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Licensed Nurse Staffing and Health Service Availability in Residential Care/Assisted Living

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Structured Abstract

Objectives—To create data driven typologies of licensed nurse staffing and health services in residential care/assisted living (RC/AL).

Design—Cluster analysis was used to describe the patterns of licensed nurse staffing and 47 services, and the extent to which these clusters were related.

Setting—RC/AL communities in the United States.

Participants—A convenience sample of administrators and health care supervisors from 89 RC/AL communities in 22 states.

Measurement—RC/AL characteristics, licensed nurse staffing (total number of hours worked by registered nurses [RNs] and licensed practical nurses [LPNs]), number of hours worked by contract nurses, and availability of 47 services.

Results—Analysis revealed four licensed nurse staffing clusters defined by total number of hours and the type of nurse providing the hours (RN, LPN, or a mix of both). They ranged from no/minimal RN and LPN hours to high nursing hours with a mix of RNs and LPNs. The 47

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services clustered into five clusters including *Basic Services*, *Technically Complex Services*, *Assessments*, *Wound Care and Therapies*, *Testing and Specialty Services*, and *Gastrostomy and IV Medications*. The availability of services was related to the presence of nurses (both RNs and LPNs) except for the *Gastrostomy and IV Medications* services, which were not readily available.

Conclusion—The amount and skill mix of licensed nurse staffing varies in RC/AL and is related to the types of services available. These findings may have implications for resident care and outcomes. Future work in this area, including extension to include non-nurse direct care workers, is needed.

Keywords

assisted living; residential care; nursing; staffing; health services

Introduction

Almost 750,000 people reside in residential care/assisted living (RC/AL) in the United States.¹ RC/AL communities are designed to provide housing and services that range from assistance with meals and grooming to medication management and therapies, while emphasizing resident autonomy and aging in place.²⁻⁴ Over time, the prevalence of chronic illnesses, dementia, and functional impairment among RC/AL residents has grown. Currently, close to 90% of RC/AL residents have a cognitive impairment and 46% have three or more chronic illnesses, suggesting a need for health services.^{1,5,6} To address these needs, communities have increased their use of licensed nursing staff, both registered nurses (RN) and licensed practical nurses (LPN).^{2,7} The limited research on nurse staffing in RC/AL suggests that having a licensed nurse (either RN or LPN) may influence resident care outcomes.⁸ Yet, nurse staffing varies, such that smaller settings less often have nurses, while larger settings may have several RNs and LPNs on staff.⁸ The extent of variability is not clear, however, nor is there a common terminology to describe patterns of licensed nurse staffing and services. Therefore, the focus of this paper is to characterize licensed nurse staffing and examine how it relates to nursing service availability in RC/AL settings.

Several factors relate to the number and types of staff (both unlicensed direct care workers and licensed nurses) who provide services in RC/AL communities. These factors include RC/AL size (ranging from a few beds to hundreds of beds), funding (private pay affords more services than Medicaid funds), resident acuity, and resident case-mix (some settings care for residents who are dying).^{1,4,9,10} In addition, states vary in how they regulate staffing. For example, Florida, Georgia, and Maine require minimum staff-to-resident ratios with no requirement for licensed nurses, while Arkansas, Iowa, and New Jersey require a RN or LPN be available 24 hours a day. Finally, factors such as nurse staffing shortages and financial constraints influence whether nurses are employed in RC/AL. Other than a recent report indicating that 96% of RC/AL communities provide blood pressure and glucose monitoring, and 93% provide incontinence care,¹⁶ there is little information about the array of services currently available in RC/AL and who provides those services.¹⁷ Understanding this variability is important because there is reason to expect that licensed nurse staffing results in variation in service availability.¹¹⁻¹⁴

Given evidence of an increasing role of licensed nurses in RC/AL,¹⁸ describing the patterns of nurse staffing and service availability in RC/AL could elucidate the connections between staffing, service availability, and quality of care.^{11,19,20} A logical first step is to describe the range of licensed nurse staffing and services available in RC/AL and create common terminology or typologies.⁴ Indeed, prior work identifying typologies of RC/AL communities has been beneficial to provide consistency in this diverse field.⁹ However, that prior work did not provide language to describe nurse staffing and available services, which is necessary for understanding care delivery. To address this issue, we used cluster analysis to examine the patterns of licensed nurse staffing (RNs and LPNs) and available services in RC/AL, and thereby created data-driven typologies of these patterns.

Methods

The data for this descriptive cluster analysis were derived from a larger study of the structure and process of health care provided in RC/AL from the perspectives of physicians and health care supervisors (HCS) who care for RC/AL residents. This study analyzed data obtained from a telephone interview conducted with HCS and administrators.²¹ In RC/AL, HCS are responsible for staff oversight, direct clinical care, and health service coordination. They may have a clinical background (e.g., RNs, LPNs, or nursing assistants) or have no clinical training.¹⁸ Of note, the larger study included interviews with medical care providers; however, this analysis used only data from interviews with the administrators and HCS to examine RC/AL characteristics, licensed nurse staffing, and available services.

Sample

Using a convenience sampling approach, a total of 90 RC/AL communities from 22 states, participated in the study. Forty-five communities were randomly selected from the publically available licensure files of Florida, New Mexico, and Wisconsin (states that vary by how they regulate RC/AL). To ensure diversity, communities were recruited for each of three stratum used in prior work: “smaller” – those with fewer than 16 beds; “new-model” – those with 16 or more beds, built after 1987, and having at least one characteristic indicating higher care need (i.e., two or more private-pay rates, a nurse on duty at all times, at least 20% of residents requiring assistance with transferring, or 25% being incontinent); and “traditional” – those with 16 or more beds that do not meet the new-model definition.²² Settings were recruited until five from each stratum (smaller, new-model, and traditional) were recruited from each state (N=45). To increase participation of medical providers for the larger study, the team recruited providers (who cared for RC/AL residents) in attendance at two national geriatric professional meetings (N=45). Communities were excluded if they primarily cared for persons with developmental disabilities or primarily served people under age 65. A total of 145 eligible communities were approached for participation; 6 did not respond. Of the 139 remaining, 90 agreed to participate (62% response rate). One RC/AL community was not included in these analyses due to incomplete data.

The study recruitment process (whether randomly selected or identified by medical providers), included an introductory letter sent to administrators, followed by a telephone call to discuss participation. If the administrator agreed to participate, he/she provided

information about setting and resident characteristics and identified the HCS. The HCS was sent (via mail or fax) an introductory letter and brochure, and was then contacted by telephone to request participation. After providing verbal consent, the HCS participated in a semi-structured telephone interview focusing on the availability of health services in the setting. If an administrator refused participation, study staff contacted the next site on the list. The study was approved by the Institutional Review Boards of the University of North Carolina at Chapel Hill (UNC-CH) and the University of Maryland Baltimore County (UMBC). Data collection was conducted over a 22 month period (September 2008 – July 2010).

Measures

Administrators provided information about community type (smaller, traditional, or new-model), profit status, bed size, years in operation, presence of a medical director, affiliation with a physician practice, and resident characteristics (age, gender, race, and number of residents who were bedfast, had dementia, or were developmentally disabled). HCSs reported on licensed nurse staffing including the current number of full and part time RNs and LPNs, the number of hours worked by these RN and LPNs, and the number of hours worked in the past week by contract RNs and LPNs (nurses employed by outside agencies). HCSs also reported their demographics, training/degree, nursing home experience, and the availability (in-house or by a contract provider) of 47 services. The project team derived this list of services from two nursing textbooks that address common nursing procedures performed in long-term care settings, the *Handbook of Nursing Procedures* and the *Handbook of Home Health Nursing Procedures*.^{23,24} The services included: vital signs, assessments, specimen collection, medication administration, skin and wound care, therapies, and laboratory and other services.

Data Analysis

The intent of this cluster analysis was to develop typologies of licensed nurse staffing and service availability and examine the associations between these typologies. We conducted two cluster analyses, one of licensed nurse staffing and one of service availability, and then examined the associations between these two clusters. Data were analyzed using SPSS for Windows version 16. Using the nurse staffing data reported for each RC/AL community, a cluster analysis was conducted applying the Two step Cluster command in SPSS, which combines partitioning and agglomerative approaches to clustering.²⁵ This procedure permits the use of both categorical and continuous variables to create clusters. The Bayesian Information Criterion (BIC) and silhouette coefficient generated by the Two step Cluster command were considered in making decisions about the number of clusters to retain.

To define the licensed nurse staffing clusters by nursing hours, the following variables were entered in the Two step Cluster command: the number of RN hours per week, the number of LPN hours per week, and categorical variables for the number of full-time and part-time RNs and LPNs. Our initial analysis determined that decline in the BIC and increase in the silhouette coefficient continued through five clusters, but the ratio of change in the BIC (0.17) and increased differentiation among settings (0.1) was considered too low to justify the greater complexity of five (as opposed to four) clusters. A second cluster analysis was

performed to group the different services into clusters with similar patterns of availability across RC/AL communities. To accomplish this effort, the data file was transposed so that services became the cases being classified and the settings took the role of “variables.” The value of each “variable” indicated whether the service was provided by the community's own staff, by contract staff, or was not available. All of the setting variables were then entered into the Two step Cluster command. Although the BIC criterion suggested a solution with fewer clusters, the silhouette coefficient was as high with a five cluster solution as with any other solution, and this solution was much more clinically interpretable.

After the service clusters were identified, service cluster scores were created for the RC/AL communities by calculating the mean rating for each setting on all of the services within a service cluster, assigning a value of 3 for services performed by in-house staff, 2 for services done by contract staff, and 1 for service that were not available. For example, the ratings that a setting had for the nine services in the *Basic Services* cluster were averaged to get a *Basic Services* score for that setting. Then, in a repeated measures analysis of variance, the mean service-cluster scores were compared among staffing clusters, with post-hoc between-subjects tests employed to test for pairwise differences among them if the global test for differences among means was statistically significant. Post hoc within-subject pairwise comparisons were employed to test whether service-cluster mean scores differed overall (i.e., when data for all staffing clusters were combined).

Results

Eighty-nine RC/AL settings from 22 states participated in the study; Table 1 displays their characteristics. The sample included 15 smaller (17%), 26 traditional (29%), and 48 (54%) new-model settings. In addition, 74% of the settings operated for profit, 37% had a medical director, and 24% had a contract with a physician practice. The settings had a mean bed size of 55.9 beds and were in operation on average for 13.7 years. Forty-two percent of the RC/AL residents were over age 85, 24% were male, 91% were Caucasian, 5% were Hispanic, 0.6% were bedfast, 44% had Alzheimer's disease or dementia, and 3% had a developmental disability.

Table 2 displays the HCS characteristics. HCS were primarily Caucasian (80%) and female (91%), with a mean age of 48 years. Training included 36% RN or nurse practitioners (NPs), 27% LPNs, 13% certified nursing assistants or medication technicians, and 24% with other non-medical background (e.g., business or marketing). The HCSs had an average of 4.8 years in their position and 65% of them had nursing home experience.

Nurse Staffing Clusters

We first examined the patterns of licensed nurse staffing according to hours worked by RNs and LPNs and RC/AL characteristics. The analysis revealed four clusters defined by in-house licensed nurse staff hours and the type of nurse providing the hours (RN, LPN, or a mix of both). Table 3 provides these results, showing the distribution of community bed size and type (smaller, traditional, or new-model) by cluster. The clusters were identified as *no/minimal hours worked by licensed nurses*, *low hours/primarily LPN*, *low hours/primarily RN*, and *high hours/mix of RN and LPN*.

The first cluster had *no/minimal hours worked by licensed nurses*. This cluster had no in-house RN or LPN hours per week, with the median value of 0 RN and LPN hours; 24% of the settings in the sample were in this group, most being smaller communities (median size of 22 beds). The second cluster had *low hours/primarily LPN* staffing, with median values of 1.5 RN and 40 LPN hours per week. Twenty-nine percent of the settings were in this cluster with a median size of 37 beds, and two-thirds of this group (N=19) were of the new-model type. The third cluster was characterized as *low hours/primarily RN* with median values of 40 RN and 0 LPN hours per week. Twenty percent of the settings were in this cluster, with a median bed size of 37 (the same as the second cluster), of which 50% were of the new-model type. Finally, the *high hours/mix of RN and LPN* cluster had the highest staffing of RNs and LPNs, with median values of 40 RN and 168 LPN hours per week. This cluster comprised 24% of the sample, and included the largest settings (median size of 75 beds) and the highest percentage of new-model settings (71%).

Service Clusters

Analytically, the 47 services grouped into five service clusters describing the range of available services. These clusters were distinguished by the type of service and who performed the service (in-house staff, by contract staff, or not available):

- *Basic services.* Basic services were primarily provided by in-house staff (89%), with 7% provided by contract staff; they were not available in 4% of settings. This cluster included vital signs, lung and post-fall assessments, blood sugar testing, mid-stream urine and stool specimen collection, administration of eye and nose drops, oxygen and respiratory treatments, exercise programs, and transportation to medical appointments.
- *Technically complex services.* These services were primarily provided by in-house staff (64%), with 18% provided by contract staff; they were not available in 18% of settings. This cluster included rectal medications, rectal temperature, intramuscular injections, suctioning of the mouth with a bulb syringe, orthopedic care, bladder training, and teaching breathing exercises.
- *Assessments, wound care, and therapies.* These services were distinguished by a mix of in-house staff (43%) and contract staff (37%), and were not available in 19% of communities. This cluster included depression and mental status assessments; wound care; pet, relaxation, and aromatherapy; flu shots; urine catheterization; and testing stool cards.
- *Gastrostomy and intravenous medication.* The services in this cluster were primarily not available (55% of settings), with 18% provided in-house and 27% by contractors. This cluster included intravenous medication, gastrostomy care, and tube feedings.
- *Testing and specialty services.* These services were provided by contract staff (73%), with 12% of services provided in-house; they were not available in 15% of communities. The services within this cluster included drawing blood, x-rays, mental health therapy, physical therapy, massage therapy, and hospice.

Relationship Between Staffing and Service Clusters

To examine the relationship between service availability and nurse staffing, we compared the five service cluster scores across the four staffing clusters. Table 5 shows the service clusters according to their mean availability score, as shown in the leftmost data column (e.g., basic services are most often offered in-house, while gastrostomy and IV medications are primarily not available). A higher score indicates greater service availability (3=performed in-house, 2=performed by contract staff, and 1=not available). Post hoc within-subject tests indicated that all the pairwise comparisons of mean scores among service clusters were significantly different ($p < .001$). For example, the overall mean for the *Technically Complex Services* cluster was significantly lower than the overall mean for the *Basic Services* cluster and significantly higher than the overall mean for the *Assessments, Wound Care and Therapies* cluster.

For *Basic Services*, *Technically Complex Services*, and *Assessments, Wound Care and Therapies*, service availability scores were related to the presence or absence of any licensed nurses rather than the type or number of nurses on staff. That is, when compared to other staffing clusters, the *no/minimal hours* staffing cluster had a significantly lower service availability score (indicated by darker shading). Availability did not differ significantly in any pairwise comparisons among the other staffing clusters.

For the *Testing and Specialty Services* cluster, only the *high hours/mix of RN and LPN* had a significantly higher service availability score (indicated by darker shading) than the other nurse staffing clusters, and there were no significant differences in service availability in pairwise comparisons among the *no/minimal hours*, *low hours/primarily LPN*, and *low hours/primarily RN* staffing clusters. Finally, *Gastrostomy and IV Medications* were not readily available (overall availability score = 1.6) and no staffing pattern differentiated availability.

Discussion

RC/AL is a long-term care setting that continues to evolve as it strives to meet the needs of a resident population that is increasing in acuity.⁵ This study created typologies of licensed nurse staffing patterns and available health services in RC/AL as a way to characterize these emerging approaches to care. The literature suggests that 47 to 70 percent of settings employ an RN or LPN, with figures varying because of state staffing requirements and variation in resident needs.^{2,13} In our sample, only 24% of communities had *no/minimal hours worked by licensed nurses*, meaning that a majority of the sample employed a licensed nurse in some capacity. While lack of a simple random sample precludes generalization to the RC/AL population, it does appear that a substantial number of communities have some nursing presence, which may have implications for resident outcomes. For example, one study of RC/AL settings found an association between RN staffing and reduced hospitalization rates. The implication was that RNs could better identify and manage acute medical issues, thereby decreasing hospitalization rates. However, this study did not explain how RNs were involved in day to day care.⁸ Future work aimed at understanding both nurse staffing and the role of the nurse in RC/AL could explain the extent to which, and under what circumstances, a nurse is needed to assure quality of care.

Another interesting finding is the use of contract nursing staff to provide services to RC/AL residents. In our study we did not specifically ask examine the roles of these contract nurses, and thus we do not know if these contract nurses were from home health agencies to provide a specific service or if they were filling a staffing need within the community. However we did find that contract nurses provided a substantial amount of services including 37% of *Assessments, Wound Care and Therapies* and 27% of *Gastrostomy and IV Medications*. This finding is consistent with other research showing that contract providers deliver a considerable amount of services in RC/AL.¹⁷ Research in nursing homes suggests that use of contract nurses can have a negative impact on the quality of care. However, it is unknown whether this is the case in RC/AL settings as well.²⁶ When examining the use of contract nurses we asked for the total number of hours worked by contract nurses in the past week (RN and LPN). Furthermore, if contract nurses provide a substantial amount of services, what role, if any, does the setting have in monitoring the quality of the care provided by these nurses? Future work focusing on the relationships among nurse staffing (including contract nurses), available services, and the quality of care could answer this important question.

Our analyses also identified a wide range of service availability. *Gastrostomy Care and IV Medications* seemed to be the “upper limit” of service provision in RC/AL (i.e., not available in 55% of settings). The settings with *high hours and a mix of RN and LPN* provided more *Testing and Specialty Services* (Table 5) even though nurses do not provide these services. One likely explanation is that larger settings may attempt to manage residents with complex health care needs by employing more nurses and providing more overall services. This finding is consistent with other literature suggesting that RC/AL communities are expanding services to support aging in place.²⁷ Future research examining the services provided by licensed nurses and other staff may determine the appropriate mix of staff required to provide high quality services in RC/AL. Understanding the links among staff mix (both licensed nurses and other direct care workers), service availability, and quality of care is critical given that state regulations provide little guidance about nurse and other staffing levels in RC/AL.

The lack of a random sample limits the generalizability of the findings to all RC/AL communities. Given the different approaches to recruitment, those settings identified by medical providers were larger and more likely to have a medical director than those identified in the initial stratified random sample ($p < .001$ for both). However, our intent was not to derive generalizable estimates (which would not have been possible with such a small sample regardless of the sampling strategy), but to explore the types of and associations between licensed nurse staffing and service availability. Thus, our sample was deliberately varied in size (5-225 beds) and nurse staffing (0-168 hours). Another limitation of this study was the lack of non-nurse direct care worker staffing data (e.g., personal care assistants, nursing assistants, and medication technicians), even though these workers comprise the bulk of the workforce in RC/AL.

Conclusion

While limitations restrict the generalizability of these findings, this study identified a wide range of licensed nurse staffing and health service availability in RC/AL. The typologies developed demonstrate the relationship between licensed nursing presence and health service availability in RC/AL, and future research could examine their relationship to resident outcomes. This exploration could help care providers decide how best to meet resident needs, and help residents, families, and clinicians identify the RC/AL settings that best match residents' health care needs.

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Table 1
Characteristics of Residential Care/Assisted Living Communities (N=89)

	Number (%) or Mean (SD)
Community type	
Smaller ^a	15 (17%)
Traditional ^b	26 (29%)
New-model ^c	48 (54%)
Ownership status, for profit ^d	66 (74%)
Number of licensed beds, mean (SD) ^e	55.9 (46.8)
Years in operation, mean (SD) ^d	13.7 (11.9)
Medical director on staff	33(37%)
Contractual affiliation with physician practice	21 (24%)
Resident demographics, mean percent (SD)	
> 85 years old	42.1 (29.7)
Male ^f	24.0 (16.2)
White/Caucasian	90.6 (19.0)
Hispanic	5.0 (16.0)
Bedfast ^d	0.6 (1.6)
Alzheimer's disease or other dementia ^d	44.1 (29.5)
People with a developmental disability ^d	2.6 (9.3)

^a Less than 16 beds

^b RC/AL communities with 16 or more beds and are not new-model

^c RC/AL communities with 16 or more beds, built after 1987, and having at least one characteristic indicating higher care need/service provision (i.e., two or more private-pay rates, a nurse on duty at all times, and at least 20% of residents requiring assistance with transferring or 25% being incontinent)

^d N = 88 due to missing data

^e Bed size range from 5 to 225, with a median of 46

^f N = 86 due to missing data

Table 2
Characteristics of Health Care Supervisors (N=89)

	Number (%) or Mean (SD)
Age (years)^a	48.2 (10.7)
Female	81(91%)
Race^a	
Black	3 (3%)
Caucasian	70 (80%)
Other (e.g., American Indian/Alaskan Native, Asian, Biracial)	15 (17%)
Ethnicity^a, Hispanic	9 (10%)
Education	
High school graduate/GED	12(14%)
Some college or community college graduate	41(46%)
4-year college graduate	24(27%)
Post-graduate (beyond 4-year college)	12(14%)
Training^{a,b}	
Registered Nurse or Nurse Practitioner	32(36%)
Licensed Practical Nurse	24(27%)
Other medical (e.g., certified nursing assistant, medication technician)	12(13%)
Other, non-medical (e.g., MBA, marketing)	21(24%)
Tenure (years) in current position in this setting	4.8(5.2)
Worked in nursing home	58(65%)

^a N = 88 due to missing data

^b Indicates highest level of nursing or other training

Table 3
Four Licensed Nurse Staffing Clusters (N=89)

	No/Minimal Hours Worked by Nurses	Low Hours, Primarily LPNs	Low Hours, Primarily RN	High Hours, Mix of RN and LPN
(N, percent of sample)	(N=21, 24%)	(N=29, 32%)	(N=18, 20%)	(N=21, 24%)
Total nursing hours per week, <i>median (IQ range)</i> ^a	0 (4)	40 (63)	40 (135)	184 (95)
RN hours per week, <i>median (IQ range)</i> ^a	0 (4)	1.5 (13)	40 (16)	40 (36)
LPN hours per week, <i>median (IQ range)</i> ^a	0 (0)	40 (69)	0 (85)	168 (105)
Community type, <i>N (%)</i>				
Smaller ^b	8 (38)	5 (17)	3 (17)	0 (0)
Traditional ^c	8 (38)	5 (17)	6 (33)	6 (29)
New model ^d	5 (24)	19 (66)	9 (50)	15 (71)
Number of licensed beds, <i>median (IQ range)</i> ^a	22 (41)	37 (59)	37 (54)	75 (58)

^a Median reported because of skewed distributions; IQ range = values between 25th and 75th quartiles

^b RC/AL communities with less than 16 beds

^c RC/AL communities with 16 or more beds and are not new-model

^d RC/AL communities with 16 or more beds, built after 1987, and having at least one characteristic indicating higher care need/service provision (i.e., two or more private-pay rates, a nurse on duty at all times, and at least 20% of residents requiring assistance with transferring or 25% being incontinent)

Table 4
Five Service Clusters

Cluster and % of RC/AL Settings by Type of Staff (own staff, contract, or service not available)	Services in Cluster
<i>Basic Services</i> 89 % own staff 7 % contract 4 % service not available	Vital Signs - radial pulse, oral temperature, blood pressure, weight Assessment - listening for rales, post fall assessment Blood Sugar Fingersticks Mid-stream urine specimens Stool specimens Eye and nose drops Oxygen/respiratory treatments -nebulizers, oxygen by nasal cannula Exercise program Transportation to medical appointments
<i>Technically Complex Services</i> 64 % own staff 18 % contract 18 % service not available	Rectal medications, suppositories Rectal temperature Intramuscular injections Suctioning mouth with bulb syringes Orthopedic care—cast care and applying support devices Bladder training Teaching and coaching breathing exercises
<i>Assessments, Wound Care, and Therapies</i> 43 % own staff 37 % contract 19 % service not available	Assessments – depression and mental status exam Wound care - staging pressure ulcers, dressing changes, and culturing Therapies - pet, relaxation/yoga, aromatherapy Flu shots Catheterization for urine specimen Testing stool cards
<i>Gastrostomy and IV Medications</i> 18 % own staff 27 % contract 55 % service not available	Intravenous medications Gastrostomy care – g-tube care and administering g-tube feedings
<i>Testing and Specialty Services</i> 12 % own staff 73 % contract 15 % not available	Drawing blood for lab samples X-rays Mental health services Physical therapy Massage therapy Hospice

Table 5
Mean (SD) Service Cluster Availability by Licensed Nurse Staffing Cluster^a

Service Cluster	Over All Staffing Clusters ^b	No/Minimal Hours	Low Hours, Primarily LPN	Low Hours, Primarily RN	High Hours, Mix of RN and LPN
Basic Services	2.9 (0.2)	2.7 (0.2) ^c	2.9 (0.1)	2.9 (0.2)	2.9 (0.1)
Technically Complex Services	2.5 (0.5)	2.0 (0.5)	2.5 (0.4)	2.7 (0.4)	2.8 (0.3)
Assessments, Wound Care, and Therapies	2.3 (0.4)	1.9 (0.3)	2.3 (0.4)	2.3 (0.4)	2.5 (0.3)
Testing and Specialty Services	2.0 (0.3)	1.9 (0.3)	1.9 (0.3)	2.0 (0.2)	2.2 (0.2)
Gastrostomy and IV Medications	1.6 (0.6)	1.6 (0.5)	1.6 (0.5)	1.7 (0.7)	1.7 (0.7)

^a Higher scores indicate greater service availability (3 = performed in-house, 2 = done by contract workers, 1 = not available).

^b In pairwise comparisons, all overall service cluster means are significantly different from one another ($p < .001$ for all).

^c Service availability mean scores in lighter shading within a row (i.e., by staffing cluster) are not significantly different from one another in mean score; however, a service availability score in darker shading differs significantly in mean score from each of the other staffing clusters in that row (i.e., p values for pairwise comparisons range from $<.001$ to $<.05$).