Unit Utilization of Internationally Educated Nurses and Collaboration in U.S. Hospitals

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Employing internationally educated nurses (IENs) to address the nursing workforce shortage is common in many countries, including the United States. This study examined the relationship between unit utilization of IENs and collaboration in U.S. hospitals. Results indicated more IENs on a unit did not significantly affect the collaboration among nurses and between nurses and physicians. The presence of IENs significantly influenced unit nursing characteristics, such as education attainment and unit tenure.

With globalization increasing the mobility of nurses around the world, internationally educated nurses (IENs) are an important part of the nursing workforce in many countries. IENs are nurses who receive their primary nursing education outside of the country of current employment. In the United States, recruiting IENs has been a strategy to overcome the nursing workforce shortage for decades. While the actual number of IENs in the United States is difficult to capture, estimates indicate that about 5.6% to 16% of the over 3 million U.S. nurses or 168,000 to 480,000 nurses are IENs (Buerhaus et al., 2009; Spetz et al., 2014). Additionally, the number of IENs taking and passing the required U.S. nurse licensure exam (NCLEX-RN® exam) increased for 3 years in a row from 2014 to 2016 (Salsberg, 2016). IENs play an vital role in healthcare delivery and outcomes in the United States, including collaboration in patient care; yet, relevant empirical evidence is scarce.

While it is well acknowledged IENs help mitigate nursing workforce shortages, debates exist regarding the direct impact of IENs on quality of care and patient outcomes. To date, few studies have empirically examined this topic and the findings were inconsistent. Some researchers suggest IENs provided quality of care comparable to U.S.-educated nurses (Neff & Harman, 2013; Shen et al., 2015). In one study, researchers reported no difference in medication errors between IENs and U.S.-educated nurses (Shen et al., 2015). In another study, a higher proportion of IENs in hospitals was not associated with poorer quality of care or nurse and patient outcomes (Neff & Harman, 2013).

Meanwhile, other researchers observed lower satisfaction among patients who received care in hospitals with higher proportions of IENs (Germack et al., 2017; Mazurenko & Menachemi, 2016). Researchers also reported higher mortality rates of patients.
in hospitals that employed more IENs (Neff et al., 2013). Therefore, there remains a need to further examine the impact of IENs on health care. Specifically, the collaboration in care settings with different levels of IENs is an area necessitating special attention.

Improving collaboration, both intra- and interprofessional, in the interest of optimizing patient outcomes has become a priority for U.S. healthcare organizations and many others around the world (Brandt et al., 2014; Interprofessional Education Collaborative, 2011). Collaboration is recognized as an essential strategy for achieving the Institute for Healthcare Improvement’s Quadruple Aim of better patient experiences, promoting provider well-being in the workplace, cost-efficient and effective care, and improved population health (Bodenheimer & Sinsky, 2014; Fink-Sannick, 2017; Havens et al., 2018; O’Connor, 2015; Sikka, Morath, & Leape, 2015). Efficient collaboration among and between nurses and other healthcare professionals is a fundamental aspect of quality work environments that often result in positive patient outcomes and satisfaction (Mazurenko & Menachemi, 2016).

While previous research has demonstrated variations in nurse-nurse collaboration and nurse-physician collaboration across acute care hospital units in the United States (Ma et al., 2018; Ma et al., 2015), it is unclear whether the presence of IENs influences nurses’ intra and interprofessional collaboration with other care providers. The primary purpose of this study was to evaluate the association between levels of IENs and collaboration among nurses and between nurses and physicians in U.S. hospital units by utilizing data from the National Database of Nursing Quality Indicators (NDNQI®) (Press Ganey Associates, 2019). A secondary aim was to describe and compare nursing characteristics of units with different levels of IENs.

Methods

Research Design

This cross-sectional, observational study used data from NDNQI, a U.S. national data repository for comparisons of nursing care and nursing-sensitive outcomes at the patient care unit level. Two NDNQI datasets collected in 2013 were used to address the research questions, including the registered nurse (RN) survey and hospital administrative data. The institutional review board at the authors’ institution approved the study.

Data and Sample

The NDNQI RN survey was used to create unit-level measures, including intra and interprofessional collaboration, utilization of IENs, and other unit characteristics (e.g., nurse staffing and education). The survey was designed to collect data from hospital units nationwide to assess, benchmark, and improve the nurse work environment in the United States. It is conducted each year electronically among hospitals that are NDNQI members. Eligible staff nurses complete the survey where data are collected about unit work environment and work content as well as demographics of nurse respondents. More information about the NDNQI RN survey can be found elsewhere (Ma et al., 2018). The eligibility criteria to participate in the survey are RNs (a) providing direct care to patients at least 50% of their time, (b) working on the current unit for 3 months or more, and (c) not employed as agency or contract nurses.

Collaboration and utilization of IENs were conceptualized as unit-level organizational characteristics, and thus, analyses were conducted at the unit level. A unit was included if it had a response rate of 50% or higher among all eligible nurses and at least five nurse respondents. These inclusion criteria were applied to ensure the aggregated unit-level measures had reasonable reliability. Researchers have recommended a response rate of 50% as a threshold for making accurate inferences when using aggregated data (Verran et al., 1995). Additionally, five types of adult units that were common and available in the majority of NDNQI hospitals were included: critical care, step-down, medical, surgical, and medical-surgical combined units.

NDNQI data analysts conducted data cleaning before...
delivering the datasets to the researchers. After applying the eligibility criteria, this study used reports of 24,034 nurses, of which 2,126 were IENs. The average number of respondents on a unit was 31 nurses. Final analyses were conducted among 958 units from 168 acute care hospitals in the United States.

Measures

**Collaboration.** Two scales were used to measure collaboration: the Nurse-Nurse (RN-RN) Interaction Scale and the Nurse-Physician (RN-MD) Interaction Scale. The RN-RN scale reflected the intraprofessional collaboration among nurses, and the RN-MD scale measured the interprofessional collaboration between nurses and physicians on a unit. The NDNQI adapted these two scales from the Index of Work Satisfaction (Stamps, 1997) and conducted pilot testing to assess the feasibility and reliability of the revised scales (Taunton et al., 2004).

Each of the two scales had six items. Sample items from the RN-RN included “There is a good deal of teamwork among nursing staff,” and “The nurses on our unit support each other.” Sample items from the RN-MD scale included “In general, physicians cooperate with nursing staff,” and “There is a lot of teamwork between nurses and doctors on our units.” Nurses were asked to respond to each item using a Likert scale from strongly disagree (1) to strongly agree (6).

Given that collaboration was conceptualized as a unit-level organizational factor in this study, responses were aggregated from individual nurse respondents for each scale. More specifically, the mean of the six items comprising the respective scale for each nurse respondent was calculated; then, the mean of the scale scores across all the nurses on a unit were calculated to measure collaboration in that unit. A higher score indicated better collaboration. Preliminary analysis suggested the aggregated measures of collaboration at the unit level using NDNQI RN survey data were reliable (Ma & Stimpfel, 2018).

**IENs.** In the NDNQI RN survey, one question asked nurses to report where they received basic RN education, in the U.S. versus outside the United States. In this study, researchers calculated the proportion of nurses receiving primary RN education outside the United States among all nurse respondents on a unit to reflect unit level of IEN utilization. Based upon the percentage of nurses who were IENs, units were categorized into four groups: units with no IENs, some IENs but less than 10%, 10% or more IENs but less than 20%, and at least 20% IENs.

**Covariates.** Hospital and unit-level factors that might also influence collaboration were included as covariates in analyses. Hospital factors included ownership, bed size, teaching status, and Magnet® status. They were defined following the methods in research that also used NDNQI data (Ma et al., 2018).

Unit-level factors included unit type, nurse staffing, education, specialty certification, nursing tenure, and shift pattern. The patient-to-nurse ratio was calculated in each unit to reflect its staffing level. Unit education attainment was calculated as the proportion of nurses with at least a baccalaureate degree in nursing. Similarly, the proportion of nurses with a nursing specialty certificate from a national nursing association (e.g., CCRN, CEN, CNOR) was calculated to indicate the unit level of specialty certification. Nursing tenure was measured in two ways: the average years as an RN across nurses on a unit (RN tenure) and the average years working on the current unit (unit tenure). Suggested by previous research that unit shift pattern, particularly overtime, is associated with collaboration (Ma & Stimpfel, 2018), a variable indicating the proportion of RNs working overtime during last shift as a covariate was included.

Analysis

Nurses who responded to the RN survey were first characterized overall and as those who were IENs. Descriptive analyses were used to present the characteristics of hospitals and units in this study. Analysis of variance was also performed to identify critical differences in collaboration and other unit characteristics by level of IENs. Finally, multi-level regressions with a hospital-level random intercept were employed to examine the relationship between unit IENs.
### Table 1. Characteristics of Nurse Respondents by Unit Type

<table>
<thead>
<tr>
<th>N of RNs</th>
<th>Age Mean (SD)</th>
<th>Years as RN Mean (SD)</th>
<th>Years on Unit Mean (SD)</th>
<th>Female (%)</th>
<th>White (%)</th>
<th>BSN (%)</th>
<th>Certification (%)</th>
<th>Full-Time (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All RNs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>24,034 (100)</td>
<td>37.59 (11.29)</td>
<td>10.04 (9.74)</td>
<td>5.67 (6.32)</td>
<td>89.14</td>
<td>68.53</td>
<td>67.98</td>
<td>83.87</td>
</tr>
<tr>
<td>Critical care</td>
<td>6,512 (27.09)</td>
<td>38.03 (10.95)</td>
<td>11.56 (9.93)</td>
<td>6.45 (6.91)</td>
<td>84.03</td>
<td>73.83</td>
<td>74.90</td>
<td>85.24</td>
</tr>
<tr>
<td>Step-down</td>
<td>3,775 (15.71)</td>
<td>36.15 (10.81)</td>
<td>8.56 (8.82)</td>
<td>4.78 (5.25)</td>
<td>87.98</td>
<td>60.49</td>
<td>70.41</td>
<td>84.79</td>
</tr>
<tr>
<td>Medical</td>
<td>4,712 (19.61)</td>
<td>37.58 (11.42)</td>
<td>9.30 (9.47)</td>
<td>5.22 (5.90)</td>
<td>91.33</td>
<td>52.62</td>
<td>61.37</td>
<td>81.45</td>
</tr>
<tr>
<td>Surgical</td>
<td>3,404 (14.16)</td>
<td>37.59 (11.84)</td>
<td>10.02 (10.37)</td>
<td>6.06 (6.82)</td>
<td>92.09</td>
<td>70.70</td>
<td>64.94</td>
<td>81.68</td>
</tr>
<tr>
<td>Medical-surgical</td>
<td>5,631 (23.43)</td>
<td>38.06 (11.48)</td>
<td>9.91 (9.69)</td>
<td>5.51 (6.16)</td>
<td>92.16</td>
<td>67.26</td>
<td>61.37</td>
<td>81.45</td>
</tr>
<tr>
<td><strong>IENs Only</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>2,126 (100)</td>
<td>44.26 (9.15)</td>
<td>19.25 (9.17)</td>
<td>7.63 (6.75)</td>
<td>88.44</td>
<td>6.59</td>
<td>83.73</td>
<td>68.26</td>
</tr>
<tr>
<td>Critical care</td>
<td>465 (21.87)</td>
<td>45.87 (9.17)</td>
<td>22.16 (9.12)</td>
<td>9.77 (7.74)</td>
<td>87.20</td>
<td>11.35</td>
<td>85.59</td>
<td>86.15</td>
</tr>
<tr>
<td>Step-down</td>
<td>335 (15.76)</td>
<td>43.41 (9.03)</td>
<td>18.56 (8.63)</td>
<td>6.90 (6.12)</td>
<td>86.24</td>
<td>3.02</td>
<td>87.13</td>
<td>92.51</td>
</tr>
<tr>
<td>Medical</td>
<td>510 (23.99)</td>
<td>43.80 (8.82)</td>
<td>18.00 (9.08)</td>
<td>6.73 (6.01)</td>
<td>89.60</td>
<td>3.79</td>
<td>85.07</td>
<td>54.71</td>
</tr>
<tr>
<td>Surgical</td>
<td>249 (11.71)</td>
<td>44.82 (9.40)</td>
<td>19.83 (9.52)</td>
<td>7.95 (6.94)</td>
<td>89.02</td>
<td>8.57</td>
<td>82.59</td>
<td>37.55</td>
</tr>
<tr>
<td>Medical-surgical</td>
<td>567 (26.67)</td>
<td>43.64 (9.25)</td>
<td>18.22 (8.92)</td>
<td>7.00 (6.43)</td>
<td>89.43</td>
<td>6.44</td>
<td>79.51</td>
<td>58.47</td>
</tr>
</tbody>
</table>

**Source:** Press Ganey Associates, 2019

BSN = bachelor of science in nursing, IENs = internationally educated nurses, RN = registered nurse
non-Magnet (46% vs. 42%) hospitals.

At the unit level, nearly half (47%) of the 958 units did not have any IENs, and on average, 9% of nurses on a unit were IENs. Comparisons of collaboration and other unit characteristics by level of IENs are summarized in Table 3. The mean scores on the RN-RN interaction scale and the RN-MD interaction scale were 4.59 (SD=0.33) and 4.14 (SD=0.35), respectively. One-way variance analysis found units with higher levels of IENs had lower RN-RN collaboration, higher patient-to-nurse ratios, higher BSN rates, longer RN tenure, and less overtime.

Estimates of the association between unit utilization of IENs and collaboration among nurses and between nurses and physicians are presented in Table 4. The estimates indicate unit proportions of IENs were not associated with the levels of RN-RN collaboration after controlling for unit and hospital characteristics. Compared to units without IENs, units with 10%-20% IENs had lower RN-MD collaboration, but this was not seen in units with IENs levels of <10% nor ≥20%. The models also suggest unit nurse staffing, overtime, unit tenure, and unit type were significantly associated with either RN-RN collaboration, RN-MD collaboration, or both. In addition, the estimates show units in nonprofit hospitals had higher RN-RN collaboration; units in large hospitals had lower RN-MD collaboration while units in Magnet hospitals had higher RN-MD collaboration.

Discussion

This study is one of the very first studies that empirically examined the association between unit utilization of IENs and intra and interprofessional collaboration in U.S. hospitals. The findings provide unique insights into the complicated role IENs play in the U.S. healthcare system.
### Table 3.
Unit Collaboration and Other Characteristics by Unit Level of IENs

<table>
<thead>
<tr>
<th>Unit Level of IENs</th>
<th>0% (n=453) Mean (SD)</th>
<th>&gt;0 &amp; &lt;10% (n=227) Mean (SD)</th>
<th>≥10% &amp; &lt;20% (n=116) Mean (SD)</th>
<th>≥20% (n=162) Mean (SD)</th>
<th>Overall (n=958) Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RN-RN collaboration*</td>
<td>4.62 (0.33)</td>
<td>4.60 (0.31)</td>
<td>4.50 (0.38)</td>
<td>4.54 (0.34)</td>
<td>4.59 (0.33)</td>
</tr>
<tr>
<td>RN-MD collaboration</td>
<td>4.17 (0.37)</td>
<td>4.12 (0.33)</td>
<td>4.09 (0.37)</td>
<td>4.15 (0.34)</td>
<td>4.14 (0.35)</td>
</tr>
<tr>
<td>Nurse staffing (patient-to-nurse ratio)*</td>
<td>4.89 (1.68)</td>
<td>4.91 (1.71)</td>
<td>5.43 (1.77)</td>
<td>5.20 (1.61)</td>
<td>5.01 (1.70)</td>
</tr>
<tr>
<td>BSN rate*</td>
<td>0.60 (0.20)</td>
<td>0.66 (0.20)</td>
<td>0.66 (0.19)</td>
<td>0.76 (0.14)</td>
<td>0.65 (0.20)</td>
</tr>
<tr>
<td>Years on unit*</td>
<td>5.32 (2.77)</td>
<td>5.75 (2.62)</td>
<td>5.82 (2.53)</td>
<td>6.45 (3.01)</td>
<td>5.67 (2.77)</td>
</tr>
<tr>
<td>Years as RN*</td>
<td>9.41 (4.11)</td>
<td>9.69 (3.80)</td>
<td>10.96 (3.61)</td>
<td>13.57 (3.96)</td>
<td>10.37 (4.23)</td>
</tr>
<tr>
<td>Certificate rate</td>
<td>0.62 (0.36)</td>
<td>0.61 (0.37)</td>
<td>0.58 (0.36)</td>
<td>0.62 (0.34)</td>
<td>0.62 (0.36)</td>
</tr>
<tr>
<td>Overtime*</td>
<td>0.35 (0.20)</td>
<td>0.34 (0.19)</td>
<td>0.32 (0.22)</td>
<td>0.25 (0.20)</td>
<td>0.35 (0.36)</td>
</tr>
</tbody>
</table>

**Source:** Press Ganey Associates, 2019

*Statistically significant difference  
BSN = bachelor of science in nursing; IENs = internationally educated nurses, MD = physician, RN = registered nurse

### Table 4.
Association between Unit Level of IENs and Collaboration

<table>
<thead>
<tr>
<th>Model 1 (Unadjusted)</th>
<th>Model 2 (Adjusted)</th>
<th>Model 1 (Unadjusted)</th>
<th>Model 2 (Adjusted)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RN-RN Collaboration</strong></td>
<td><strong>RN-MD Collaboration</strong></td>
<td><strong>RN-RN Collaboration</strong></td>
<td><strong>RN-MD Collaboration</strong></td>
</tr>
<tr>
<td>β [95% CI]</td>
<td>p Value</td>
<td>β [95% CI]</td>
<td>p Value</td>
</tr>
<tr>
<td>≥0 &amp; &lt;10%</td>
<td>-0.02 [-0.07 - 0.03]</td>
<td>0.444</td>
<td>-0.01 [-0.06 - 0.04]</td>
</tr>
<tr>
<td>≥10% &amp; &lt;20%</td>
<td>-0.12 [-0.19 - 0.05]</td>
<td>0.001</td>
<td>-0.06 [-0.14 - 0.02]</td>
</tr>
<tr>
<td>≥20%</td>
<td>-0.07 [-0.13 - 0.01]</td>
<td>0.014</td>
<td>-0.01 [-0.10 - 0.07]</td>
</tr>
</tbody>
</table>

**Source:** Press Ganey Associates, 2019

**Note:** Model 2 was adjusted for hospital and unit characteristics. Hospital characteristics included ownership, bed size, teaching status, and Magnet status. Unit characteristics included unit type, proportion of baccalaureate nurses, unit RN tenure, specialty certificate rate, and overtime. BSN = bachelor of science in nursing; IENs = internationally educated nurses, MD = physician, RN = registered nurse
The use of IENs and their influence on quality of care and patient outcomes has been a controversial topic. IENs often face challenges when transitioning to practice in the United States because of the differences in culture, language, and healthcare system between home country and the United States (Ghazal et al., 2019; Moyce et al., 2016). Anecdotally there are concerns IENs may not perform up to the same level as peer U.S. nurses during patient care, including collaboration. In this study, having more IENs did not lead to a decrease in nurses’ collaboration with other providers. Therefore, such concerns may not be necessary.

Another notable finding of this study is the results illustrating the influence of IENs’ presence in shaping unit nursing characteristics. Units that had more IENs had a higher proportion of BSN nurses. This is, at least partially, because IENs are more likely to have a baccalaureate degree to qualify for the U.S. nursing licensure exam (NCLEX-RN). This finding is consistent with reports from the National Council of State Boards of Nursing (Budden et al., 2013). Previous research has also demonstrated hospitals with a higher proportion of BSN nurses are likely to have lower patient mortality and failure to rescue (Aiken et al., 2003). It is, therefore, possible that IENs contribute to improved health outcomes via promoting a better educated U.S. nursing workforce.

While higher turnover rates exist in hospital nurses (Park et al., 2016), this study indicated IENs stayed longer on their unit than peer U.S. nurses, and units with a higher proportion of IENs had a longer unit tenure among its nurses. Some IENs are recruited to the United States for the sole reason to work as an RN, while some come to work in the nursing profession after moving here with their family. Despite the different motivations for migrating to another country as an RN, previous qualitative research has shown IENs are more inclined to stay on a unit longer (Chun Tie et al., 2018). In other words, units with more IENs have a more stable nursing workforce or lower turnover rate. Lower turnover rates can contribute financially to a unit by reducing expenses on recruiting and hiring new nurses. It can also benefit collaboration among nurses over time.

IENs are often recruited to fill nursing position vacancies to mitigate the impact of the nursing workforce shortage on nursing quality and patient outcomes (Sherwood & Shaffer, 2014; Reinwald, 2015). Despite this, units in this study with higher proportions of IENs had higher patient-to-nurse ratios. IENs are likely to work in environments with heavier workloads that can result in worse patient outcomes (Ma et al., 2018; McHugh & Ma, 2013). Furthermore, previous research found patient-to-nurse ratios were negatively associated with collaboration on a unit (Ma & Stimpfel, 2018). This explains, at least partially, why units with higher proportions of IENs had worse collaboration in the binary analysis without adjusting nurse staffing. Another interesting finding of this study is that despite the higher patient-to-nurse ratios, units with a higher proportion of IENs had fewer overtime shifts. One possibility is those units might have longer shifts in general and thus were less likely to have nurses work overtime. Future studies are warranted to examine this interesting phenomenon.

**Limitations**

Despite the use of a national database with a large sample, this study has limitations. It used an observational, cross-sectional design; therefore, findings are correlational, not causal. Although IENs’ age, gender, race, education, work experience, etc., were reported, researchers were not able to specify the source country of IENs and whether English is a native or official language in nursing education. Also, though data from a unique nationwide database (NDNQI) were used, it should be noted hospitals’ participation was voluntarily, and thus, some types of hospitals may be over-represented or underrepresented. Researchers only examined collaboration of nurses with peer nurses and physicians. Further research should investigate the influence of IENs on nurses’ collaboration with other healthcare professionals.

**Implications**

Findings from this study have implications for nurse
leaders. Given the ongoing nursing workforce shortage, especially in rural areas, this study suggests nurse managers and administrators should not be reluctant to hire qualified IENs to fill position vacancies. It is also essential for nurse managers and U.S.-educated nurses to recognize IENs’ contribution to a higher educated, more stable nursing team on their units. Recognition of an individual nurse’s value can lead to a healthy work environment and workforce, which further contributes to high quality of care and improved patient outcomes. Hospitals that serve a highly diverse patient population may also benefit from IENs’ additional language skills and knowledge of other cultures.

To help IENs better assimilate into the work environment and care team, hospitals may consider providing educational modules focusing on basics of the healthcare system within the employer hospital and in the United States, in addition to the standard work orientation program/training. Communication and teamwork workshops in the context of the U.S. healthcare system and culture would be another way to assist in integrating and orienting IENs. Such programs can be conducted in collaboration with IEN recruitment agencies. A peer mentoring program that pairs new IENs with a team of mentors, including a U.S.-educated nurse and a senior IEN, can also be explored.

**Conclusion**

The study is among the first to investigate the role of IENs in intra and interprofessional collaboration among nurses and physicians in patient care units in U.S. hospitals. The findings suggest higher proportions of IENs were not associated with lower levels of collaboration in U.S. hospital units. Additionally, this study indicates the presence of IENs can contribute to a more educated and stable nursing workforce in patient care units. $\$

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**References**


continued on page 50
Collaboration in U.S. Hospitals
continued from page 40


