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RN jurisdiction over nursing care systems in nursing homes: application of latent class analysis

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Abstract

Background—In the context of declining registered nurse (RN) staffing levels in nursing homes, professional nursing jurisdiction over nursing care systems may erode.

Objectives—The purpose of this study is to develop a typology of professional nursing jurisdiction in nursing homes in relation to characteristics of RN staffing, drawing upon Abbott's (1988) tasks and jurisdictions framework.

Method—The study was a cross-sectional, observational study using the 2004 National Nursing Home Survey (N=1,120 nursing homes). Latent class analysis tested whether RN staffing indicators differentiated facilities in a typology of RN jurisdiction, and compared classes on key organizational environment characteristics. Multiple logistic regression analysis related the emergent classes to presence or absence of specialty care programs in 8 clinical areas.

Results—Three classes of capacity for jurisdiction were identified, including ‘low capacity’ (41% of homes) with low probabilities of having any indicators of RN jurisdiction, ‘mixed capacity’ (26% of homes) with moderate to high probabilities of having higher RN education and staffing levels, and ‘high capacity’ (32% of homes) with moderate to high probabilities of having almost all indicators of RN jurisdiction. ‘High capacity’ homes were more likely to have specialty care programs relative to ‘low capacity’ homes; such homes were less likely to be chain-owned, and more likely to be larger, provide higher technical levels of patient care, have unionized nursing assistants, have a lower ratio of LPNs to RNs, and a higher education level of the administrator.

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Discussion—Findings provide preliminary support for the theoretical framework as a starting point to move beyond extensive reliance on staffing levels and mix as indicators of quality. Further, findings indicate the importance of RN specialty certification.

Keywords

nurse staffing; staff mix; organizational performance; authority; autonomy

Increasing acuity in nursing homes (Kasper & O'Malley, 2007), due to in part to growth in post-acute care, (Harrington, Carrillo, & Blank, 2008; Ng, Harrington, & Kitchener, 2010) combined with a documented decline in registered nurses (RNs) (Harrington et al., 2008) has limited the amount of professional expertise in nursing homes and the ability of professional nurses to affect nursing care systems. In fact, a nursing home may only have one RN, who also serves as the Director of Nursing (Fleming & Kayser-Jones, 2008), or use a visiting nurse model of RN presence (Bowers & Nolet, 2009; Burger et al., 2009). In this staffing context, RNs may not maintain professional jurisdiction over nursing care systems, ultimately jeopardizing patient safety and increasing overall health care costs (Horn, 2008; Horn, Buerhaus, Bergstrom, & Smout, 2005).

Professional jurisdiction is the extent to which a profession has the authority and autonomy to determine the care tasks to be provided and who provides those care tasks, using specialized knowledge and judgment (Abbott, 1988). This authority may be legally ascribed (i.e., state nurse practice acts), but also is a function of the larger public perceptions of which profession has legitimate expertise for addressing a specific issue (Abbott, 1988). Further, workers compete for jurisdiction as they make day-to-day decisions that establish boundaries for who manages or performs care tasks (Abbott, 1988). Abbott's framework has been used to examine which profession determines aspects of health care delivery such as sub-specialty areas in medicine, (Halpern, 1992; Martin, Currie, & Finn, 2009), dentistry (Adams, 2004), and care quality improvement processes and cost containment strategies (Casalino, 2004), but has not been used to understand professional nursing jurisdiction over nursing home care.

Previous research has linked multiple aspects of RN staffing in nursing homes to care system processes and outcomes. For example, higher levels of educational preparation and specialty knowledge in nursing homes have been related to more effective RN leadership and supervisory skills (Fleming & Kayser-Jones, 2008; Siegel, Young, Mitchell, & Shannon, 2008). Nursing home use of advanced practice nurses (APNs) has been related to better resident quality of care outcomes (Kane, Keckhafer, Flood, Bershadsky, & Siadaty, 2003; Lekan, Hendrix, McConnell, & White, 2010; Mezey et al., 2005). A higher proportion of RNs among nursing home staff, as well as having overall higher RN staffing levels, have been linked to better quality of care (Akinci & Krolikowski, 2005; Anderson, Hsieh, & Su, 1998; Bostick, 2004; Castle, 2002; Horn et al., 2005; Weech-Maldonado, Meret-Hanke, Neff, & Mor, 2004). By conceptually relating each of these aspects of staffing to a single, underlying construct of professional nursing jurisdiction, we move beyond examining staffing characteristics in isolation to gain an overall picture of RN jurisdiction in nursing care systems.

The aims of this study were to: 1) develop a typology of professional nursing jurisdiction by classifying nursing homes in relation to characteristics of RN staffing, using measures of RN educational preparation, employment of APNs, and overall RN staffing levels; 2) assess concurrent validity of this typology of professional nursing jurisdiction by measuring the relationships of the typology with specialty care programs in nursing homes; and 3) identify organizational environment characteristics that relate to professional nursing jurisdiction in a nursing home.

Theoretical Foundation and Research Hypotheses

Typology of RN Jurisdiction: Characteristics of RN staffing in nursing homes

Three key characteristics of RN staffing in nursing homes are hypothesized to form a typology of RN jurisdiction; these are educational level of the RNs, use of APNs, and RN staffing levels (Hypotheses 1a-c; summarized in Figure 1). These indicators operationalize the construct of RN jurisdiction.

Educational preparation—Hypothesis 1a: The educational levels of both the Director of Nursing (DON) RN and staff RNs, as well as whether they hold any specialty certifications, are indicators of stronger professional nursing jurisdiction. According to Abbott (1988), jurisdiction is strengthened because access to new and specialized professional nursing knowledge through further education increases RN capacity to establish authority that RNs alone hold the unique expertise required to make decisions about nursing care systems. Specialty certification may strengthen current or create new jurisdiction. Nurses obtaining specialty certification have accessed and mastered unique nursing knowledge and are linked to an external organization that can advocate for them, affecting legal and publicly-perceived legitimacy of their jurisdiction.

Use of APNs—Hypothesis 1b: Having APNs providing care in the nursing home is an indicator of stronger professional nursing jurisdiction. When APNs, rather than physicians, manage residents' medical care, APNs create nursing jurisdiction over components of care systems that would otherwise be part of the medical profession's jurisdiction. Abbott (1988) terms this provider shift from physician to nurse a “clientele settlement” (p.77).

RN staffing levels—Hypothesis 1c: Having a higher proportion of RNs relative to overall nursing staff is an indicator of stronger professional nursing jurisdiction. A greater proportion of RNs creates greater opportunity for RNs to directly infuse their specialized nursing knowledge into the care being provided by LPNs and NAs. Abbott (1988) refers to this as “formalization,” (p.103) whereby expert, abstract knowledge is elaborated at each level of assistive personnel and linked directly to treatments and care. Without RNs present, organizations may decouple the care from the profession by prescribing routines that can be carried out by paraprofessionals who follow a set of rules. Ultimately, the abstract knowledge that is the core of nursing professional expertise may become irrelevant to how care occurs in the nursing home.

Concurrent validity of the typology of RN Jurisdiction: Specialty Care Programming

In nursing homes with established RN jurisdiction, we would anticipate that care processes in nursing care systems are congruent with expert nursing knowledge. Therefore, relating our typology of RN jurisdiction to care processes allows us to assess the concurrent validity of the typology. Specialty care programming that targets patients at risk for nurse-sensitive clinical issues is one potential measure of care processes because it suggests that clinical nursing expertise is present to address these care issues. We hypothesize, therefore, that greater RN jurisdiction will relate to a nursing home having specialty care programs across a wide range of clinical issues that require nursing expertise (Hypothesis 2), including hospice and palliative care (Stevenson & Bramson, 2009; Suhrie et al., 2009), pain management (Herman, Johnson, Ritchie, & Parmelee, 2009; Swafford, Miller, Tsai, Herr, & Ersek, 2009), dementia care and behavior problems (Luo, Fang, Liao, Elliott, & Zhang, 2010; Nobili et al., 2008), continence care (Leung & Schnelle, 2008; Palmer, 2008; Schnelle et al., 2010), wound care (Frain, 2008; Lynn et al., 2007; Vu, Harris, Duncan, & Sussman, 2007), and restorative care (Resnick et al., 2009).

Organizational environment characteristics related to RN Jurisdiction

RN jurisdiction is hypothesized to vary with organizational environment characteristics, including ownership, patient population, level of technical services offered, and characteristics of non-RN nursing staff and the nursing home administrator (NHA) (Hypotheses 3a-g).

Ownership—Hypothesis 3a: For-profit status and chain status relate to weaker RN jurisdiction. Shareholder accountability inherent in for-profit ownership typically conflicts with the autonomy of professionals, such as RNs, to make decisions about resource use, thereby potentially weakening RN jurisdiction. Chain status increases the bureaucratization of the organization, moving jurisdiction to a regional or central level, potentially decreasing local-level RN jurisdiction.

Patient population—Hypothesis 3b: Having a higher proportion of Medicaid-only residents relates to weaker RN jurisdiction. Termed “client differentiation” (Abbott 1988, p. 122), low-status patients are often linked to low-status professionals and workplaces. Residents in a facility serving largely Medicaid-funded residents may have little power to demand RN-level professional care; paraprofessionals may primarily shape care. Hypothesis 3c: Size of the facility relates to stronger RN jurisdiction. Controlling for other factors, larger organizations generate an increased demand for professionals (Abbott, 1988). Larger nursing homes provide more roles for RNs, such as Assistant Director of Nursing. By contrast, smaller nursing homes may have only one RN employed (Fleming & Kayser-Jones, 2008).

Level of technical services offered—Hypothesis 3d: Providing care for residents with peripherally inserted central catheters (PICC lines) relates to stronger RN jurisdiction. New technology creates new opportunities or demand for professions (Abbott, 1988). Higher tech interventions such as PICC lines increases demand for professional nursing services.

Characteristics of non-RN nursing staff—Hypothesis 3e: Having unionized NAs and NA career ladders relate to stronger RN jurisdiction. When highly routinized or menial tasks are performed by nonprofessional workers supervised by professionals, jurisdiction is enhanced by freeing the professionals to focus on more complex tasks (Abbott 1988). Both unionization and career ladders have this effect, either by mobilizing NAs as a legitimate, paraprofessional, workforce, or by making explicit steps in occupational mobility between non-professional and professional work. Hypothesis 3f: Higher LPN to RN ratio relates to weaker RN jurisdiction. By contrast, when core components of professional work, rather than routinized or menial tasks, are operationalized by algorithms for 'purchase' by other groups, professional jurisdiction is diminished. RN assessment and care planning are frequently operationalized using discrete forms to be completed by LPNs, whereby core aspects of the nursing process are accomplished by LPNs rather than RN. Abbott (1988) terms this "commodification" (p. 146); greater use of LPNs may indicate greater commodification of RN practice.

Characteristics of the NHA—Hypothesis 3g: Higher education level and any specialty certification of the NHA relate to weaker RN jurisdiction. As the majority of NHAs are not RNs, additional, non-nursing knowledge gained through preparation at greater than a bachelor's degree, or through holding a specialty certification, may strengthen NHA professionalization and capacity for jurisdiction over nursing care systems.

Methods

Sample

Data were drawn from public-use data from the 2004 National Nursing Home Survey (NNHS), a nationally representative, cross-sectional survey conducted in 2004 of 1,174 nursing homes certified by Medicare and/or Medicaid, or state licensure to provide care. Originally, nursing homes were sampled using a stratified two-stage probability design, including primary strata of facility size and metropolitan area; data were collected using a computer-assisted personal interview combined with a self-administered mail survey of the NHA (National Center for Health Statistics, 2011). The NNHS has been used extensively to measure the relationships between nursing home organizational context, nurse staffing and quality of care and has demonstrated adequate data reliability and validity (Kang, Meng, & Miller, 2011; Krause, 2011; Luo et al., 2010; Tak, Sweeney, Alterman, Baron, & Calvert, 2010; Temple, Dobbs, & Andel, 2010). We downloaded the public-use files from the NNHS website for analysis. Of the 1,174 facilities, 1,120 reported having a DON on staff, resulting in a final sample of 1,120 facilities. Approval for the conduct of the research using de-identified, public-use data was obtained by the university medical center institutional review board.

Measures

Typology of RN Jurisdiction: Characteristics of RN staffing in nursing homes —Measures (Table 1) included facility-level measures of RN educational preparation and use of APNs. Educational preparation was defined as whether the DON was prepared at the bachelor's degree level, the percent of other RNs in the facility prepared at the bachelor's

degree level, whether any RNs are prepared at the master's degree level, whether the DON has a specialty certification, and whether other RNs have a specialty certification. Use of APNs was defined as whether the facility has a nurse practitioner or clinical nurse specialist on staff. RN staffing level was defined as the ratio of the number of RN full-time equivalents (FTEs) to LPN and NA FTEs (Anderson, Corazzini, & McDaniel, 2004) . Measures were checked for potential collinearity; intercorrelation coefficients were less than .16, confirming appropriate inclusion as independent constructs (Munro & Page, 1993). Categorical measures were dummy coded with 1 equaling the presence of the indicator and continuous measures were coded 1 if the facility was greater than the sample median split on the variable and 0 otherwise. The transformation of continuous measures was done to ease interpretation of results by having all measures as dichotomous indicators. Further, we did not specify a priori cut points at which we anticipated higher staffing would relate to jurisdiction. Rather, we hypothesized that higher levels should relate to jurisdiction and thus chose the median split as the cut point for each indicator.

Concurrent validity of the typology of RN Jurisdiction: Specialty Care Programming—Measures (Table 1) were constructed from the NNHS item which asked if the facility had a special program with specially trained personnel in any of 8 clinical areas of hospice care, palliative care/end of life care, pain management, behavior problems, skin/wounds, continence management, dementia, and restorative care, clarifying that training provided to all facility personnel does not constitute a special care program. Therefore, specialty care programming was defined as whether the facility reported having a program in any of the 8 clinical areas. Each of the 8 areas was coded as a dichotomous indicator of the absence or presence of the program.

Organizational environment characteristics related to RN Jurisdiction—Measures (Table 1) included indicators of ownership type, patient population, use of technical services, characteristics of non-RN nursing staff and of the NHA. Ownership was defined as whether the facility is for-profit and/or part of a chain. Patient population was defined using payment mix and facility size. As the public-use payment mix and size data are categorical data, payment mix was defined as whether the facility had 80% or more of residents with Medicaid as the primary payer and facility size was defined as whether the facility had 100 or more beds. Use of technical services was defined as whether the facility provided PICC line care. Characteristics of non-RN nursing staff were defined as whether the NAs in the facility were unionized, whether the facility provided a career ladder to NAs, and the ratio of the number of LPN FTEs to RN FTEs. NHA characteristics were defined as whether the NHA was prepared at greater than a bachelor's degree, and whether the NHA held a specialty certification. Categorical measures were coded with 1 equaling presence of the indicator and continuous measures were coded as 1 if the facility was greater than the sample median split on the variable and 0 otherwise.

Analysis

Develop a typology of RN Jurisdiction by classifying nursing homes in relation to characteristics of RN staffing (aim 1)—To test the degree to which indicators differentiate facilities in a typology of RN jurisdiction, we conducted latent class

analysis (LCA), a probabilistic clustering approach that empirically classified facilities into classes (Magidson & Vermunt, 2002) by simultaneously considering the 7 RN staffing characteristics that operationalized RN nursing jurisdiction. LCA estimated the probability of a facility belonging to a specific class, as well as the conditional probability of having a particular RN staffing characteristic given membership in a class. Further, the goal was to identify the fewest number of classes that accounted for the observed patterns of RN staffing characteristics. We used Latent Gold 4.5 (Vermunt & Magidson, 2005) to conduct the LCA because it allowed for inclusion of the NNHS survey sampling weights. As there were 8% or less missing data across all variables (range=0-90 facilities missing data; mode=1 facility missing data), we used simple imputation prior to latent class analyses. First, we estimated models fitting 1-4 clusters and selected the best solution based on a significant improvement in fit from the previous solution, simultaneous with no significant improvement in the subsequent solution. Fit criteria included the Lo-Mendell-Rubin adjusted likelihood ratio test and the Bayesian Information Criterion (Lo, Mendell, & Rubin, 2001). Once the optimal solution was identified, we generated posterior probabilities of the likelihood that a facility was in each of the identified classes, and assigned the facility to the class associated with the highest probability. We next examined the class-specific probabilities of having each indicator to develop class profiles. The profiles allowed us to describe classes and assess meaningfulness in relation to RN jurisdiction. In summary, this approach to analysis allowed us to group the nursing homes according to different levels of RN jurisdiction, as operationalized by different patterns of RN staffing. These groups formed our typology.

Assess concurrent validity of the typology of RN jurisdiction (aim 2)—We assessed concurrent validity by conducting multiple logistic regression analyses to test whether class membership significantly predicted presence of each of 8 specialty programs in the facility. Because we were interested in developing a predictive model to assess validity, rather than describing how classes differed on characteristics of interest, we conducted multiple logistic regression analyses using STATA 9.2, appropriately accounting for survey weights, rather than using Latent Gold 4.5 (Thorpe, Thorpe, Kennelty, & Pandhi, 2011)

Identify organizational environment characteristics related to RN jurisdiction (aim 3)—Lastly, using Latent Gold 4.5, we compared classes using the chi-squared statistic (Bonferroni alpha adjustment) on the set of organizational environment characteristics. These comparisons allowed us to test the degree to which characteristics differed by class membership.

Results

Sample

Table 1 summarizes facility characteristics. Considering RN staffing, 42% of all DONs and 25% of other RNs held a bachelor's degree; most held an associate's degree. Only 13% of facilities had an RN with any graduate degree; 12% had an APN. Forty percent had DONs and other RNs with specialty certifications. The mean FTE ratio of RNs to other nursing staff was .17. Regarding specialty care programs, lower prevalence programs included

palliative/end of life (17%,), hospice (19%), continence (22%), behavior problems (24%), pain (26%) and dementia (32%). Higher prevalence programs included skin/wounds (54%) and restorative care (69%). For organizational environment, most facilities were for-profit (54%) and chain-owned (61%). About one-half (49%) were 100 beds or larger, with only 21% serving largely Medicaid patients. Twenty-three percent provided PICC line care. Fifteen percent had unionized NAs, and 31% reported having NA career ladders. The mean ratio of LPNs to RNs in nursing homes was 2.5. Finally, 31% of NHAs held a graduate degree and 27% held a specialty certification.

Typology of RN jurisdiction (aim 1 results)

Table 2 presents the results of the latent class analysis. According to the Lo-Mendell-Rubin LR (LMR) test, (3-class > 4-class, $p<.01$), the 3-class model was a better fit than the 1, 2, or 4 class models. Consistent with the LMR test, a 3-class model was favored according to the Bayesian Information Criterion. Table 3 and Figure 2 present the prevalence of facilities in each of the 3 classes, as well as the predicted prevalence rates for facilities in a specific class having a particular RN staffing characteristic. Like factor analysis, the interpretation of classes occurs by examining indicator-specific probabilities conditioned on class membership, whereby a high conditional probability is analogous to a high factor loading. We interpreted .70-1.00 as a high latent class ‘loading’, .40 - .69 as moderate, and less than . 40 as low(Ryan et al., 2007).

Class 1 included 41% (N=6,251) of facilities. These facilities had a low probability of having any of the 7 RN staffing characteristics hypothesized to indicate RN jurisdiction. As a result, we viewed facilities in this class as having a consistently low probability of having the capacity to establish RN jurisdiction and labeled this class ‘Low Capacity’.

Class 2 included 27% (N=4,192) of facilities. These facilities had a high probability of having a DON who held a bachelor's degree (.92), and a moderate probability of having a greater proportion of other RNs holding a bachelor's degree (.75). Further, these facilities had a moderate probability of having a higher than median FTE ratio of RNs to other nursing staff (.52). While these indicators suggested capacity for RN jurisdiction, we labeled this class “Mixed Capacity” because of a low probability of having any of the remaining indicators.

Class 3 included 32% (N=4,884) of facilities. These facilities had moderate to high probabilities of having all indicators except that of having an APN or RN prepared with a graduate degree, for which probabilities were still higher than classes 1 and 2, but with overall low probabilities (0.25 and 0.27, respectively). These facilities had a high probability of having specialty certified RNs (1.00), and a moderate probability of having a specialty certified DON (.67). Additionally, facilities had moderate probabilities of having higher levels of DON and RN education levels (.53 and .68, respectively), as well as having higher RN staffing ratios (.66). Because of this moderate to high probability pattern, we labeled this class ‘High Capacity’.

Concurrent validity of the typology of RN jurisdiction (aim 2 results)

Table 4 presents the results of the multiple logistic regression models. We estimated separate models for each of the 8 specialty care programs, with 'low capacity' as the reference category. Consistent with our research hypothesis, facilities in the 'high capacity' class were more likely to have specialty care programming in all areas ($p<.01$) except for behavior problems and restorative care, relative to the 'low capacity' class. The 'mixed capacity' class did not differ from 'low capacity' class in any clinical area except for continence care ($p<.05$).

Organizational environment characteristics related to RN jurisdiction (aim 3 results)

Table 5 summarizes the results of the chi-square analyses.

Ownership—Prevalence of for-profit facilities did not differ across classes, but there was a significant difference in prevalence of chain-owned facilities ($\chi 2=6.47$, $p<.01$). Supporting our hypothesis, the highest proportion of chain-owned facilities was in the 'low capacity' class (67%), followed by the 'mixed capacity' (60%), and 'high capacity' (55%).

Patient population—We found no relationship between proportion of Medicaid-funded patients and class, but a significant relationship between facility size and class ($\chi 2=6.47$, $p<.01$). Supporting our hypothesis, a greater proportion of larger facilities was found in the 'high capacity' class (56%) compared to 'mixed' or 'low' capacity (46% and 44%, respectively).

Level of technical services offered—Supporting our hypothesis, the greatest proportion of facilities providing PICC line care was found in the 'high capacity' class (30%), compared to the 'mixed' or 'low' classes (23% and 18%, respectively) ($\chi 2=8.01$, $p<.001$).

Characteristics of non-RN nursing staff—We found no relationship between NA career ladders and class, but whether NAs in a facility are unionized was related to class ($\chi 2=11.99$, $p<.0001$). In support of our hypothesis, over twice as many nursing homes with unionized NAs were in the 'high capacity' class (23%) as in the 'low capacity' class (10%). 'Mixed capacity' facilities also had a lower percentage of facilities with unionized NAs (15%). Further, the ratio of licensed practical nurses (LPNs) to RNs was significantly related to class. Supporting our hypothesis, facilities in the 'high capacity' class had a significantly lower LPN ratio than facilities in the 'low capacity' class ($F=8.95$, $p<.01$, post-hoc Scheffe $p<.01$).

Characteristics of the NHA—No relationship was found between whether the NHA has a specialty certification and class. A significant relationship was found between educational preparation of the NHA and class in the opposite direction of our hypothesis. A greater proportion of facilities in the 'high capacity' class had NHAs prepared at greater than a bachelor's degree (37%), compared to the 'low' and 'mixed' capacity classes ($\chi 2=6.03$, $p<.01$).

Discussion

Results from the study provide preliminary support of the validity of characteristics of RN staffing in nursing homes to indicate RN jurisdiction. All aspects of RN staffing hypothesized to indicate RN jurisdiction over nursing care systems, including educational preparation, use of APNs, and staffing levels, simultaneously and meaningfully distinguished groups of nursing homes. Each of the three groups, which we labeled low, mixed, and high capacity for RN jurisdiction, were related to specialty care programming, furthering our understanding of the extent to which professional nursing actually shapes care in nursing homes.

Findings related to the mixed capacity group of facilities provide evidence of the importance of considering these indicators of jurisdiction as a set, congruent with our theoretical framework. Specifically, nursing homes with mixed capacity for RN jurisdiction were no more likely than low capacity facilities to have specialty care programs in any clinical area except continence. Yet, these facilities were more likely to have higher educational preparation of RNs and higher RN staffing ratios, two indicators that, taken in isolation, some previous research would suggest relate to better care systems. By looking at the group of facilities on the full set of indicators of jurisdiction simultaneously, we see that although Mixed Class facilities have higher levels of RN educational preparation and staffing ratios, they have a low probability of having RNs, including the DON, with specialty certifications. Had we not analyzed this problem from the perspective of Abbott's (1988) tasks and jurisdictions approach using latent class analysis, we would have missed this critical difference of external affiliation in partnership with educational preparation and RN staffing levels as key to how jurisdiction relates to specialty care programs. Examining characteristics of RN staff in isolation, therefore, can obscure the overall picture of the relationships between the underlying construct of RN jurisdiction and nursing care systems in nursing homes, ultimately impeding the understandings needed to improve quality.

The differences in findings between mixed and high capacity nursing homes also are critical to identifying levers for systems-level change in nursing homes relevant to a resource-constrained environment. Mixed capacity nursing homes have a high likelihood of having already invested in higher RN staffing levels and RNs prepared at the BSN level. In a resource-constrained environment with a low likelihood of additional resources being added for improving RN staffing mix and levels, our findings suggest that networking and knowledge gained through specialty certification, may be a strategy for enhancing RN expertise. Reducing the isolation of the RN in nursing homes through external affiliation potentially can effect beneficial changes on how professional nurses shape care systems.

Gerontological nursing organizations that provide resources and knowledge to DONs and other RNs in management positions in long-term care can potentially make a significant impact on how RNs establish and maintain jurisdiction over nursing care systems in long-term care. Professional organizations have the capacity to seek legislative and regulatory authority over tasks for their members, and can establish accreditation and certification standards that enhance use of specialized knowledge considered the sole domain of a profession. Nursing homes with higher proportions of professional nurses who hold

specialty certifications have access to knowledge of pertinent clinical practice guidelines developed and endorsed by the specialty organization as part of the specialized knowledge, as well as being connected to an infrastructure supporting adherence to guidelines or policy that enhances RN-level jurisdiction over care to integrate nursing science into care systems. Further, the fact that the mixed capacity class contained almost a third of all homes nationally is encouraging; it suggests that many nursing homes have the potential to develop and strengthen RN jurisdiction over care.

In spite of this encouraging finding, almost half (41%) of nursing homes nationally were classified in the low capacity group. These homes had low probabilities of having RNs and DONs prepared adequately for organizing and delivering complex care. Moreover, this group had overall low levels of RNs to serve as clinical resources to nursing staff providing care to an increasingly complex resident case-mix (Kasper & O'Malley, 2007). In the context of health care reform, professional nursing risks ceding jurisdiction permanently over how care systems are organized in facilities claiming to provide ‘nursing’ care.

In fact, recent developments of the Green House model of nursing home care delivery and other models of culture change illustrate this potential shift. The Green House model encourages unlicensed nursing staff to organize nursing care systems for residents, with the RN as a visiting consultant with no permanent, on-site presence. Research indicates that RNs experience significant conflict with this consultant role, including issues of professional accountability and scope of practice; difficulties in recruiting RNs to work in these models of care directly follow from this conflict (Bowers & Nolet, 2009; Burger et al., 2009).

Another area of concern is the low levels of APNs found in nursing homes, even in high capacity homes. As APNs are prepared to practice beyond medical care management to lead implementation of evidence-based practice programs (Lekan et al., 2010), our finding suggests a missed opportunity for increasing capacity to improve care. Future work should explore this in more depth, including giving consideration to differences in having APNs directly employed by the home versus providing care as external care providers.

Organizational Environment Characteristics Related to RN Jurisdiction

The majority of the research hypotheses proposed related to organizational context were supported in this research, lending further support for the importance of Abbott's (1988) tasks and jurisdictions approach to understanding relationships between contextual factors and professional nursing jurisdiction over care. Findings in relation to the NHA, however, were contrary to our hypotheses about organizational context. These findings point to the critical need to explore in more depth the relationship between the DON and NHA and how that is optimized for quality of care and care systems driven by nursing science. Potentially, with graduate degree training, NHAs gain more knowledge in how to bring together interdisciplinary expertise for quality care systems, and—as such—facilitate the nursing care systems expertise that the DON brings to the table. This is a critical area for further study.

Limitations and Next Steps

Latent class regression analysis is a promising method to explore nursing home organizational typologies and further our understanding of RN jurisdiction over nursing care

systems. However, this study has several important analytical limitations. Most notably, we did not study the relationships between jurisdiction and resident care outcomes. Findings indicate the urgency to link data to resident outcomes data to measure the extent to which RN jurisdiction over nursing care systems affects quality of care outcomes through effects on care processes. Specific to the NNHS, linking the specialty care programming measures to non-public use data on resident outcomes is a critical next step. Beyond the NNHS, researchers can use this typology to classify nursing homes and measure relationships between high-capacity RN jurisdiction and other characteristics of nursing care systems (as described in Figure 1), such as how the nursing process is enacted in high-capacity facilities relative to low-capacity facilities and the impact on resident care outcomes.

Additional limitations include the fact that the available NNHS measures do not fully operationalize external affiliation and connections of RNs with sources of gerontological and long-term care nursing expertise. Given the potential importance of how affiliation differentiates mixed and high capacity homes, better understanding of what specialty certification means is important. Ultimately, this approach to classification gives us a starting point to examine quality outcomes and move beyond such heavy reliance on staffing levels and staffing mix as indicators of quality. This study offers new directions for examining what nurses are actually doing in professional roles which may improve care and outcomes for residents.

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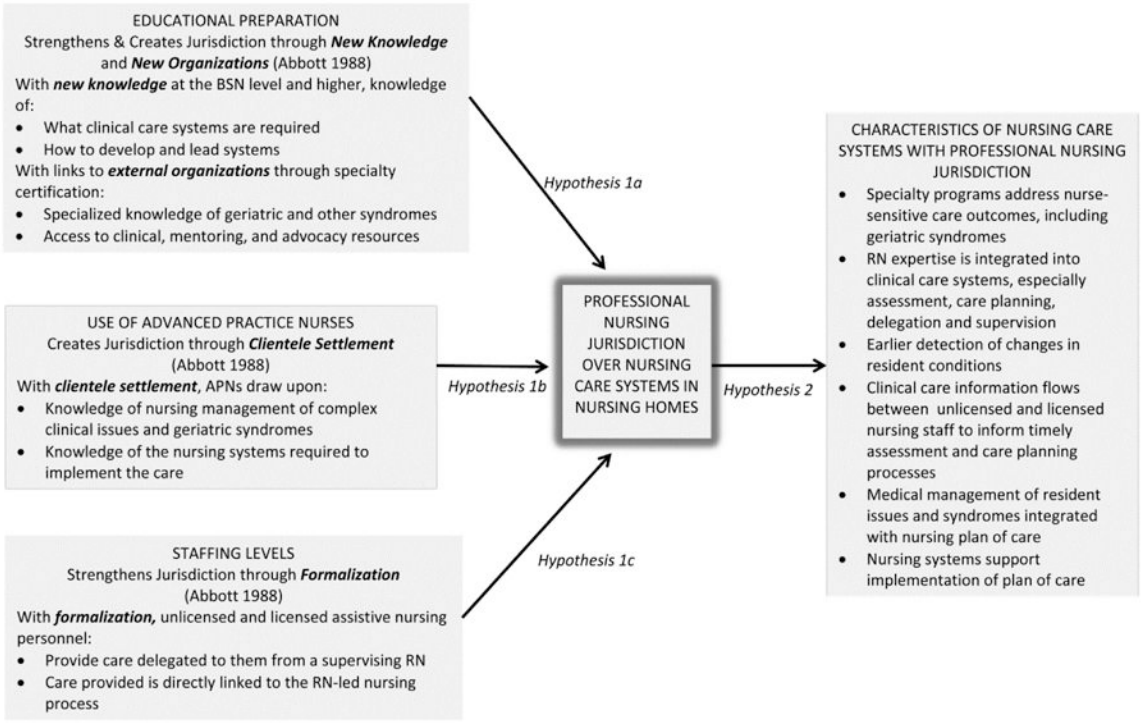

Figure 1.

Relationship of indicators of professional nursing jurisdiction with nursing care system characteristics. BSN=Bachelor of Science in Nursing; APN=Advanced Practice Nurse; RN=Registered Nurse.

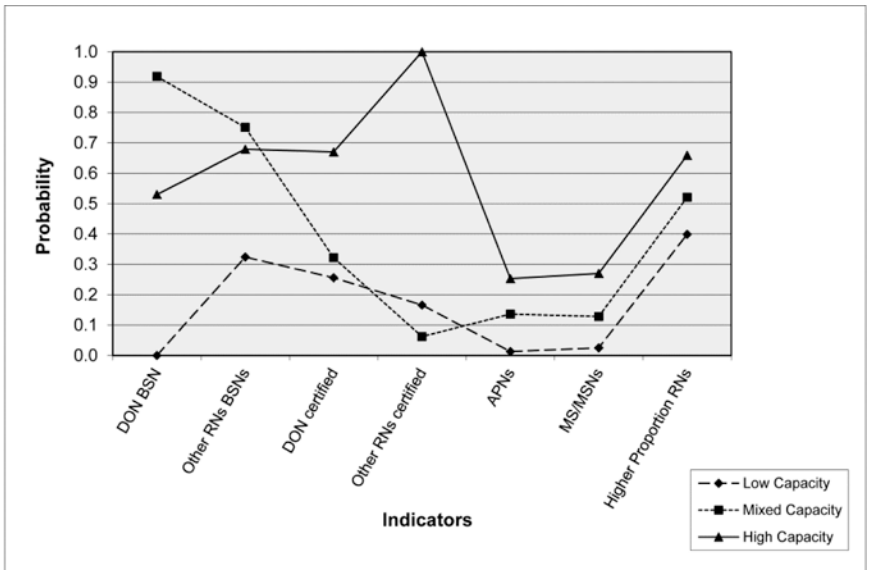

Figure 2.

Probability of indicators of professional nursing jurisdiction by latent class. DON=Director of nursing; BSN=Bachelor of Science in Nursing; RN=Registered nurse; APN=Advanced Practice Nurse; MS/MSN=Master of Science/Master of Science in Nursing

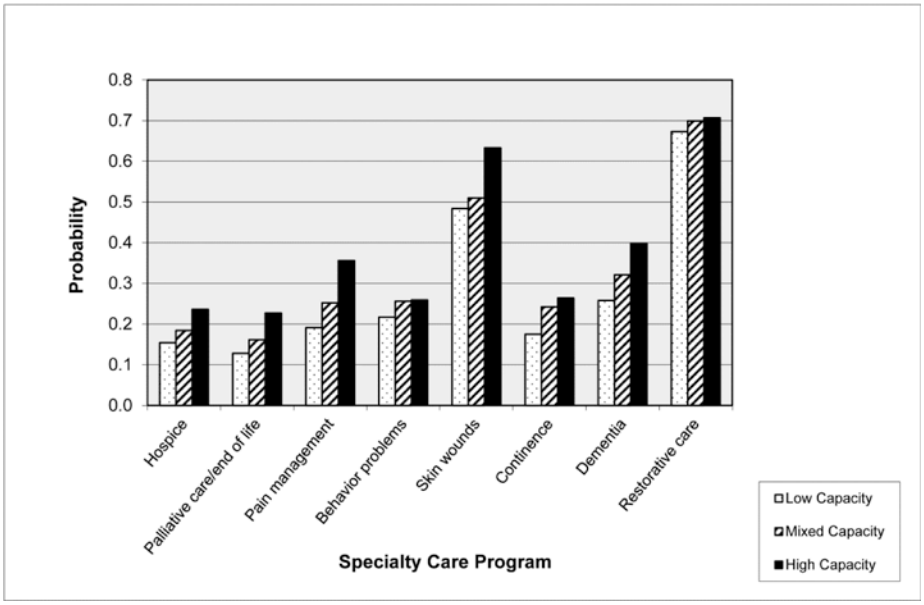

Figure 3.
Predicted probabilities of having specialty care programs by latent class.

Table 1

Variable Specification, Descriptive Statistics, & Hypothesized Relationship with RN Jurisdiction (N=1120 facilities, table results weighted to represent U.S. population, N=15,327).

Construct	How measured	N	%	Hypothesized Relationship with RN Jurisdiction***
RN Staffing Indicator of Professional Nursing Jurisdiction				
DON prepared at BSN level	0/1 DON has BS/BSN degree	6,442	42.0	+ ; H1a
Other RNs in facility prepared at BSN level	0/1 Facility > median of % RNs with BS/BSN degree	*	24.9 [23.2-26.6]*	+ ; H1a
Specialty certification of DON	0/1 DON has specialty certification, including NADONA, ANCC, or other	6,218	40.6	+ ; H1a
Specialty certification of other RNs in facility	0/1 Whether any RNs in facility have specialty certification	6,180	40.3	+ ; H1a
RNs in facility have graduate degree	0/1 Whether any RNs in facility have MS/MSN degree	2,012	13.1	+ ; H1a
Presence of Advanced Practice Nurses in facility	0/1 Facility has a Nurse Practitioner or Clinical Nurse Specialist on staff	1,886	12.3	+ ; H1b
Proportion of nursing staff that are RNs	0/1 Facility > median of ratio of RN FTEs / LPN FTEs + NA FTEs	*	.17 [.16-.18]*	+ ; H1c
Specialty Care Programming				
Dedicated program for each of the following clinical issues:	0/1 Facility has special program with specially trained staff dedicated to clinical issue			
Hospice		2,885	18.8	+ ; H2
Palliative care/end of life program		2,587	16.9	+ ; H2
Pain management		3,990	26.0	+ ; H2
Behavior problems		3,697	24.1	+ ; H2
Skin/wounds		8,257	53.9	+ ; H2
Continence		3,402	22.2	+ ; H2
Dementia		4,902	32.0	+ ; H2
Restorative care		10,636	69.4	+ ; H2
Organizational environment characteristics affecting RN Jurisdiction				
Profit status	0/1 Facility is for-profit	8272	54.0	- ; H3a
Chain status	0/1 Facility is part of a chain	9379	61.2	- ; H3a
Serves largely Medicaid residents	0/1 Facility has ≥ 80% Medicaid patients	3257	21.3	- ; H3b
Number of nursing home beds	0/1 Facility has ≥ 100 beds	7458	48.7	+ ; H3c
Level of technical services offered	0/1 Facility provides PICC lines	3524	23.0	+ ; H3d
Unionization of nursing assistants	0/1 NAs in the facility are unionized	2368	15.5	+ ; H3e
Career ladders for nursing assistants	0/1 A career ladder is available to NAs	4792	31.3	+ ; H3e
Proportion of licensed nurses that are LPNs	Ratio of LPN FTEs/RN FTEs	2.5**	[2.3-2.7]**	- ; H3f
NHA has graduate degree	0/1 NHA is prepared at greater than BA/BS	4748	31.0	- ; H3g
NHA has certification	0/1 NHA has specialty certification	4145	27.0	- ; H3g

Note. H=Hypothesis; RN=Registered nurse; LPN=Licensed practical or vocational nurse; NA=Nursing assistant; NHA=Nursing home administrator; DON=Director of nursing; BS/BSN=Bachelor of Science/Bachelor of Science in Nursing; NADONA=National Association of Directors of Nursing Administration in Long Term Care; ANCC=American Nurses Credentialing Center; MS/MSN=Master of Science/Master of Science in Nursing; FTEs=Full-time equivalents; PICC=peripherally inserted central catheter.

* By definition, median splits divide sample at 50th percentile; weighted sample means with 95% confidence intervals provided instead

** Weighted sample mean; 95% confidence interval

*** Hypothesized relationship with jurisdiction; hypothesis number referenced in text

Table 2

Fit Statistics for Latent Class Model of Professional Nursing Jurisdiction over Nursing Home Care.

	Number of Classes			
Fit Statistics	**1**	**2**	**3**	**4**
Lo-Mendell-Rubin Adjusted Likelihood Ratio (LR) Test	n/a	230.8	**95.0**	48.7
P-value (k-1 vs. k)*	n/a	<.01	**<.01**	>.01
Bayesian Information Criterion**	9393.9	9219.2	**9180.4**	9187.9

* LR Test tests significance in the -2 X Log-likelihood difference between the model with k and k-1 classes.

** Smaller value indicates a better model fit

Table 3

Predicted Frequency of Indicators of Professional Nursing within each Latent Class (N=15,327 facilities).

Indicator	LC1 "Low Capacity" (N=6,251; 40.8% of population)	LC2 "Mixed Capacity" (N=4,192; 27.4% of population)	LC3 "High Capacity" (N=4,884; 31.9% of population)
DON prepared at BSN level	0 (0.0)	3,852 (91.9)*	2,590 (53.0)*
Facility has greater than median percentage of RNs prepared at BSN level	2,024 (32.4)	3,148 (75.1)*	3,316 (67.9)*
Specialty certification of DON	1,598 (25.6)	1,350 (32.2)	3,270 (67.0)*
Specialty certification of other RNs in facility	1,038 (16.6)	258 (6.2)	4,884 (100.0)*
Presence of Advanced Practice Nurses in facility	79 (1.3)	570 (13.6)	1,237 (25.3)
Facility has any RNs with a graduate degree	154 (2.5)	537 (12.8)	1,321 (27.0)
Facility has greater than median ratio of RN FTEs to nursing staff FTEs	2,492 (39.9)	2,182 (52.1)*	3,219 (65.9)*

Note.LC=Latent class; DON=Director of nursing; RN=Registered nurse; BSN=Bachelor of Science in Nursing; FTEs=Full-time equivalents.

*
>50% of facilities in latent class predicted to have this indicator

Table 4

Summary of Logistic Regression Analyses for Latent Classes Predicting Presence of Specialty Care Programs (N=15,327 facilities).

	LC2 "Mixed Capacity"			LC3 "High Capacity"		
Specialty Care Program Type	**B**	**SE B**	**e^B**	**B**	**SE B**	**e^B**
Hospice	.22	.20	1.24	.53**	.18	1.70
Palliative care/end of life program	.27	.21	1.31	.69***	.19	1.99
Pain management	.35	.18	1.42	.85***	.16	2.35
Behavior problems	.22	.17	1.24	.23	.16	1.26
Skin/wounds	.10	.15	1.11	.61***	.15	1.84
Continence	.40*	.18	1.50	.52**	.17	1.69
Dementia	.31	.16	1.36	.65***	.15	1.91
Restorative care	-.04	.16	.97	-.16	.15	.85

Note. LC=Latent class; LC1 "Low Capacity" is the reference category.

* <.05

** <.01

*** <.001