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**Internationally Educated Nurse Hiring: Geographic Distribution, Community, and Hospital Characteristics****Sung-Hyun Cho, PhD, RN [Associate Professor],**

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Since the 1990s, the confluence of several trends — population and nurse workforce aging, increased acuity and complexity of hospital care, and difficult working conditions — has caused a growing global shortage of registered nurses. As hospitals in the United States cope with persistent nursing shortages, many have begun to look overseas to fill vacant staff positions (Aiken, Buchan, Sochalski, Nichols, & Powell, 2004). As the largest importer of internationally educated nurses (IENs), the United States is considered to be the epicenter of global nurse migration (Aiken, 2007; Kingma, 2007). While IENs compose a relatively small portion of the total U.S. nursing workforce, their numbers are growing; data from the National Sample Survey of Registered Nurses (NSSRN) provided by the Health Resources and Services Administration (HRSA, 2006, 2010) suggest the proportion of IENs in the U.S. workforce increased from 3.5% to 5.4% (100,791 to 165,539 nurses) between 2004 and 2008. The number of IENs who passed the nursing licensure exam (NCLEX-RN) grew by 53% (from 14,954 to 22,879) between 2004 and 2007 (National Council of State Boards of Nursing, 2005, 2009), although not all IENs who pass the NCLEX-RN are hired by U.S. health care organizations (Aiken, 2007).

Internationally educated nurses are located unevenly across the nation (Aiken, 2007; HRSA, 2006, 2010; Polsky, Ross, Brush, & Sochalski, 2007; Schumacher, 2010). In the 2008 NSSRN, nearly half of IENs were working in three states: 26% in California, 12% in New York, and 10% in Texas (HRSA, 2010). The countries of origin, educational backgrounds, and settings in which IENs work are also well-documented. The top source countries of nurses who come to work in the United States are the Philippines (50% of IENs), Canada (12%), and India (10%) (HRSA, 2010). When compared to U.S.-educated nurses (USENs), a higher proportion of IENs have received their basic nursing education in baccalaureate

degree programs (41.6% vs. 30.4%) and fewer have associate degrees (8.7% vs. 41.6%) (Xu, Zaikina-Montgomery, & Shen, 2010). Also, more IENs work in central cities than USENs (45.9% vs. 21.9%), but fewer work outside metropolitan areas (1.5% vs. 17.8%) (Aiken, 2007). A higher proportion of IENs work in hospitals than USENs (70.3% vs. 58.8%), but fewer work in ambulatory care (5.8% vs. 10.3%) (Xu et al., 2010).

## Significance of the Study

This study goes beyond previous research, which focused almost entirely on individual characteristics of IENs, such as their educational and professional characteristics, by focusing on hospital's hiring of IENs in the United States. We, therefore, examined the relationships between hospital and community characteristics and IEN hiring. Our approach expands current knowledge of IENs to better understand the organizations, particularly acute care hospitals, that hire IENs and the characteristics of the communities where those hospitals are located. Because existing data sources about IENs include information from individual nurses rather than employers, it has been difficult to explore organization and community-level predictors of IEN hiring. The recent addition of a question about IEN hiring practices in the American Hospital Association (AHA) Annual Survey provides an opportunity to examine, for the first time, the demand side of IEN employment. Given the prominent role of IENs in hospitals, understanding the community and hospital characteristics associated with IEN hiring can help to characterize the role of IENs in meeting health care needs in the United States.

There is currently no theoretical framework to guide the study of hospitals' hiring of IENs. One possible approach would be to use a microeconomic theory of supply and demand. However, although such an approach might better elucidate factors that expand our knowledge of the IEN labor force, the challenges of estimating supply and demand are well-known, not the least of which is the recognition of a "market failure" for health services (Glied, 2001; Segal & Bolton, 2009), and beyond the scope of our project. In an effort to contribute knowledge of important community and hospital-level characteristics that may be considered in future supply-demand modeling efforts, we examined those characteristics that were associated with hospitals' hiring of IENs. Therefore, we conceptualized hospitals' hiring of IENs as a function of both community and hospital-level characteristics. This two-tiered model implies that first, hospitals' decisions to hire IENs are influenced by perceived community needs and receptivity to IENs; and second, in this context, hospitals also make decisions to hire IENs based on conditions and needs within their hospitals.

Although prior research identified primary source countries for IENs, their geographic distribution, and employment settings (Aiken, 2007), our interest in hospitals' hiring has not previously been explored. Therefore, selection of variables for our two-tiered conceptual model was guided by a HRSA study (2007) of methods for identifying communities and facilities with nursing shortages. Although the HRSA study focused on developing a method to identify communities and hospitals with shortages of RNs, several of the community demographic characteristics used are also relevant to our examination of hospitals' hiring of IENs. For example, a community that is racially and ethnically diverse, with a more highly educated population, and with a higher foreign-born population, might provide a more

welcoming environment for IENs and therefore hospitals located in these communities might be more likely to hire IENs. Similarly, a hospital located in a community with high levels of hospital utilization (reflected by the number of hospital beds and inpatient days in the community) might be more likely to hire IENs.

The HRSA report also identified relevant facility characteristics that are relevant to our analysis (e.g., RNs per hospital bed, staffing ratios). If, for example, a hospital had fewer RNs per hospital bed or poorer staffing ratios, and if the hospital was interested in improving staffing, it might do so by hiring IENs. We further expanded on the HRSA model by including information on several additional hospital characteristics, including hospital ownership, which has been linked to nurse staffing (Mark & Harless, 2007; Seago, Spetz, & Mitchell, 2004), but not previously explored in the context of IEN hiring. We included hospital teaching status, since teaching hospitals are perhaps the most frequent site for hiring of international medical graduates (IMGs), particularly residents (Mick & Lee, 1997) and, therefore, may be more likely to hire IENs. Finally, we added a variable reflecting the health of the community by including the infant mortality rate. This is consistent with Mick and Lee's (1997) finding that counties in 24 of 48 states had a higher proportion of IMGs when the infant mortality rate was high. Thus, hiring of IENs in counties with high infant mortality rate might mirror the pattern of hiring of IMGs.

Therefore, the purposes of this study were to (a) examine the geographic distribution of IEN hiring and (b) determine associations between community and hospital characteristics and IEN hiring. We first examined the geographic distribution of IEN hiring at the census region and state levels; then we examined the community and hospital factors associated with IEN hiring to explain geographic variations observed in IEN hiring.

## Methods

### Data Sources

Three sources of data were used in this study (see Table 1). The first was the AHA Annual Survey from fiscal years (FY) 2007 and FY 2008. The AHA survey is a voluntary survey of approximately 6,000 U.S. hospitals that includes questions about hospital characteristics. Since FY 2007, it has included a question about IEN hiring practices. The second source of data was the Area Resource File (ARF, 2008 release), a data repository managed by the HRSA. The ARF is a health resources information system containing more than 6,000 variables for each of the nation's counties. We obtained data from the ARF on the characteristics of counties where hospitals were located. Because the ARF includes data from over 50 sources, variables included were collected in different years (see Table 1). The final data source was the 2008 NSSRN County Public Use File. The NSSRN is a quadrennial survey that examines the supply, composition, and distribution of nurses in the United States (HRSA, 2010). Data on RN supply were derived from the 2008 NSSRN. These databases were linked by using the Federal Information Processing Standards state and county codes.

## Study Sample

We selected general medical-surgical hospitals located in 50 states and the District of Columbia. Hospitals controlled by the federal government (e.g., military and Veterans' Administration hospitals) were excluded from the study sample because their different patient populations and nursing workforce made them incomparable to hospitals with other ownership types. In FY 2007, 4,656 hospitals met these criteria, of which 3,998 (86%) participated in the AHA Annual Survey. Of the hospitals participating in the survey, 3,217 (80%) answered the questions pertaining to IEN hiring practices. For FY 2008, 4,628 hospitals met the inclusion criteria, of which 3,963 (86%) participated in the AHA survey, and 3,321 (84%) responded to the IEN hiring questions.

## Variables

**IEN hiring**—In 2007, the AHA survey contained, for the first time, a question about IEN hiring: “Did your facility hire more foreign-educated nurses (including contract or agency nurses) to help fill RN vacancies in 2007 vs. 2006?” The 2008 survey asked the same question about the 2008 vs. 2007 period. The question in both years had the same four response options: more, less, same, or did not hire. Foreign-educated nurses were defined in the survey as individuals who were foreign-born and received their basic nursing education in a foreign country (AHA, 2008, 2009). Since the AHA uses a more restrictive definition of foreign-educated nurses than other data sources such the NSSRN, which includes U.S.-born nurses who received their basic nursing education outside of the United States (HRSA, 2010), we expected the study would generate conservative estimates of the effects of community and hospital characteristics on U.S. hospitals' IEN hiring. Hospitals that reported hiring foreign-educated nurses were asked to identify the countries or continents from which they recruited nurses; response options were Africa, Korea, Canada, Philippines, China, India, and other. Although the term “foreign-educated nurses” was used in the AHA survey, we use the term “internationally educated nurses” throughout this article. Because our study focused on whether or not hospitals hired IENs, we treated the IEN hiring variable as dichotomous in the data analysis, with 1 = hired IENs (more, less, same) and 0 = did not hire IENs.

**Geographic distribution**—We measured geographic distribution of IEN hiring as the percentage of hospitals that reported hiring IENs for each census region and state, along with the percentage of hospitals hiring IENs from each source country or continent for each census region.

**Community characteristics**—We considered community characteristics to be best represented by the characteristics of immediate counties in which sample hospitals were located. The community characteristics are described in Table 1 with four groups of variables. Demographic and economic characteristics included the percentages of the population over age 65 years, non-Whites, foreign-born, and college-educated individuals living in the county, along with county-level rates of poverty, unemployment, and rural-urban status (defined using the Core Based Statistical Area codes). Community health was defined using the 5-year infant mortality rate (average of 2001-2005), categorized into three groups: low (below 25th percentile; less than 5.3 deaths per 1,000 live births), middle

(between the 25th and 75th percentiles), and high (75th percentile or above; 8.5 deaths or more). Two measures of hospital utilization were included: the number of hospital beds per 1,000 persons and the number of inpatient days per person. The RN supply was categorized into three groups: low (below the 25th percentile), middle (between the 25th and 75th percentiles), and high (75th percentile or above). We also included an “unable to estimate” group for RN supply since the 2008 NSSRN county data file withheld information likely to point to individual nurses in less-populated counties (including 238 hospitals in 2007 and 249 hospitals in 2008).

**Hospital characteristics**—Hospital characteristics included in our analyses were ownership, size, teaching status, whether or not the hospital maintained a separate nursing home unit, and nurse staffing. Nurse staffing was assessed using two measures of RN staffing and skill mix. RN staffing indicated the adjusted average daily census (accounting for outpatients as well as inpatients) per full-time equivalent (FTE) RN. Skill mix was the proportion of FTE RNs out of total FTE nursing personnel (RNs, licensed practical or vocational nurses, and nursing assistive personnel).

### Data Analysis

Geographic distribution of IEN hiring was analyzed at the census region and state levels. To evaluate the community and hospital characteristics associated with IEN hiring, we conducted multivariate logistic regression analyses to identify the independent associations between community and hospital characteristics and likelihood of IEN hiring. The logistic regression model included both community and hospital characteristics as independent variables and the IEN hiring as a dichotomous dependent variable. Separate regression analyses were conducted for FY 2007 and FY 2008. We assessed the statistical significance of odds ratios at the 5% level. Because only 561 (29%) counties in 2007 and 573 (28%) in 2008 contained more than a single hospital, we did not correct for county-level clustering.

### Ethical Consideration

This study was approved by the institutional review board of the University of North Carolina at Chapel Hill.

### Results

Overall, 80.5% of hospitals in 2007 and 83.8% of hospitals in 2008 responded to the IEN hiring question. The Pacific and East South Central regions had the lowest response rates in both years. Overall, 21% of responding hospitals in 2007 and 20% in 2008 reported hiring IENs (see Column E in Table 2).

### Geographic Distribution by Region And State

Variation in IEN hiring was found at both the region and state levels. Table 2 shows IEN hiring by region for FYs 2007 and 2008. In 2007, the region with the largest percentage of hospitals hiring IENs was the Pacific region (35%), followed by the Midatlantic (32%) and South Atlantic (29%) regions. In 2008, the largest percentage of hospitals that hired IENs was in the West South Central region (32%), followed by the Pacific (30%) and South

Atlantic (28%) regions. The region with the smallest percentage of hospitals reporting IEN hiring in both years was the West North Central region. States within each region also showed differences in IEN hiring. States with the largest percentage of hospitals reporting IEN hiring (analysis not shown, results are available upon inquiry to the first author) were New Jersey, Maryland, the District of Columbia, Florida, Oklahoma, and Arizona, while the states with the largest absolute number of hospitals reporting IEN hiring were New York, Florida, Texas, and California. The states with the lowest percentages of hospitals reporting IEN hiring were West Virginia, North Dakota, Nebraska, and Utah.

Of the hospitals that reported hiring IENs, 520 hospitals (76%) in 2007 and 426 (64%) in 2008 also responded to the subsequent question on source countries or continents from which IENs were hired (see Table 3). The rank of source countries and continents was consistent between the 2 years. Overall, the greatest percentage of hospitals reported hiring IENs from the Philippines, although a higher percentage of hospitals in New England reported hiring IENs from Canada. More hospitals in the Midatlantic, South Atlantic, and Mountain regions reported hiring IENs from India than other regions, while a higher percentage of hospitals in the Pacific region reported hiring IENs from China and Korea.

### **Community and Hospital Characteristics Related To IEN Hiring**

Results of multivariate logistic regression analyses for each year are shown in Table 4. Hospitals located in counties with greater proportions of older residents, non-White, college-educated, and unemployed residents as well as in metropolitan statistical areas (vs. rural areas) were more likely to hire IENs. Hospitals located in counties in the high and low percentiles of infant mortality were less likely to hire IENs than those in the middle category. The number of hospital beds per population was associated negatively with likelihood of IEN hiring, whereas the number of inpatient days per population was associated positively with the likelihood of IEN hiring. In 2007, hospitals located in counties in the low RN supply percentiles were less likely to have hired IENs than hospitals in the middle RN supply percentile. In 2008, hospitals located in counties in the low RN supply percentile were more likely to have hired IENs than hospitals in the high RN supply percentile. Among hospital characteristics, the only variable that was significantly and positively associated with likelihood of IEN hiring in both years was hospital size. In 2008, hospitals that maintained nursing homes or had higher skill mix were less likely to hire IENs.

## **Discussion**

### **Results**

We first report geographic variations in IEN hiring at both the census region and state levels, which is consistent with prior studies using data from individual nurses. Our finding that the largest proportion of hospitals in the Pacific, Midatlantic, and South Atlantic regions reported hiring IENs is consistent with Polsky et al.'s (2007) report that these regions also had the greatest number of foreign-trained new entrants to the U.S. registered nurse workforce in 1990 and 2000 U.S. Census data. New York, New Jersey, Florida, Texas, and California, which have been reported to have the highest density of IENs in previous studies

(Aiken, 2007; HRSA, 2006, 2010; Schumacher, 2010), also reported the greatest percentages or absolute numbers of IEN hiring hospitals in our study.

Our finding that the Philippines, Canada, and India were the top source countries from which hospitals hired IENs was also consistent with previous studies (HRSA, 2010; Schumacher, 2010). The prominence of low-income countries such as the Philippines and India as source countries from which U.S. hospitals hire IENs highlights the ongoing ethical dilemmas inherent in hiring IENs from countries with poorly resourced health systems to work in the United States. Members of the U.S. nursing sector have sought to minimize the negative impact of IEN hiring on low-income source countries, but the voluntary nature of these efforts, such as the Voluntary Code of Ethical Conduct for the Recruitment of Foreign-Educated Nurses to the United States (Alliance for Ethical International Recruitment Practices, 2009), leaves primary responsibility for ethical recruitment with individual hospitals and recruitment agencies.

Our analysis showed strong and consistent relationships between community characteristics and IEN hiring. Hospitals in counties with older, more diverse, and more educated populations were more likely to report hiring IENs. These findings may reflect differences in hospital administrators' perceptions of community receptiveness to IENs. Administrators at hospitals in areas with more diverse and more educated populations might perceive their communities and patient populations to be more receptive to IENs than those in areas with less diverse and less-educated populations. Our finding that hospitals in urban areas were more likely to hire IENs than those in rural areas is consistent with previous studies of IENs. The positive relationship between county unemployment rate and hospitals' IEN hiring could be attributed to IEN labor market participation in areas of high and low unemployment. Increases in RN employment during economic recessions have been explained by the impact of real or anticipated decreases in RNs' spousal income, which would stimulate an increase in RNs' participation in the labor market (Buerhaus, Auerbach, & Staiger, 2009). Given the majority (74%) of IENs are married (Xu & Kwak, 2005; Xu et al., 2010), IENs living in counties with higher unemployment rates might participate more actively in the labor market if their spouses are less likely to be employed.

We did not find a clear relationship between aggregate community health (measured as infant mortality rate) and hospitals' IEN hiring. Hospitals in counties in both the high and low percentile infant mortality rate categories were less likely to report hiring IENs than hospitals in counties in the middle percentile category. The finding that IENs are less likely to be hired in counties with high infant mortality suggests the gap-filling role of IENs in U.S. hospitals may be limited. However, this finding should be interpreted with caution because it cannot account for within-county variability in community health and needs; also, geographic variations, even within a county, especially large urban counties, have been reported in health care needs and utilization (Carlisle, Valdez, Shapiro, & Brook, 1995; Sasson et al., 2010). It is possible that analyses using more finegrained geographic units of analysis (e.g., ZIP codes and census tracts) would show a different relationship between community health needs and hospitals' IEN hiring. A positive relationship between inpatient days per person and IEN hiring may reflect greater demand for IENs in areas with higher inpatient utilization. An inverse relationship between hospital bed supply and IEN hiring,

after controlling for inpatient utilization, is difficult to interpret within our analysis. Further investigations are needed to examine how community-level hospital utilization is related to hiring of IENs.

Few hospital characteristics showed significant and consistent relationships with IEN hiring after controlling for community characteristics. Only hospital size was associated positively with IEN hiring in both years, possibly because larger hospitals might have more institutional resources (connections with recruiters, staffing agencies, etc.) and better access to IEN hiring channels. The fact that hospitals without nursing homes were more likely to report hiring IENs could be related to basic RN education. Given IENs are more likely than USENs to hold baccalaureate degrees, hospitals focusing on acute care provision might hire IENs because they prefer a more highly educated nurse workforce. The inverse relationship between skill mix and likelihood of hiring IENs may be related to hospitals with lower skill mix seeking to hire IENs to increase the proportion of RNs on their staffs.

### Study Limitations

This study has several limitations. First, the findings could be influenced by non-response bias; nearly 20% of hospitals that participated in the AHA survey did not respond to the IEN question. Also, response rates differed by region and state. Therefore, geographic variations in IEN hiring need to be interpreted with caution. We analyzed data from 2 fiscal years to address this limitation and to produce more generalizable findings. Third, hospitals' reported hiring of IENs during a 2-year period might not reflect the degree to which they already employ IENs. Hospitals that reported not hiring IENs in 2007 and 2008 might have employed IENs who were hired previously, so their reported hiring practices in 2007 and 2008 may not mean there were no IENs working in those hospitals. Fourth, although we used the most recent data available at the time this study was conducted, some variables (e.g., education and foreign-born population from 2000 census data) might not reflect the characteristics of counties accurately in 2007 and 2008.

### Conclusion

Despite these limitations, our study expands understanding of the demand side of IEN employment in U.S. hospitals by providing the first in-depth examination of the community and hospital factors related to hospitals' IEN hiring. The study findings that more community characteristics than hospital characteristics were strongly associated with IEN hiring suggest perceived community needs and receptivity to IENs could be an important consideration in hospital administrators' decisions to hire IENs. These findings suggest that as the U.S. population ages and becomes increasingly diverse, the demand for IENs is likely to grow. Nurse leaders and faculty may face challenges with regard to ethical recruitment of IENs from low-income countries, incorporation of IENs into U.S. health care organizations, and the continued development of a diverse U.S.-educated nursing workforce. Further studies examining the factors that influence hospitals' IEN hiring practices over longer time periods and under different economic conditions (e.g., throughout the economic recession that began in late December 2007) will enable a more robust examination of our study



findings and provide a richer understanding of how hospital administrators make decisions to bring IENs into their workforces.\$

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### Executive Summary

- As the largest importer of internationally educated nurses (IENs), the United States is considered to be the epicenter of global nurse migration.
- The purposes of this study were to examine the geographic distribution of IEN hiring and determine associations between community and hospital characteristics and IEN hiring.
- More community characteristics than hospital characteristics were strongly associated with IEN hiring which suggest perceived community needs and receptivity to IENs could be an important consideration in hospital administrators' decisions to hire IENs.
- These findings suggest that as the U.S. population ages and becomes increasingly diverse, the demand for IENs is likely to grow.
- Nurse leaders and faculty may face challenges with regard to the ethical recruitment of IENs from low-income countries, incorporation of IENs into U.S. health care organizations, and continued development of a diverse U.S.-educated nursing workforce.
- This study expands understanding of the demand side of IEN employment in U.S. hospitals by providing the first in-depth examination of the community and hospital factors related to hospitals' IEN hiring.

**Table 1**  
**Community and Hospital Characteristics: Definitions and Data Sources**

Variable	Definition	Data Source, Year
<b>Community Characteristics</b>		
<i>Demographic and economic</i>		
Older population	% persons age 65 years or older	ARF, 2007
Race and ethnicity	% non-White	ARF, 2007
Foreign-born population	% foreign-born population	ARF, 2000
Education	% persons with 4 or more years of college education among age 25 years or older	ARF, 2000
Poverty	% persons in poverty	ARF, 2007
Unemployment	% unemployed age 16 years or older	ARF, 2007
Rural-urban area	Metropolitan division, metropolitan, micropolitan, and rural	ARF, 2007 AHA, 2007/2008
<i>Community health</i>		
Infant mortality	Number of infant deaths per 1,000 live births; low (<25th percentile), middle (25th-75th), high ( 75th)	ARF, 2001-2005
<i>Hospital utilization</i>		
Hospital beds	Number of hospital beds per 1,000 persons	ARF, 2006
Inpatient days	Number of inpatient days per person	ARF, 2006
RN supply	Number of RNs with active licenses per 1,000 persons; low (<25th percentile), middle (25th-75th), high ( 75th)	NSSRN, 2008
<b>Hospital Characteristics</b>		
Ownership	Not-for-profit, investor-owned, non-federal government	AHA, 2007/2008
Size	Number of beds	AHA, 2007/2008
Teaching status	Membership in Council of Teaching Hospitals and Health Systems	AHA, 2007/2008
Maintaining a nursing home	Maintains a separate nursing home type of long-term care unit	AHA, 2007/2008
RN staffing	Adjusted average daily census per FTE RN	AHA, 2007/2008
Skill mix (RN proportion)	% FTE RNs out of total FTE nursing personnel	AHA, 2007/2008

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**Table 2**  
**Geographic Distribution of IEN Hiring by Region in Fiscal Years 2007 and 2008**

	FY 2007						FY 2008					
	Survey Participants (A)	IEN Item Respondents (B)	Response Rate (%) (C=B/A)	Hired IENs (D)	IEN Hiring (%) (E=D/B)		Survey Participants (A)	IEN Item Respondents (B)	Response Rate (%) (C=B/A)	Hired IENs (D)	IEN Hiring (%) (E=D/B)	
<b>Overall</b>	<b>3,998</b>	<b>3,217</b>	<b>80.5</b>	<b>682</b>	<b>21.2</b>		<b>3,963</b>	<b>3,321</b>	<b>83.8</b>	<b>664</b>	<b>20.0</b>	
New England	171	140	81.9	34	24.3		167	140	83.8	31	22.1	
Mid Atlantic	330	298	90.3	96	32.2		323	293	90.7	75	25.6	
South Atlantic	563	509	90.4	150	29.5		550	437	79.5	123	28.1	
East North Central	633	549	86.7	96	17.5		647	544	84.1	80	14.7	
East South Central	346	230	66.5	19	8.3		354	241	68.1	18	7.5	
West North Central	593	483	81.5	26	5.4		592	558	94.3	28	5.0	
West South Central	622	479	77.0	107	22.3		596	560	94.0	181	32.3	
Mountain	290	248	85.5	56	22.6		290	255	87.9	40	15.7	
Pacific	450	281	62.4	98	34.9		444	293	66.0	88	30.0	

**Table 3**  
**Source Countries or Continents of IENs Overall and by Region: Percentage of Hospitals that Hired IENs from Each Source Country or Continent (multiple responses)**

	n		Philippines		Canada		India		Africa		China		Korea		Other	
	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008	2007	2008
<b>Overall</b>	520	426	70.6	63.6	31.7	31.0	26.7	27.2	10.4	12.9	9.2	10.3	8.1	7.5	22.7	28.2
New England	30	23	33.3	30.4	50.0	52.2	6.7	17.4	10.0	13.0	0.0	4.3	3.3	4.3	26.7	30.4
Mid Atlantic	72	50	73.6	74.0	18.1	12.0	36.1	36.0	8.3	6.0	6.9	12.0	13.9	8.0	26.4	30.0
South Atlantic	119	94	70.6	63.8	37.0	29.8	34.5	42.6	15.1	22.3	8.4	7.4	3.4	5.3	23.5	35.1
East North Central	62	54	72.6	53.7	41.9	50.0	19.4	24.1	11.3	24.1	12.9	22.2	6.5	14.8	19.4	31.5
East South Central	13	12	92.3	66.7	23.1	16.7	23.1	25.0	0.0	8.3	0.0	0.0	0.0	0.0	23.1	25.0
West North Central	12	10	66.7	70.0	25.0	30.0	0.0	0.0	16.7	10.0	8.3	10.0	0.0	0.0	25.0	20.0
West South Central	85	88	82.4	80.7	21.2	19.3	27.1	21.6	11.8	9.1	3.5	4.5	8.2	3.4	15.3	14.8
Mountain	47	30	68.1	56.7	23.4	23.3	34.0	30.0	6.4	6.7	8.5	3.3	8.5	3.3	29.8	43.3
Pacific	80	65	66.3	53.8	40.0	46.2	20.0	15.4	6.3	4.6	21.3	18.5	15.0	15.4	22.5	26.2

**Table 4**  
**Relationship of Community and Hospital Characteristics to IEN Hiring**

	FY 2007		FY 2008	
	Odds Ratio [95% CI]	<i>p</i>	Odds Ratio [95% CI]	<i>p</i>
<b>Community Characteristics</b>				
<i>Demographic and economic</i>				
% age 65+ years	1.040 [1.003, 1.079]	0.034	1.054 [1.017, 1.092]	0.004
% non-White	1.034 [1.025, 1.043]	<0.001	1.032 [1.023, 1.041]	<0.001
% foreign-born population	1.003 [0.984, 1.023]	0.733	0.999 [0.980, 1.018]	0.898
% age 25+ with 4+ years college	1.037 [1.021, 1.053]	<0.001	1.038 [1.022, 1.054]	<0.001
% persons in poverty	0.975 [0.946, 1.005]	0.099	1.011 [0.983, 1.040]	0.447
% unemployment	1.160 [1.071, 1.256]	<0.001	1.090 [1.009, 1.179]	0.030
Rural-urban area (vs. rural area)				
Metropolitan division	2.035 [1.193, 3.471]	0.009	1.599 [0.960, 2.663]	0.071
Metropolitan statistical area	2.026 [1.300, 3.157]	0.002	1.538 [1.019, 2.321]	0.041
Micropolitan statistical area	1.530 [0.984, 2.378]	0.059	1.305 [0.881, 1.933]	0.185
<i>Community health</i>				
Infant mortality (vs. middle)				
Low	0.764 [0.585, 0.997]	0.048	0.789 [0.609, 1.022]	0.073
High	0.733 [0.553, 0.972]	0.031	0.669 [0.511, 0.877]	0.004
<i>Hospital utilization</i>				
Hospital beds per 1,000 persons	0.838 [0.737, 0.953]	0.007	0.835 [0.739, 0.943]	0.004
Inpatient days per person	1.786 [1.195, 2.671]	0.005	1.763 [1.175, 2.644]	0.006
<i>RN supply (vs. low)</i>				
Unable to estimate	0.718 [0.365, 1.412]	0.337	0.717 [0.415, 1.240]	0.234
Middle	1.351 [1.024, 1.782]	0.033	1.194 [0.922, 1.546]	0.180
High	0.995 [0.690, 1.436]	0.979	0.648 [0.452, 0.930]	0.019
<b>Hospital Characteristics</b>				
Ownership (vs. non-federal government)				
Not-for-profit	1.300 [0.980, 1.724]	0.069	1.240 [0.948, 1.623]	0.117
Investor-owned	1.292 [0.896, 1.864]	0.169	1.195 [0.840, 1.702]	0.322
Size (number of beds)	1.001 [1.001, 1.001]	<0.001	1.001 [1.001, 1.002]	<0.001
Teaching hospital (vs. not)	0.882 [0.608, 1.278]	0.506	0.789 [0.541, 1.151]	0.219
Maintaining a nursing home (vs. not)	0.890 [0.682, 1.162]	0.393	0.605 [0.455, 0.806]	0.001
RN staffing	0.966 [0.890, 1.047]	0.399	0.932 [0.848, 1.023]	0.140
Skill mix (RN %)	0.997 [0.987, 1.006]	0.485	0.982 [0.973, 0.991]	<0.001

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