RN Supply and Demand in North Carolina Public Health Agencies

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Background

- Part of a much larger federal research study to identify facilities and communities with critical shortages of RNs in the U.S.
- Intended to inform facility designation under the Nursing Education Loan Repayment Program
  - Program intended to assist high-need nursing loan repayers who work in high-need facilities

Objectives

- To better understand:
  - Community-level predictors of RN shortages
  - Agency-level predictors of RN shortages
- To quantify the improvement in predictive power provided by agency-level predictors
- To identify necessary data for such analyses nationwide

Data Sets and Compilations

- Facility-level data
  - Survey of Nurse Employers in North Carolina
- Community-level data
  - Area Resource File (ARF)
  - U.S. Census Bureau

Analyses Using Facility Data

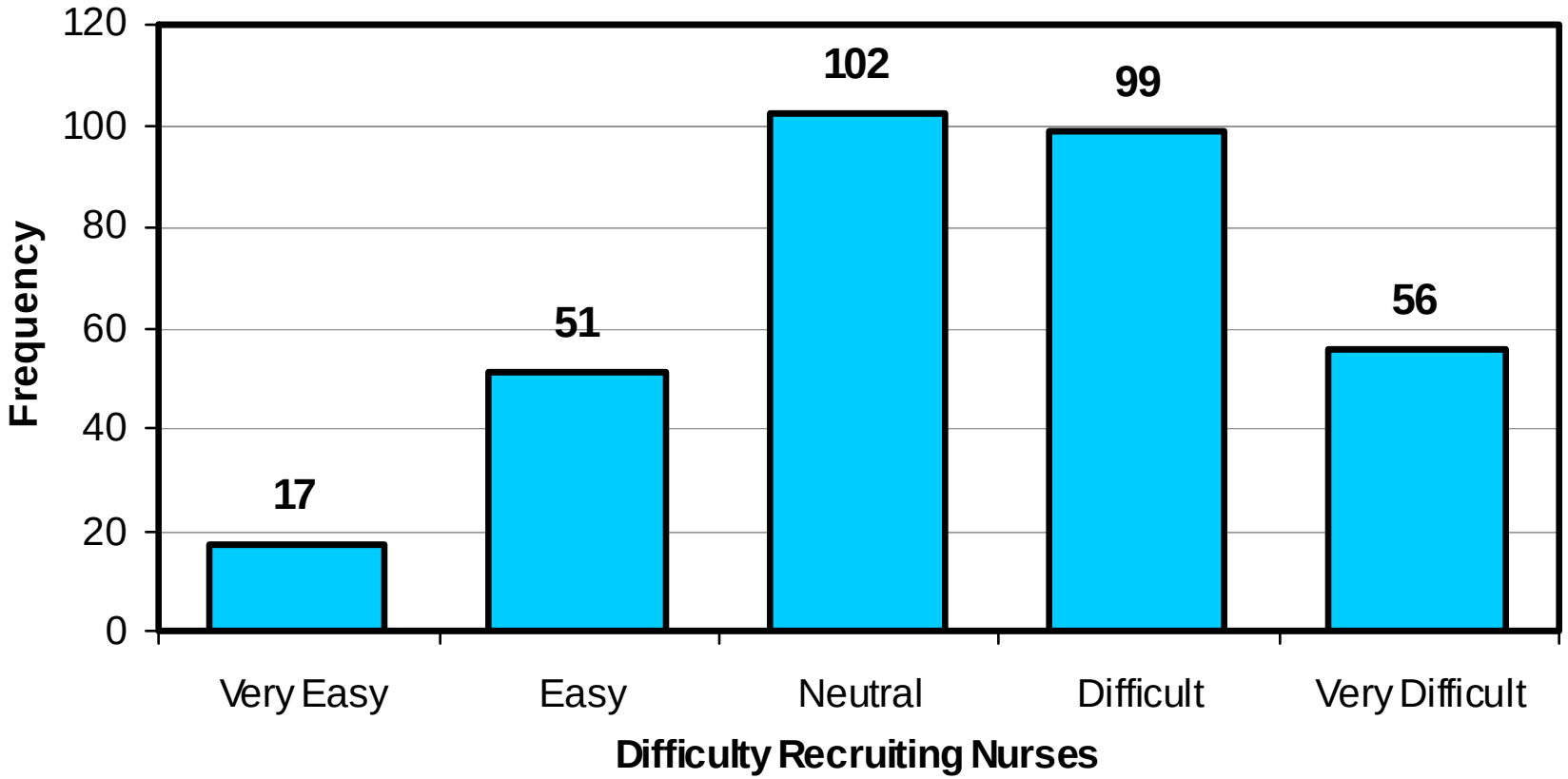
- Methods: Ordered Probit Models
- Dependent variable: Self-reported difficulty recruiting RNs
- Performed an external validation of NC data

Ordered Probit Models

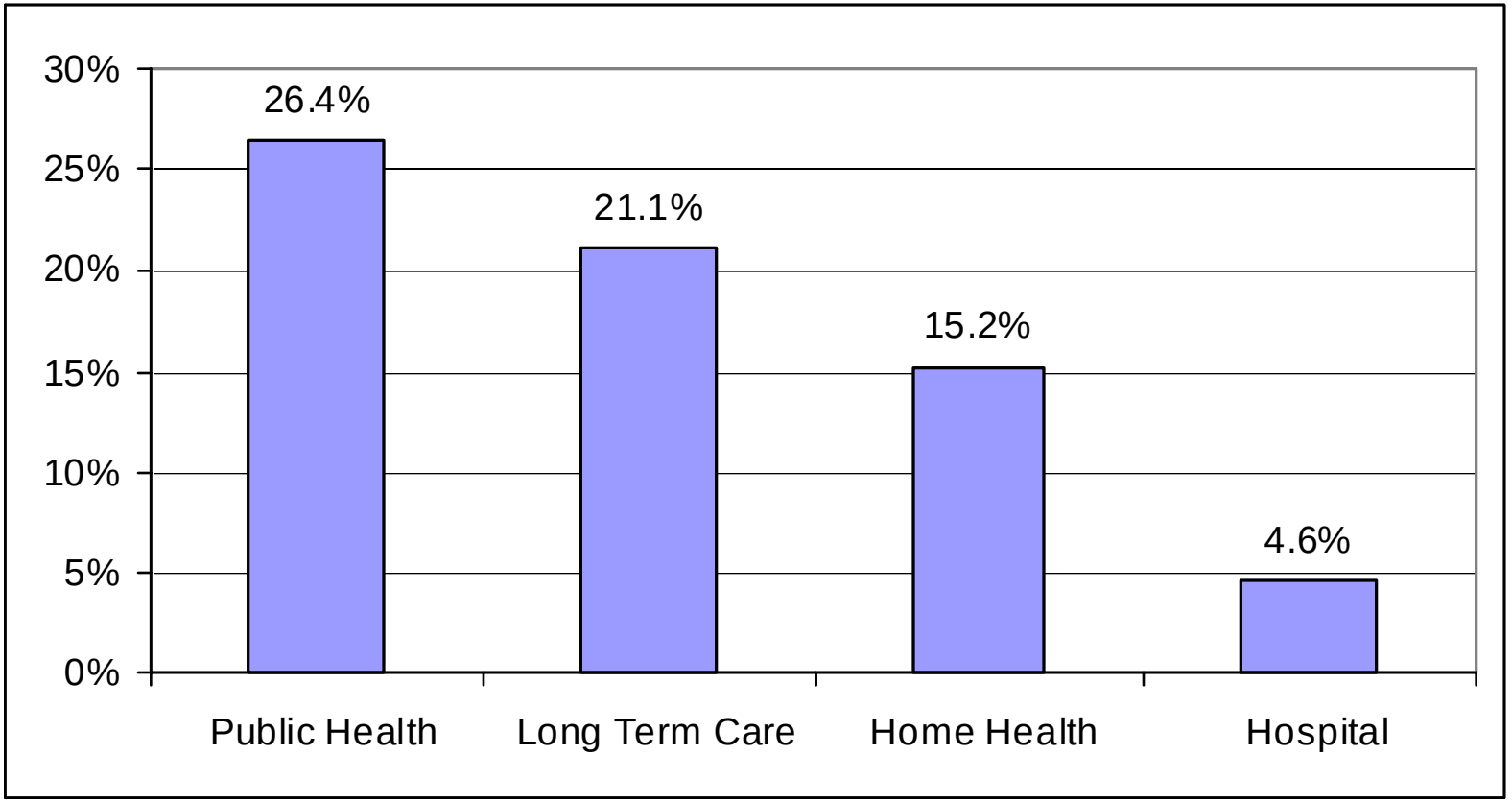
Indicator (Dependent) Variable

- Reported Difficulty Recruiting RNs
  - Ordinal variable
  - Five-point scale with categories Very Difficult, Difficult, Neutral, Easy, Very Easy for various RN positions
  - Median of all positions was taken to produce an overall score

Distribution of Nursing Recruitment Difficulty Indicator (Four Types of Health Facilities), North Carolina, 2004



Public Health Agencies Most Likely to Report "Very Difficult"



Independent Variables

- Demographic variables (county-level)
  - Metropolitan status
  - Population age
  - Population race/ethnicity
  - Income and poverty indicators
- Nursing variables (county-level)
  - Nursing personnel per capita
  - Health care facilities per capita
  - Nursing school
  - Ratio of RN salary to median income

Independent Variables (continued)

- Facility variables
  - Budgeted RN positions
  - RN turnover rate

Coefficient Estimates of the Ordered Probit Analysis of NC Public Health Agency Data, 2004

Variable	Coeff.	p-value
Dummy for metropolitan area	-0.65	0.083
Proportion of population >65 years	26.18	0.001
Proportion of White population	-41.84	<0.0005
Proportion of Black population	-33.75	0.003
Proportion of Hispanic population	-3.01	0.012
Proportion of population using Medicaid	1.82	0.029
Income per capita ($10,000)	-2.35	0.025
Percentage of population in poverty	-0.33	<0.0005
# of hospitals per 10,000 individuals	-4.32	<0.0005
# of hospices per 10,000 individuals	1.5	0.152
Ratio of average RN salary to median income	-3.06	0.015
Dummy for county having hospital with professional nursing school	-0.4	0.666
Total number of budgeted RN positions	-1.59	0.054
RN turnover rate	5.6	0.001
Threshold 1	-52.36	<0.0005
Threshold 2	-51.37	<0.0005
Threshold 3	-50.34	<0.0005
Threshold 4	-49.21	<0.0005
McKelvey-Zavoina R-square = 0.830		

Factors Associated With More RN Recruitment Difficulty in PH Agencies

- Older population
- Higher proportion of population on Medicaid
- More RN turnover

Factors Associated With Less RN Recruitment Difficulty in PH Agencies

- Metropolitan area
- Higher per capita income
- Higher rates of poverty
- More hospitals per 100,000 population
- Better RN salaries relative to median income
- More budgeted RN positions

Conclusions

- Of the four types of facilities used in the study, public health agencies appeared to have the greatest nurse staffing problems
- The model had good explanatory power
- Facility variables improve the model, but many community variables are associated with agency-level recruitment difficulty