1745-7599.2012.00750.x>

Medicaid (2020). Status of state Medicaid decisions: Interactive map.
<https://www.kff.org/medicaid/issue-brief/status-of-state-medicare-expansion-decisions-interactive-map/>

National Rural Health Association (2015). *Quality of life impacts the recruitment and retention of rural health care providers*.
<https://www.ruralhealthweb.org/getattachment/Advocate/Policy-Documents/QualityofLifeRecruitmentRetentionProvidersFeb2015.pdf.aspx?lang=en-US>

Neff, D. F., Yoon, S. H., Steiner, R. L., Bejleri, L., 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. <http://doi.org/10.1016/j.outlook.2018.03.001>

Nurse Practitioner Schools. (2020). *The lack of diversity in advanced nursing*.
<https://www.nursepractitionerschools.com/blog/diversity-in-advanced-nursing/>

Rengers, C. (2020). 'The genie's out of the bottle,' and telehealth is on its way to being the new norm. *The Wichita Eagle*. <https://www.kansas.com/news/business/biz-columns-blogs/carrie-rengers/article242082156.html>

Spetz, J., Skillman, S. M., & Andrilla, C. H. A. (2017). Nurse practitioner autonomy and

satisfaction in rural settings. *Medical Care Research and Review*, 74, 227-235.
<http://doi.org/10.1177/1077558716629584>

Talbot, J. A., Burgess, A. R., Thayer, D., Parenteau, L., Paluso, N., & Coburn, A. F. (2019). Patterns of telehealth use among rural Medicaid beneficiaries. *The Journal of Rural Health*, 35(3), 298-307. <https://doi.org/10.1111/jrh.12324>

United States Department of Agriculture Economic Research Service. (n.d.). Kansas. <https://data.ers.usda.gov/reports.aspx?StateFIPS=20&StateName=Kansas&ID=17854>

Xue, Y., Kannan, V., Greener, E., Smith, J. A., Brasch, J., Johnson, B. A., & Spetz, J. (2018). Full scope-of-practice regulation is associated with higher supply of nurse practitioners in rural and primary care health professional shortage counties. *Journal of Nursing Regulation*, 8(4), 5-13. [https://doi.org/10.1016/S2155-8256\(17\)30176-X](https://doi.org/10.1016/S2155-8256(17)30176-X)

Xue, Y., Smith, J. A., & Spetz, J. (2019). Primary care nurse practitioners and physicians in low-income and rural areas, 2010-2016 [Research Letter]. *JAMA*, 321(1), 102-105. <https://doi.org/10.1001/jama.2018.17944>