Health Workforce Abstract
August 2017

Fitzhugh Mullan Institute for Health Workforce Equity
THE GEORGE WASHINGTON UNIVERSITY

The Impact of Nurse and Support Staff and Relative Contributions to Patient Satisfaction Outcomes: A Production Function Approach to Determining Optimal Staffing

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ISSUE

Building on a robust literature on the relationship of nurse staffing levels to outcomes in hospitals, this study examines the effects of changes in the level of both nurse's (RN and LPNs) and their support staff's (assistive personnel) hours on six measures of patient satisfaction outcomes. Higher patient satisfaction scores are now rewarded as part of the Medicare reimbursement policies. The aim of the study is to identify optimal levels of staffing for maximizing these outcomes, and to better understand the interaction of these two groups of healthcare workers with regard to these outcomes of interest.

METHODS

We constructed a dataset using the American Hospital Association's (AHA) Annual Survey and the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, which included 1675 hospitals in 48 states for the years 2010-2014. We conducted multivariate regression analyses. To capture non-linearity we estimated a flexible functional form (third order polynomial with a staff interaction term). We also included state and year dummies and control for each hospital's total number of FTEs, urban/rural status and teaching status through the term $\boldsymbol{X_{it}}$.

RESULTS

We find that the number of hours per patient day of both RN-LPN and AP hospital staff are strongly related to all six patient satisfaction measures, and that the marginal products of both types of staff inputs exhibit initial increasing marginal returns, followed by decreasing marginal return. Our findings suggest that hospitals would theoretically need to dramatically increase their number of both RN-LPN and AP nursing hours to maximize the marginal contributions to patient satisfaction. We also report the percent of hospitals by type that are below the minimum threshold level at which the marginal effect of an extra hour becomes positive and find that AP staffing is particularly deficient, with more than half of hospitals below the threshold depending on the satisfaction measure. Rural, non-teaching and governmental non-federal hospitals are the most likely be under the minimum threshold.

CONCLUSIONS

These findings suggest that there is a considerable room to improve patient satisfaction outcomes through additional nurse and support staff hours. This does not mean all hospitals should conclude that it is possible or even desirable to dramatically increase staffing, since the costs of labor and potential reimbursement gains must be considered. It does suggest, however, that it is possible to provide health care organizations with tailored information on how to optimize their staffing for specific outcomes of interest. It also suggests that there is a differential impact of nurse and their support staff across different patient satisfaction measures.

Key Words: Health workforce, hospital staffing, optimal staffing, nurse staffing, nurse assistive personnel, production function

This work is funded through HRSA Cooperative Agreement U81HP26493: Health Workforce Research Centers Program