Practice Characteristics and Geographic Distribution of Clinical Pharmacist Practitioners in North Carolina

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BACKGROUND Clinical pharmacist practitioners (CPPs) are specially credentialed pharmacists in North Carolina. CPPs potentially play an important role in meeting the health care needs of populations in rural and underserved areas.

METHODS A cross-sectional study was conducted using an electronic survey sent to all active and inactive CPPs in North Carolina. The survey consisted of 36 multiple-choice and free text questions. Respondents were queried regarding qualifications, experience, practice characteristics, and perceived rewards and challenges of CPP practice.

RESULTS Survey responses were received from 54 active CPPs and 22 inactive CPPs, for an overall response rate of 65.5%. Forty-one active CPPs (75.9%) and 14 inactive CPPs (63.6%) came from ambulatory care backgrounds. Twenty-eight active CPPs (51.9%) and 11 inactive CPPs (54.5%) were paid by the institutions for which they were employed.

LIMITATIONS The overall survey response rate was only 65.5%. Additionally, the majority of survey questions were in a multiple-choice format, which may have prevented more honest reflection.

CONCLUSIONS Active CPPs most often come from ambulatory care backgrounds. Few CPPs are practicing in rural areas, a circumstance that may be related to financial viability, as most CPP practice in, and are compensated by, larger institutions such as academic health centers.

Pharmacists are making positive, cost-effective contributions to health care nationwide. A recent study found that expenditures for clinical pharmacy services produce $4 in savings for every $1 spent [1]. Due to the overall positive impact of clinical pharmacy services, many states have passed pharmacy practice laws that allow pharmacists to practice at a more advanced level.

Under the Clinical Pharmacist Practitioner Act of 2000, licensed pharmacists who meet certain additional requirements may exercise extensive practice privileges well beyond the traditional model of pharmacy practice, including initiating new drug therapy, changing medication doses, renewing previous drug therapy, ordering labs or tests, and obtaining patient referrals [2]. Many of these privileges are available to pharmacists in the majority of states nationwide as part of collaborative drug therapy management [3]. However, only North Carolina and a handful of other states issue DEA numbers and allow prescribing authority for all medications, including controlled substances [4]. In North Carolina, these advanced practice pharmacists are called clinical pharmacist practitioners (CPPs) and are licensed by both the state pharmacy and medical boards [2]. The exact limits of the pharmacist’s privileges are dependent on the scope of the protocol established between the overseeing physician and the pharmacist.

Pharmacist involvement in rural health care is making a difference in many areas of the country. Medication therapy management services have proven to be beneficial in rural communities, especially areas where chronic disease states are prevalent and primary care providers are lacking [5]. Studies suggest that a pharmacist may be a patient’s first access to health care in rural areas [6]. Pharmacists also have opportunities to be leaders in confronting public health concerns in rural areas, especially with their abilities in disease state management and preventive medicine [7].

Approximately 30% of North Carolina’s population lives in rural areas, compared with 17% nationwide [8]. The poverty rate for nonmetropolitan areas of North Carolina is 19%, compared with 15% for metropolitan areas of the state. Additionally, people living in rural areas of the state have lower per-capita incomes, higher rates of unemployment, and less access to transportation than people in urban areas of North Carolina [9]. People living in North Carolina’s rural areas also face more barriers to accessing health care, due in part to a lack of health care providers in close proximity to their home [10].

Although North Carolina has very progressive pharmacy practice rules and regulations, only 199 of the 10,620 pharmacists licensed in North Carolina have obtained CPP licensure since the inception of the Clinical Pharmacist Practitioner Act of 2000.
Practitioner Act [11], with 144 CPPs actively practicing at present. A demographic examination of these practitioners, coupled with an investigation into the promoting and limiting forces that CPPs face in practice, may encourage pharmacists in North Carolina and elsewhere to consider practicing at this level, which could further the evolution of the profession and help to address unmet societal health needs. The North Carolina model of CPPs is designed to provide an additional option for meeting the health care needs of rural populations that often face severe shortages of primary health care providers.

This article will examine the implications of this practice model’s adoption in terms of the geographical distribution of CPPs in North Carolina, with emphasis on the role of enhanced care for underserved rural populations, based on the observation that CPPs are not well distributed among rural counties in North Carolina.

Methods

Study methods have been described in detail elsewhere [12]. Briefly, this was a cross-sectional study conducted through means of an original, electronic survey consisting of 36 multiple-choice and free text questions. The survey was sent on 3 different occasions (May 26, 2011; June 13, 2011; and June 27, 2011) in attempts to further encourage non-responders. The sample was comprised of all active CPPs (active CPP license) and inactive CPPs (expired CPP license); this list was obtained from the North Carolina Medical Board and the North Carolina Board of Pharmacy.

Questions were categorized as to qualifications, experience, practice characteristics, perceived rewards and challenges, and basic demographic information. For several of the questions, respondents were able to select multiple responses.

Information regarding qualifications included level of education, completion of a residency and/or fellowship, board certification (ie, Board of Pharmacy Specialties), other certification (eg, Certified Diabetes Educator or Certified Geriatric Pharmacist), or completion of approved certificate programs (North Carolina Center for Pharmaceutical Care or Accreditation Council for Pharmacy Education).

Information regarding types of pharmacy experience was also requested. Categories included community pharmacies (chain or independently owned), hospital, ambulatory care (ie, outpatient medical clinics), and industry. Additional information collected included years in practice and amount of clinical experience before application for licensure as a CPP. Practice characteristic descriptors included the type of practice setting (eg, physician’s office, hospital clinic, long-term care center), geographic setting (eg, urban, suburban, or rural), affiliation with an academic health center, therapeutic area of CPP practice, level of employment as a CPP (full-time or part-time), and method of payment for services rendered. The geographic practice setting was not predefined in the survey questionnaire; rather, it was left to the discretion of the respondent to determine if his or her practice setting should be characterized as urban, suburban, or rural.

Since the perceived rewards and challenges these practitioners face are not well understood, relevant items were presented utilizing a free text response format to allow for more openness in response, with example responses for each question. Inactive CPPs were also asked why they were no longer active in CPP practice, and all CPPs were asked their reason for initially pursuing CPP licensure. The survey’s face validity was assessed by 2 CPPs who were not involved in the survey’s development. Multiple-choice responses were analyzed by way of calculated percentages. Qualitative results were analyzed by thematic content analysis; these results are presented in a separate publication [13]. The results regarding perceived rewards and challenges of CPP practice are also published elsewhere. Prior to the survey being administered, approval for this study was obtained from the institutional review board at the University of North Carolina at Chapel Hill.

Results

The overall survey response rate was 65.5%, with 54 active CPPs (62%) and 22 inactive CPPs (68.8%) responding. There were 87 actively practicing CPPs at the time the survey was administered.

Qualifications and Experience

Basic demographic, educational background, and training information are shown in Table 1. Active CPPs surveyed had an average of 16.3 years of pharmacy experience, and inactive CPPs surveyed had an average of 16.6 years of pharmacy experience. Regarding years of clinical practice experience prior to applying for CPP licensure, 7 active CPPs (13.0%) and 2 inactive CPPs (9.1%) had less than 3 years experience; 13 active CPPs (24.1%) and 9 inactive CPPs (40.9%) had 3–5 years experience; and 34 active CPPs (63.0%) and 10 inactive CPPs (45.5%) had more than 5 years experience.

Forty-one active CPPs (75.9%) and 14 inactive CPPs (63.6%) reported an ambulatory care pharmacy background; 33 active CPPs (61.1%) and 9 inactive CPPs (40.9%) indicated involvement in hospital pharmacy; and 31 active CPPs (57.4%) and 17 inactive CPPs (77.3%) had experience in community pharmacy. Additionally, 10 active CPPs (18.5%) and 1 inactive CPP (4.5%) were from long-term care pharmacy backgrounds, and 1 active CPP (1.9%) and 3 inactive CPPs (13.6%) came from pharmaceutical industry backgrounds. These percentages reflect CPPs practicing in multiple practice settings concurrently.

Practice Characteristics

Twenty-eight active CPPs (51.9%) and 11 inactive CPPs (50.0%) described themselves as practicing in an urban setting; 18 active CPPs (33.3%) and 7 inactive CPPs (31.8%) considered their practice setting to be suburban; and 7 active
Table 1. Demographic and Other Characteristics of the Study Population (N = 76)

| Characteristic                      | Active CPPs (N = 54) n (%) | Inactive CPPs (N = 22) n (%) |
|-------------------------------------|----------------------------|-----------------------------|
| Age, in years                       |                            |                             |
| 25-30                               | 9 (16.7)                   | 0 (0.0)                     |
| 31-40                               | 18 (33.3)                  | 14 (63.6)                   |
| 41-50                               | 13 (24.1)                  | 4 (18.2)                    |
| 51-60                               | 10 (18.5)                  | 2 (9.1)                     |
| Older than 60                       | 4 (7.4)                    | 2 (9.1)                     |
| Sex                                 |                            |                             |
| Male                                | 21 (38.9)                  | 2 (9.1)                     |
| Female                              | 33 (61.1)                  | 20 (90.9)                   |
| Race                                |                            |                             |
| White                               | 49 (90.7)                  | 16 (72.7)                   |
| Asian                               | 3 (5.6)                    | 4 (18.2)                    |
| American Indian/Alaskan native      | 2 (3.7)                    | 2 (9.1)                     |
| Year of entry-level pharmacy degree |                            |                             |
| 2000 and later                      | 22 (40.7)                  | 5 (22.7)                    |
| 1990-1999                           | 13 (24.1)                  | 9 (40.9)                    |
| 1980-1989                           | 7 (13.0)                   | 0 (0.0)                     |
| 1980 and earlier                    | 8 (14.8)                   | 3 (13.6)                    |
| Background and training             |                            |                             |
| Doctor of Pharmacy                  | 50 (92.6)                  | 18 (81.8)                   |
| Residency                           | 38 (70.4)                  | 15 (68.2)                   |
| Board of pharmaceutical specialties | 27 (50.0)                  | 7 (31.8)                    |
| Bachelor of Science (pharmacy)      | 22 (40.7)                  | 8 (36.4)                    |
| Other certifications                | 20 (37.0)                  | 11 (50.0)                   |
| Bachelor of Science (any discipline)| 13 (24.1)                  | 3 (13.6)                    |
| Master’s degree                     | 6 (11.1)                   | 2 (9.1)                     |
| Fellowship                          | 4 (7.4)                    | 0 (0.0)                     |

Note. CPP, clinical pharmacist practitioner.

*For the question about year of entry-level pharmacy degree, only 50 active CPPs and 17 inactive CPPs responded.

*Respondents were given the option of selecting multiple answers for background and training.

*Master’s degrees includes Master of Business Administration, Master of Science (pharmacy), and Master of Public Health.

CPPs (13.0%) and 3 inactive CPPs (13.6%) practiced in a rural environment. Thirty active CPPs (55.6%) and 7 inactive CPPs (31.8%) indicated that their practice location was affiliated with an academic medical center. Details surrounding types of CPP practice settings are shown in Table 2.

Seventeen active CPPs (31.5%) and 5 inactive CPPs (22.7%) indicated that the CPP practice role accounted for the entirety of their employment. For active CPPs who reported that their role as a CPP did not constitute the entirety of their employment, 3 (5.6%) indicated the CPP model constituted greater than 75% of their time; 4 (7.4%) reported that this work occupied 51%–75% of their time; 13 (24.1%) reported that it occupied 26%–50% of their time; and 17 (31.5%) reported that it occupied 25% or less of their time. The remainder of their time was spent in traditional pharmacy-related practice activities, such as dispensing, teaching, research, administration, directing residency programs, conducting operations related to their business, working in long-term care facilities, or performing pharmacist duties in a clinical setting without functioning as a CPP.

Therapeutic areas of CPP practice are shown in Table 3.

**Financial Compensation**

Thirty-three active CPPs (61.1%) and 12 inactive CPPs (54.5%) were paid by the institutions for which they were employed, independent of service intensity or frequency—a common cost-avoidance model for clinical pharmacy departments across the country. Fourteen active CPPs (25.9%) and 9 inactive CPPs (40.9%) were remunerated for services rendered through direct patient billing in a fee-for-service model. Other sources of payment included disease management programs, colleges of pharmacy, pharmaceutical companies, research funds, and grants. A few CPPs reported billing insurance providers, but only for providing vaccinations. Of interest, 8 active CPPs (14.8%) indicated that they did not bill for services at all, or that their work was voluntary.

**Discussion**

This exploratory survey provided a view of CPPs in North Carolina, including qualifications, experience, practice characteristics, and perceived rewards and challenges of this role.

Most practitioners who responded to the survey had 5 or more years of clinical experience prior to licensure as a CPP. This may be a reflection of the requirements for CPP licensure, or perhaps CPP licensure is a form of self-selection. Further research examining the career path of CPPs is required.

Most CPPs came from ambulatory care backgrounds and worked in therapeutic areas where medications for chronic disease states may require frequent dose adjustments to have the desired clinical effect (see Table 3). There is a need within the pharmacy profession to define specific disease states where a pharmacist’s primary therapeutic modality is in the adjustment of medications [14]. Data from this survey suggests that likely candidates for CPP emphasis would be the 10 disease states listed in Table 3, which overlap significantly with the disease states that are the leading causes of morbidity and mortality in North Carolina [6].

Only a small percentage (13.0%) of CPPs in North Carolina practiced in rural settings (see Table 2 and Figure 1); in these areas, there is also a relative scarcity of general medical practitioners (5.2 per 10,000 residents in rural counties versus 8.2 per 10,000 in counties with a population of more than 100,000 residents) [15-17]. This lack of general medical practitioners could pose a barrier for CPPs with a desire to serve in rural areas, as a protocol with a supervisory physician is necessary for a CPP to practice. It would appear, then, that there is a scarcity of practicing CPPs in those counties with more limited access to health care—areas where a clear opportunity exists for CPPs to enhance the quality of care provided.

Initiatives exist in North Carolina to increase access to health care in underserved areas. One of these is Community...
TABLE 2.
Practice Characteristics for Active and Inactive Clinical Pharmacist Practitioners (CPPs) in North Carolina (N = 76)

| Setting                                    | Active CPPs (N = 54) | Inactive CPPs (N = 22) |
|--------------------------------------------|----------------------|------------------------|
| Hospital-based clinic                       | 20 (37.0)            | 3 (13.6)               |
| Physician’s office (group practice)        | 20 (37.0)            | 13 (59.1)              |
| Hospital inpatient service                 | 9 (16.7)             | 1 (4.5)                |
| Other                                      | 5 (9.3)              | 0 (0.0)                |
| Physician’s office (individual practice)   | 3 (5.6)              | 1 (4.5)                |
| Free-standing clinic                       | 3 (5.6)              | 2 (9.1)                |
| Community pharmacy (chain store)           | 3 (5.6)              | 0 (0.0)                |
| Community pharmacy (independent)           | 1 (1.9)              | 3 (13.6)               |

Geographic characteristics

| Geographic Characteristics | Active CPPs (N = 54) | Inactive CPPs (N = 22) |
|----------------------------|----------------------|------------------------|
| Urban                      | 28 (51.9)            | 11 (50)                |
| Suburban                   | 18 (33.3)            | 7 (31.8)               |
| Rural                      | 7 (13.0)             | 3 (13.6)               |

*Respondents were given the option to list multiple practice settings.

*Other practice settings included hospice, college health, free clinic, infusion clinic, and research.

Care of North Carolina, a patient-centered medical home model that focuses on improving health care delivery in rural areas through the establishment of regional multidisciplinary networks [18]. Such initiatives could provide CPPs with more opportunities to practice in rural areas and could initiate discussions with rural physicians regarding the benefits that CPPs could provide.

However, the speculated inability of CPPs to independently generate revenue and thereby develop a sustainable practice model outside of a large institution may pose a significant barrier. It is suggestive that the majority of CPPs who became inactive came from community pharmacy backgrounds. In the absence of official provider status, CPP services provided in the context of community pharmacy would present few, if any, opportunities for revenue generation beyond direct patient billing—an unlikely scenario in impoverished rural areas. Indeed, most CPPs practice in larger settings that may have more financial resources, and slightly more than half of all active CPPs work in a setting associated with an academic medical center. The characteristics of billing practices for the majority of CPPs are commonly associated with an organized health care system, an arrangement that may not be as prevalent in rural areas that lack the population density to support these kinds of institutions. Thus, the relative scarcity of large-scale health care systems constitutes a formidable barrier to CPPs practicing in circumstances where their services might prove most useful. An additional challenge is the absence of any governmental mechanism for CPPs to bill for services rendered.

Examples from the literature describe disparities between urban and rural areas with regards to access to health care facilities that offer disease management services for a variety of disease states [19-28]. An increased risk of hospitalizations [29, 30] and mortality [31] in rural areas has also been demonstrated. The American Public Health Association’s most recent policy statement regarding rural health cited several barriers to care in rural areas, including higher self-employment and lower wages resulting in inadequate insurance coverage. Additional barriers cited were shortages of primary care practitioners, emergency medical services, and long-term care facilities [32]. The number of active CPPs for whom CPP work makes up the entirety of their employment is equal to the number of active CPPs for whom this work takes up less than 25% of their time, and nearly 15% of active CPPs stated that they did not bill for services at all. If CPPs are to serve underserved populations in North Carolina, as intended, some mechanism is needed for integrating their services into the state’s health care system at the financial level.

Although the goal is to improve how chronic illness is managed in rural areas, resources may be limited. A recent study concluded that, although the Patient Protection and Affordable Care Act of 2010 (ACA) focused on expanding primary care services to areas that may have more limited access, several institutions—in particular colleges of pharmacy—may be unprepared to meet the challenge. The authors of this study called for more structured academic programs and more experiential training focused on rural areas to help address this need [33].

Further initiatives are needed to fully integrate advanced practice pharmacists into rural health care to meet the needs of this population. Recognition of CPPs as health care providers by Medicare and/or Medicaid would assist in this regard, as would some mechanism of integrating CPP services into a medical home model or accountable care organization model in underserved rural regions. The ACA does support expanding the role of pharmacists to address medication use problems by providing for programs that expand clinical pharmacy services and by granting federal recog-

TABLE 3.
Areas of Therapeutic Practice* for Active and Inactive Clinical Pharmacist Practitioners (CPPs) in North Carolina (N = 76)

| Area                                     | Active CPPs (N = 54) | Inactive CPPs (N = 22) |
|------------------------------------------|----------------------|------------------------|
| Anticoagulation                          | 34 (63.0)            | 13 (59.1)              |
| Hyperlipidemia                           | 27 (50.0)            | 14 (63.6)              |
| Diabetes                                 | 25 (46.3)            | 12 (54.5)              |
| Respiratory diseases                     | 19 (35.2)            | 6 (27.3)               |
| Hypertension                             | 18 (33.3)            | 10 (45.5)              |
| Medication therapy management            | 14 (25.9)            | 5 (22.7)               |
| Smoking cessation                        | 14 (25.9)            | 3 (13.6)               |
| Hematology/oncology                      | 8 (14.8)             | 0 (0.0)                |
| Pain management                          | 8 (14.8)             | 2 (9.1)                |
| Osteoporosis                             | 7 (13.0)             | 3 (13.6)               |
| Obesity                                  | 5 (9.3)              | 3 (13.6)               |
| Heart failure                            | 4 (7.4)              | 2 (9.1)                |
| Mental health                            | 4 (7.4)              | 1 (4.5)                |

*Respondents were given the option to list multiple therapeutic practice activities.
nition that pharmacy services are of critical importance to the realization of the nation’s health care initiatives [34]. In addition to elevating the provider status of CPPs or integrating CPPs into medical home models, alternative initiatives could include student loan forgiveness, specialized scholarship programs for CPPs who demonstrate a commitment to practice in rural areas, or specialized scholarship programs for promising rural students who otherwise might not be in a position to pursue a professional education.

Additionally, the measured clinical and economic impact of CPP practice in North Carolina needs to be addressed in order to make advanced pharmacy practice more financially feasible in all areas of every state and to serve populations with greater health care needs, limited health insurance coverage, and significant barriers to access.

This study was limited in that the overall survey response rate was only 65.5%, which may affect generalizability. Another limitation may be in the construction of the survey questions. The majority of questions were in a multiple-choice format, which may have prevented more honest reflection, most notably for the question concerning the reasons for initially pursuing CPP licensure. However, most questions did include an option to submit another answer, if the best answer was not listed as a choice.

Conclusion

In this study population, active CPPs had 5 or more years of clinical experience prior to obtaining CPP licensure. CPPs most often came from ambulatory care backgrounds, and they were more often involved in the treatment of chronic disease states. Although there are perceived benefits to practicing as a CPP, there may also be challenges that make CPP practice in the rural setting less financially viable. Indeed, the majority of CPPs practice in urban settings and at large institutions where greater financial support is likely more available. In the rapidly evolving health care environment, ensuring the availability of quality health care to rural Americans is an especially daunting challenge. In all future rural health initiatives, incorporation of a viable CPP model for patient care is necessary to ensure the best and most cost-effective care possible.

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