



# Using a Computerized Information System to Examine the Relationship Between Unit Acuity and Nurse Staffing: A Pilot Study

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## Study Purpose

- Determine the feasibility of obtaining and analyzing unit acuity and nurse staffing data in a computerized information system (CIS)
- Describe the variability in unit acuity and nursing staffing
- Examine the relationships between unit acuity and nursing staffing

## Conclusion

- Unit acuity and nurse staffing data were available for collection and analysis in the CIS
- Variability was established:
  - Nurse staffing levels were lower at night than during the day on the medical surgical unit and ICU
  - Nurse staffing levels were lower on the medical surgical unit than the ICU at night
- A significant positive relationship exists between unit acuity and nursing staffing on the:
  - Intensive care unit (Pearson's r correlation coefficient = 0.71, p<0.01)
  - Medical surgical unit (Pearson's r correlation coefficient = 0.63, p<0.01)

## Study Design

**Method:** Cross-sectional, retrospective

**Setting:** 96-bed inpatient hospital, which is part of a large Midwest healthcare system

**Sample:** All adult patients admitted to one medical-surgical unit and one intensive care unit during the months of May and October 2014

**Definition of variables:**

**Unit Acuity:** Acuity is the level of illness of a patient at a point in time; Unit acuity is the sum of the acuity scores of all patients on a unit at a point in time

**Nurse Staffing:** Total registered Nurse (RN) hours worked on a unit during a shift

**Measurement tools:**

**Unit Acuity Report:** Acuity scores from 1-5 for each patient are generated automatically by a configured commercial software program that is mapped to nursing documentation in the electronic health record (EHR); A score of 1 is low acuity, a score of 5 is high acuity

**Nurse Staffing Report:** RN hours are collected from the same commercial software program

**Data analysis:**

**Data** were collected every 4 hours (6 times per day) x 2 units x 31 days per month x 2 months for a total of 744 units of analysis for each variable; repeated measures

**Descriptive statistics** were used to determine variability

**Inferential statistics** were used to determine correlation between variables (Pearson's r correlation coefficient)

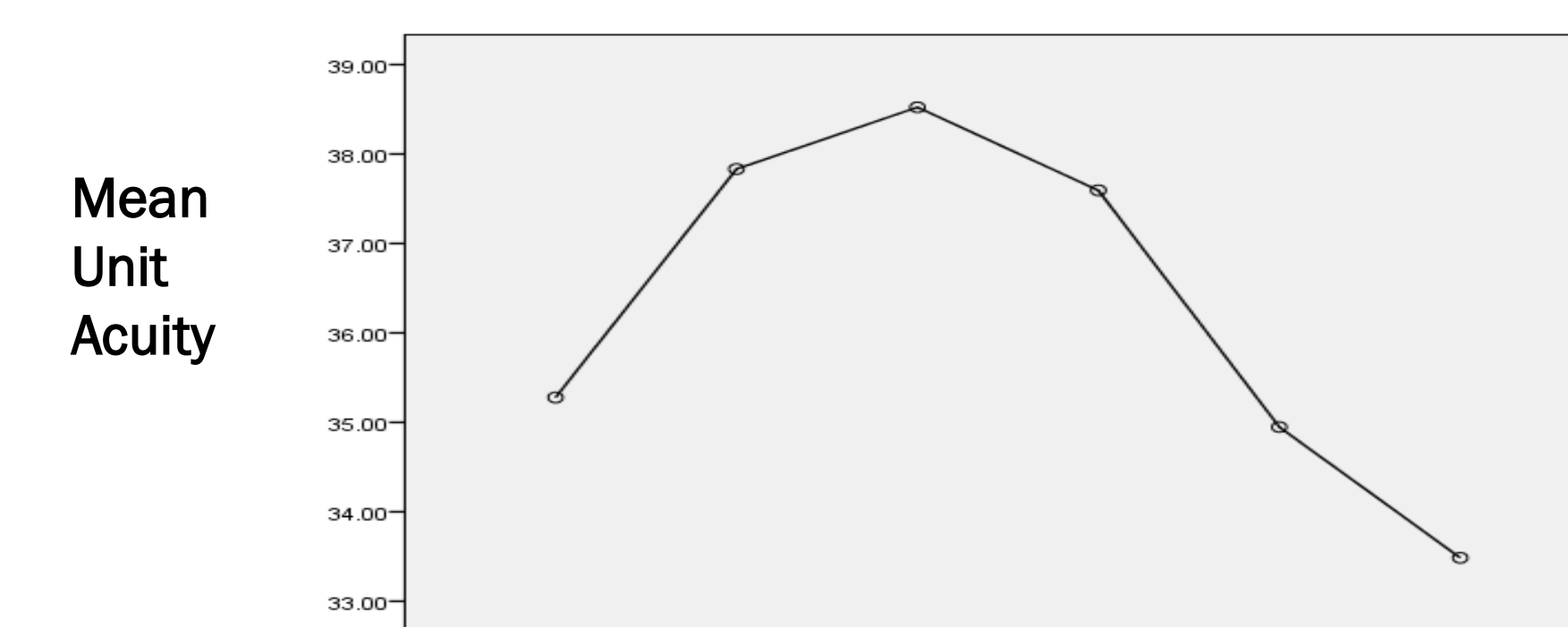
Correlation between Unit Acuity and RN Hours Worked by Day of Week and Time/Shift (n=8)  
Medical Surgical Unit – May and October, 2014 (\*p<0.05; \*\*p<0.01)

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
3AM – 7AM	0.828*	0.466	-0.092	-0.202	0.259	0.502	0.816*
7AM – 11AM	0.909**	0.840**	0.799**	0.591	0.065	0.918**	0.961**
11AM – 3PM	0.860**	0.925**	0.741*	0.320	0.327	0.899**	0.917**
3PM – 7PM	0.918**	0.226	0.589	0.766**	-0.224	0.648	0.815*
7PM – 11PM	0.848**	0.625	0.370	0.253	0.544	0.731*	0.893**
11PM – 3AM	0.188	0.012	0.112	0.129	0.226	0.739*	0.803*

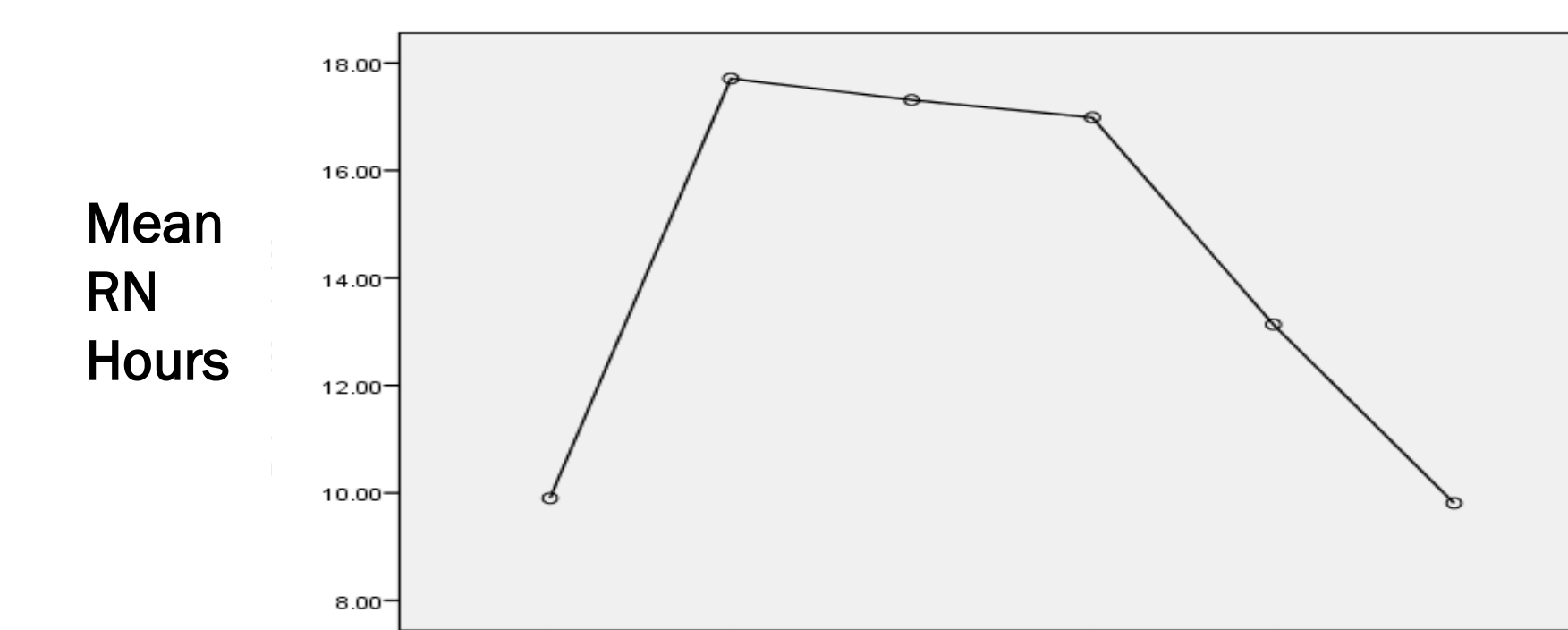
Correlation between Unit Acuity and RN Hours Worked by Day of Week and Time/Shift (n=8)  
Intensive Care Unit – May and October, 2014 (\*p<0.05; \*\*p<0.01)

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
3AM – 7AM	0.669	0.720*	0.780*	0.552	0.482	0.960**	0.644
7AM – 11AM	0.876**	0.665	0.642	0.623	0.878**	0.775*	0.916**
11AM – 3PM	0.736*	0.402	0.591	0.716*	0.829**	0.799**	0.855**
3PM – 7PM	0.682	0.470	0.690*	0.670*	0.699*	0.504	0.668
7PM – 11PM	-0.037	-0.011	-0.628	0.073	0.528	0.717	0.115
11PM – 3AM	0.538	0.808*	0.752*	0.310	0.474	0.716*	0.891**

## Results – Medical Surgical Unit



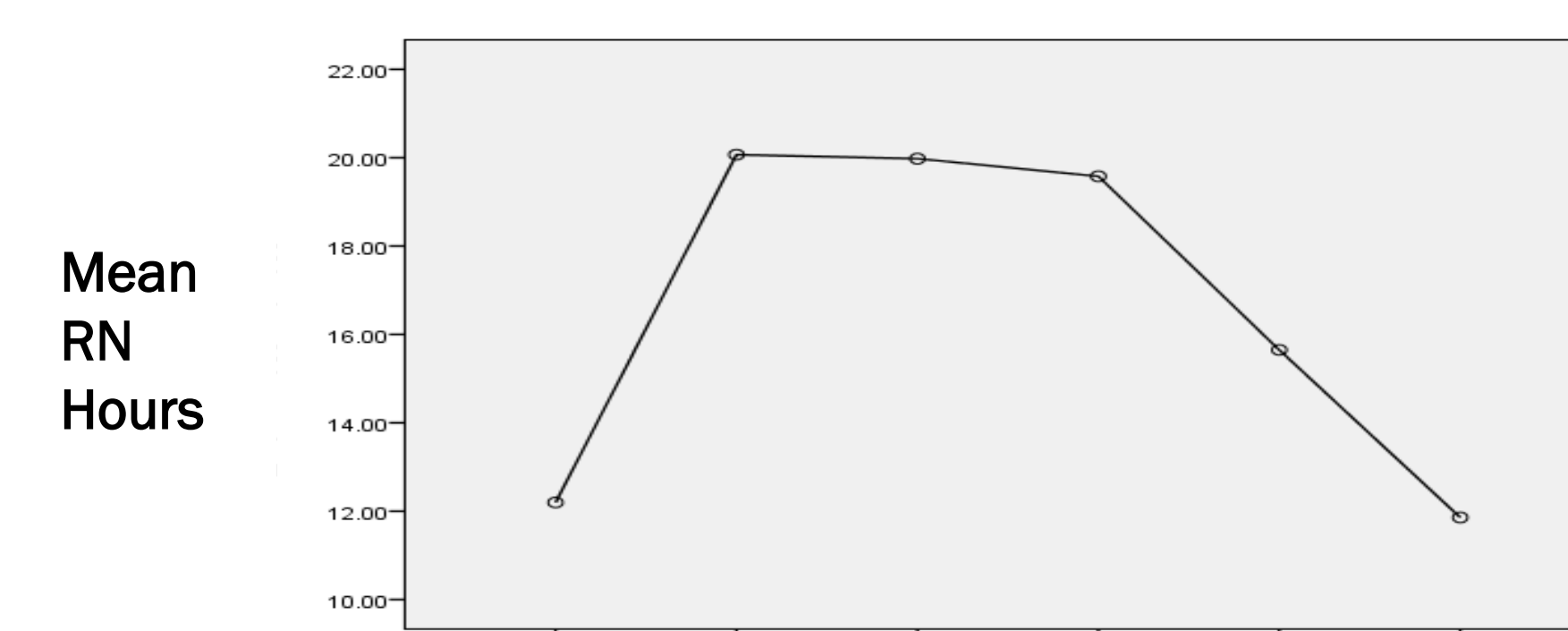
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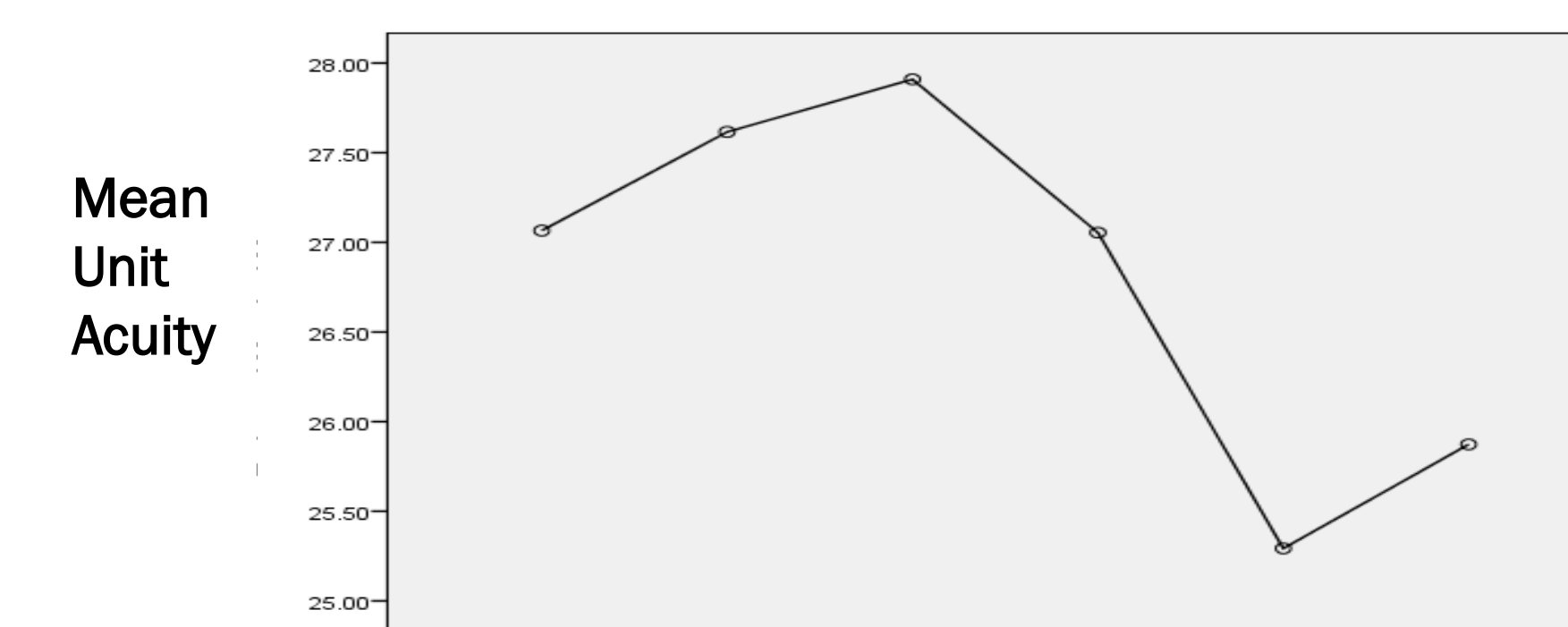


TIME 1= 3AM; 2= 7AM; 3=1 1AM; 4= 3PM; 5= 7PM; 6= 11PM

May  
2014  
(n=31)

Oct  
2014  
(n=31)

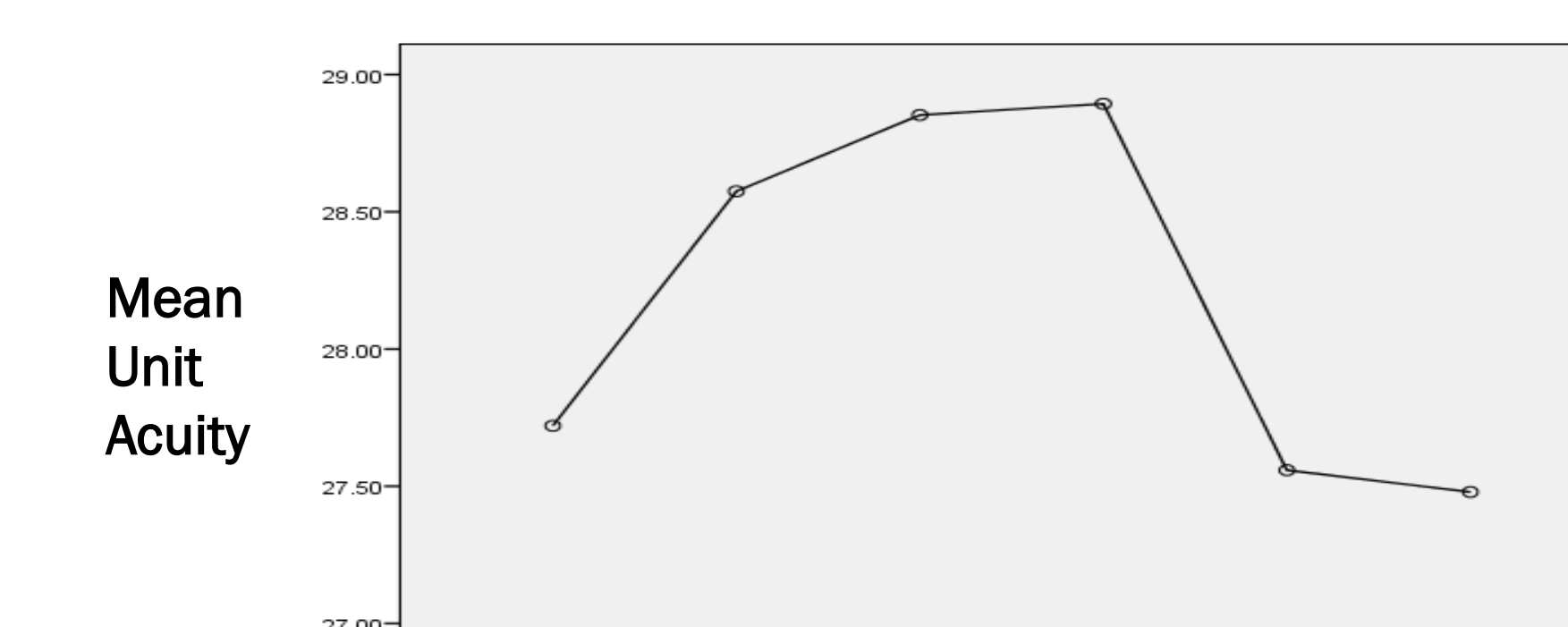
## Results – Intensive Care Unit



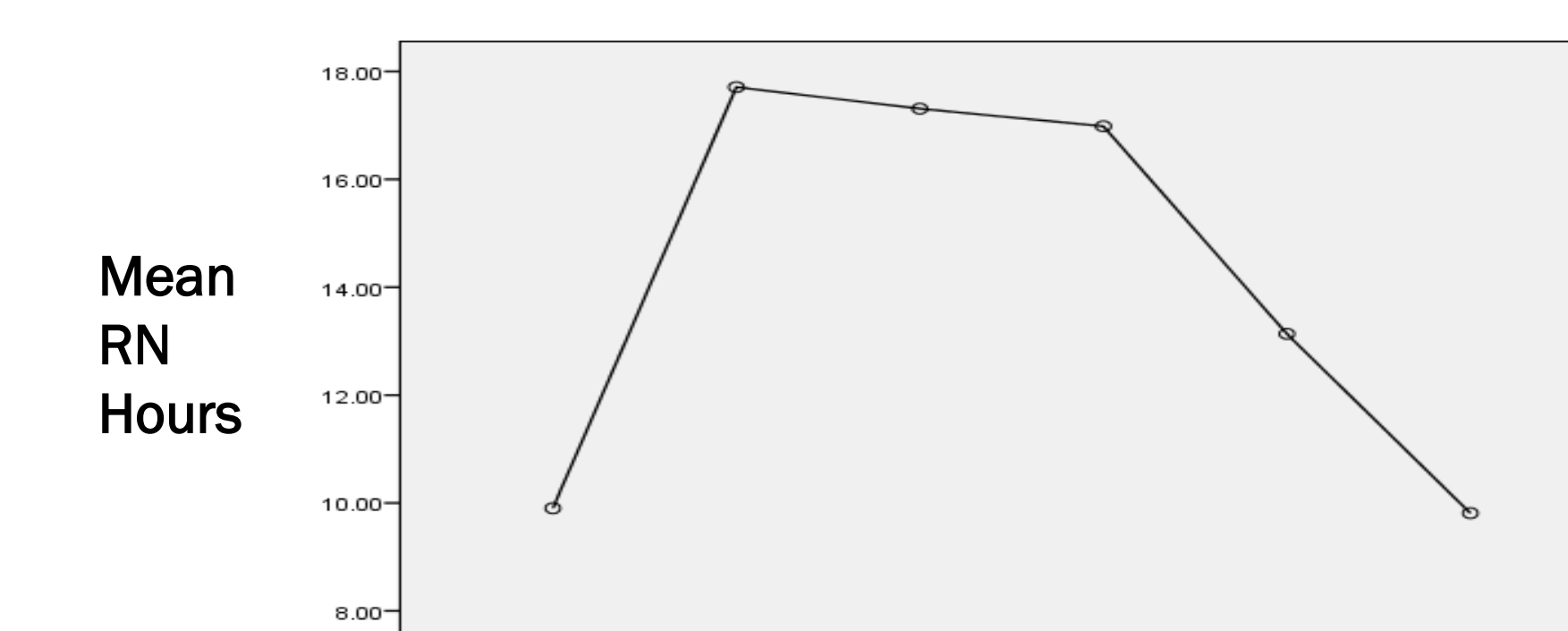
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## Discussion

- In 2008, the American Nurses Association (ANA) took the position that evidence-based nurse staffing levels should be determined using patient acuity rather than nurse workload.
- In 2009, the American Organization of Nurse Executives (AONE) advocated for the use of existing nursing documentation in the electronic health record (EHR) to objectively determine patient acuity levels to guide nurse staffing.
- This study used an automated nurse-sensitive patient acuity measurement tool.
- Study results could help guide nurse staffing to reduce healthcare costs and improve patient care.
- Recommendations for further research:
  - Larger sample sizes;
  - Different settings;
  - Various patient populations; and/or
  - Other automated patient acuity systems.
- This pilot study serves as background for this student's program of research: The relationship between nurse-sensitive patient acuity scores and length of hospital stay after colorectal surgery.

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### For More Information

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