Effect of the Affordable Care Act Medicaid Expansion on Labor Participation of Female Registered Nurses in Outpatient Care

by

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1 Introduction

Low income families in the United States face unique obstacles when it comes to accessing basic health care. The minimum requirements for public insurance and the high cost of private insurance have made even basic primary care inaccessible to many. For those who do have Medicaid, finding a primary care physician presents an additional challenge since many physicians refuse to accept it due to low reimbursement rates compared to those of the commercial market. One way this is being addressed is by restructuring health care delivery to depend less on physicians through a team-based approach that expands the roles of registered nurses (RN).

The Affordable Care Act (ACA) of 2010 introduced measures intended to increase accessibility of primary care for the most vulnerable including a substantial expansion of public insurance, increased funding for health centers and the promotion of alternative payment models (APMs) which encourage a collaborative approach to primary care. These measures have the potential to impact both the supply and demand sides of the health care system. While much research has been carried out on the demand side, very little work has been done on the supply effects of these changes. This study examines the effects that these measures had on the supply of female RNs in outpatient settings relative to hospitals and finds an increase in the probability of an RN working in an outpatient setting among (1) young, unmarried RNs with a maximum household income of 501 percent of the federal poverty level and (2) young unmarried RNs who have at least one child under age 6. These results are consistent with relatively high hospital turnover rates and strong labor force attachment among RNs in these demographic groups. It is expected that RNs will play a larger role in the provision of primary care and management of chronic diseases and thus lead to more opportunities for RNs in outpatient settings as more health care organizations seek to increase capacity, improve quality and reduce overall costs.

1.1 Background

Healthcare expenditure is currently a major concern in the United States. At \$9,892 per capita in 2017, the nation's health care spend was 145 percent above the median spend among

industrialized member countries of the Organization for Economic Cooperation Development (OECD). Despite having the highest spend, in 2015 the US had 19 percent fewer practicing physicians per 1,000 than the OECD median. Of practicing physicians, it had the absolute lowest percentage of general practitioners among all OECD countries (Anderson, Hussey, & Petrosyan, 2019).

National demand for primary care physicians is projected to exceed supply by over 23,000 full-time equivalents (FTEs) by 2025 assuming current trends of workforce participation, health care delivery and utilization continue (of Health & Services, 2013). This shortfall is expected to be most severe among Medicaid beneficiaries (Barnes et al., 2017). Contributing to the shortage on the supply side is an imbalance in clinician supply as higher numbers of new clinicians are choosing to specialize (Traczynski & Udalova, 2018). Further weakening supply, fewer physicians are choosing to accept public insurance due to lower reimbursement rates relative to private insurers and the higher administrative burden associated with Medicaid (Decker, 2012; Cunningham & O'Malley, 2008).

As physician supply continues to stagnate, the U.S. population is expected to have grown by 18 percent over the past two decades, resulting in an additional fifty million people who will require health care (Weiss, 2010). The aging baby boomer generation is also expected to intensify demand for healthcare services with a higher prevalence of chronic conditions (Weiss, 2010). Further intensifying demand, the ACA contained several measures boosting access to healthcare services and improving affordability. These measures include the expansion of Medicaid coverage, subsidies for plans purchased in the individual marketplace, an insurance mandate whereby those not covered and above a certain income threshold are subject to a penalty and the elimination of cost sharing for essential preventive care services.

Increased demand for primary care resulting from the ACA coverage expansions has been estimated to require an additional 7,200 primary care providers or 2.5 percent of the 2013 baseline supply (Huang & Finegold, 2013). In 2013, an estimated seven million people resided in areas where the expected increase in demand was greater than 10 percent of the baseline (Huang & Finegold, 2013). To address the primary care physician shortage, the ACA contained several provisions to boost the supply side of the primary care market. To encourage acceptance of new Medicaid patients among providers, the ACA increased

Medicaid reimbursement rates to match those of Medicare for primary care services. This would have had a varying differential impact across states due to the wide distribution in Medicaid to Medicare reimbursement ratios that prevailed before the ACA. States with the lowest Medicaid to Medicare ratios in 2008 such as New Jersey at 37 percent and California at 47 percent also had the lowest Medicaid patient acceptance rates (Decker, 2012) thus showing the potential to increase acceptance through this policy lever.

Ideally, there would not be a physician shortage and every person would have access to a physician for basic health care regardless of their geographic location or demographics. One solution to the physician shortage is to empower the nursing workforce to share responsibility in providing care by (1) enabling nurse practitioners to practice to their fullest potential, (2) to expand the role that registered nurses play in ambulatory care through care delivery transformation by implementing APMs such as those based on the patient-centered medical home and bundled payments that aim to reduce costs through resource optimization and care coordination while ensuring quality of care standards are met, (3) and by increasing the prevalence of nurse-led clinics in high need areas.

Nurse practitioners (NPs) are trained in primary care and qualified with a Master's of Science degree but are inhibited from practicing in many states due to a patchwork of state restrictions. In 2013, there were 57,330 NPs in the labor force and that number is expected to grow to 110,540 FTEs by 2025 whereas the primary care physician workforce is only expected to grow by 22,880 FTEs to 133,420 over the same period (of Health & Services, 2013). The ACA contained several provisions to expand the supply of NPs in primary care through scholarships, loans and training opportunities in health clinics.

While NPs can practice independently as primary care providers in many states, their scope of practice is more limited in other states by mandates for physician oversight, transition to practice periods, restrictions on their authority to prescribe medications and lower rates of reimbursement relative to physicians. The National Council of State Boards of Nursing defines independence as practicing with "no requirement for a written collaborative agreement, no supervision, [and] no conditions to practice." In its report on supply and demand, the HRSA highlights the potential to effectively mitigate primary care provider shortages by allowing NPs to practice to the fullest extent of their training (of Health &

Services, 2013) and in 2010, full practice status became the recommended model in the Institute of Medicine's Future of Nursing Report and the National Council for State Boards of Nursing's Model Nursing Practice Act and Administrative Rules (Cunningham & O'Malley, 2008; Decker, 2012). In 2013, only 17 states and the District of Columbia had full scope of practice policies in place. Allowing NPs to provide primary care independently may lead to more collaborative care as NPs establish nurse-led clinics in which responsibilities are shared with registered nurses and other medical professionals.

While empowering NPs to practice would directly increase the supply of primary care providers, it is the army of registered nurses that could have a substantial impact on primary care capacity. Registered nurses comprise the single largest segment of the US healthcare workforce (HRSA, 2017). In May, 2019 there were over 2,980,000 registered nurses employed in the US workforce outnumbering both physicians and NPs by over a million combined at 109,370 and 200,600 respectively (U.S. Department of Labor, 2019).

One major obstacle preventing nurses from contributing to primary care is prevailing payment structures based on the fee for service (FFS) model. Under traditional FFS, reimbursement is maximized through face-to-face visits with a physician. In physician offices following this model, decisions are often made and carried out by a lone physician with a few helpers on hand, usually medical aids, under increasingly strained capacity as the ratio of clinicians to population declines (Ghorob, Bodenheimer, et al., 2012; Hing, Hooker, & Ashman, 2011). Increasing the number of patients seen by physicians would require increasing their panel size, the number of patients seen in a given year, but increasing panel sizes are associated with compromised quality and burnout among physicians (Blechter et al., 2018). Another common issue with the lone physician model is the lack of communication between providers treating the same patient which often leads to redundancies in care (James & Poulsen, 2016; Salmond & Echevarria, 2017).

To address the capacity limiting constraints of the FFS system, increasing attention has been paid to expanding the roles of RNs to include chronic disease management, prescription refills and other care occurring in ambulatory care settings for which well-established clinical practice guidelines are available. It has been shown that registered nurses can add value to caring for patients with hypertension, diabetes, rheumatoid arthritis or hyperlipidemia.

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Calls for delivery reform have focused on expanding delivery by stratifying patient panels into groups with physicians limiting their time to those patients with complex conditions while NPs and RNs handle cases that require more standardized care or patient education (Casalino, 2010; James & Poulsen, 2016; Salmond & Echevarria, 2017; Margolius & Bodenheimer, 2010; Chen & Bodenheimer, 2011). Expanding the roles of RNs in this way could thereby add capacity without further demands on a physician's time (Ghorob et al., 2012; Shaw et al., 2014).

Nurse-led care has been shown to be both cost-effective and lead to outcomes that are on par with and sometimes superior than those of physician-led care. One study found that among patients with rheumatoid arthritis, nurse-led care achieved better outcomes and was more cost effective than rheumatologist-led care (Ndosi et al., 2014). Another study that was based on a randomized trial found that among patients with atrial fibrillation, nurse-led care produced better patient outcomes including better adherence to treatment and lower mortality rates than cardiologist-led care (Hendriks et al., 2012).

An increasing number of health care organizations are adopting APMs that facilitate a team-oriented approach inclusive of nurses as a way of increasing their primary care capacity (Kanter, Polsky, & Werner, 2019; Muhlestein & McClellan, 2016). Most APMs include cost sharing incentives that tie profits to cost savings achieved relative to an established baseline level. To reduce the cost of care, organizations can optimize skill-mix by allocating primary care providers, RNs and other staff to cases for which their care would be most effective in terms of quality and cost. Shifting care from physicians and NPs to RNs can reduce the overall cost by substituting lower cost practitioners for those who command a higher wage (Kurtzman, 2011). As part of their recommendations on policy, The American Academy of Nursing recently highlighted the value of expanding the role of baccalaureate registered nurses in primary care (Vanhook et al., 2018). The ACA contained several provisions promoting APMs in support of transforming care delivery with the implementation of accountable care organizations (ACOs) in the Medicare program through the Medicare Shared Savings Program, testing of bundled payment and episode-based payment initiatives, the expansion of value-based purchasing in the Medicare Program (ACA Title III Subpart A, Part I, Secs 3001-3008) and Community Health Teams to support Medical Homes (Sec

3502).

RNs and NPs already play an integral role in Health Centers. Health Centers are a vital source of outpatient care for patients who are uninsured or on Medicaid, for those located in medically underserved areas, participants of high-deductible health plans and low income patients with chronic illness. The Health Centers Program administered by the Health Resources and Services Administration (HRSA) and authorized in Public Health Service Act Section 330 distributes grants to Federally Qualified Health Centers (FQHC). In order to be eligible, Health Centers must provide comprehensive primary care services as well as ancillary services with payments arranged on a sliding scale as to facilitate access to all individuals regardless of income or insurance status. Health Centers that are not designated as FQHCs can receive many of the same benefits but are not entitled to receive Section 330 grant funds.

The wide array of services that must be provided by health centers in order to qualify for grant funds necessitates a team-based approach among physicians, non-physician clinicians and other staff. A study comparing office-based and health center-based primary care found that Health Centers employ significantly more non-physician clinicians (including PAs and NPs) than physician offices. Using 2006-2007 data from the National Ambulatory Medical Care Survey, it found that nearly a third of all visits were with non-physicians and the vast majority of these were without a physician being present (Hing et al., 2011). This suggests that the uptake of team-oriented care and reliance on non-physicians has long been on the rise and moving faster in Health Centers than in physician offices.

Another study of prevailing staffing patterns in Health Centers found that overall levels of productivity are similar across Health Centers with typical staffing patterns and those featuring a high proportion of RNs. It found that neither model was dominant over the other showing that practices can be productive with varying blends of physicians, NPs, RNs and other medical staff (Ku, Frogner, Steinmetz, & Pittman, 2015). Staffing patterns are usually linked to local factors like the prevailing supply of clinicians and non-clinicians as well as scope of practice laws. This suggests that any solution to the primary care provider shortage would need to be adaptive and flexible enough to adjust to differences in these factors as Health Centers have shown to be.

Studies have shown that Health Centers are a cost-effective source of care for Medicaid patients. In 2017, 16 percent of Medicaid patients were served by Health Centers while Health Center Medicaid revenue represented only 1.7 percent of total Medicaid expenditure (NACHC, 2016). Health Center patients on Medicaid also have lower utilization and spending on both inpatient and outpatient services relative to non-health centers (Nocon et al., 2016). In addition, they have lower utilization of costly hospital emergency department-related services (Nocon et al., 2016). This suggests that if individuals have access to basic primary care including preventive services and ongoing chronic disease management, they may be less likely to face more complicated problems that require expensive hospitalization later on. Thus, channeling resources to primary care may reduce health care expenditure overall.

Medicaid is the largest source of health center funding accounting for 44 percent of total revenue in 2017 (Heisler, 2016), and the Medicaid expansion was shown to have a substantial effect on the percentage of Health Center patients covered by Medicaid. Figure 7 shows that from 2000 to 2013, the number of Medicaid patients served by Health Centers increased from 3.9 million to 8.8 million while from 2013 to 2017, as the total number of patients continued to increase steadily, the growth in patients covered by Medicaid sharply accelerated to 13.3 million. The percentage of patients served by Medicaid also rose from 41 to 49 percent during this time. Furthermore, the number of uninsured patients fell by 1.4 million suggesting that some proportion of those who were previously uninsured had secured Medicaid coverage through the ACA. From 2010 to 2017, health center Medicaid revenue increased by 97 percent when adjusted for inflation while on a per patient basis, it grew by only 11 percent reflecting the increase in Medicaid beneficiaries and not an increase in per patient cost (Rosenbaum, Sharac, Shin, & Tolbert, n.d.).

The second largest source of health center funding comes from federal grants under Section 330. The ACA established the Community Health Center Fund to supplement program funding from the annual appropriations process and directed 11 billion dollars in mandatory appropriations over fiscal years 2011 through 2015 (Williams & Redhead, 2010) which ensured a consistent flow of resources to the Health Centers Program and ultimately supplanted the funds previously granted through the discretionary appropriations process. This cumu-

lative increase across its key sources of revenue has enabled health centers to substantially expand capacity and increase services. Over 2010 through 2017, the number of health center sites increased by 59 percent to 11,056 sites, the number of patients served increased by 40 percent to 27.2 million, and total staff increased by 70 percent to 223,840 FTEs (Rosenbaum et al., 2017).

In 2013, 40 percent of Health Center funding came from Medicaid patient revenue whereas only 18 percent of this funding came from its second largest source, Section 330 grants. With Medicaid comprising a substantial share of overall Health Center revenue, the increase in revenue over 2013 to 2017 attributable to the influx of patients who were newly insured by Medicaid had a larger impact on health centers in expansion states than those in states that did not expand Medicaid coverage. While the percentage of total revenue attributable to Medicaid increased from 38 percent in 2010 to 44 percent in 2017 across all states, there was a wide gap between expansion and non-expansion states. Among Medicaid expansion states the percentage of revenue coming from Medicaid was 48 percent and among non-expansion states it was only 29 percent (Sharac, Shin, Gunsalus, & Rosenbaum, 2018).

There was also a larger increase in the number of health center patients served in Medicaid expansion states than in non-expansion states. Among expansion states, the number of patients served grew by 43 percent whereas it only rose by 33 percent in non-expansion states (Sharac et al., 2018). The higher number of patients served in expansion states is largely attributable to the surge in operating revenue from the increased share of patients insured by Medicaid that enabled health centers to expand capacity through more sites and hiring of additional staff. A study conducted in 2015 found that health centers located in expansion states were more likely to report an increase in service capacity for substance use treatment, chronic care management and vision care than those in non-expansion states (Rosenbaum et al., 2017).

The ACA also established a new grant program for Nurse-Managed Health Clinics (NMHCs) which are similar to Health Centers but are usually led by a team of NPs. The increase in resources flowing to health centers and NMHCs across all communities is very likely to have increased demand for registered nurses in outpatient settings along both the intensive and extensive margins.

In May 2019, the BLS reported that the mean hourly wage for RNs working in hospitals and outpatient care centers across the U.S. was \$37.24 and \$40.73, respectively, but for RNs working in physician offices, the average was only \$33.45 (U.S. Department of Labor, 2019). It is possible that the higher average wage in outpatient centers reflects a higher marginal revenue product for work performed in outpatient care settings such as in Health Centers where RNs increasingly play an integral role in care coordination and delivery as more organizations adopt collaborative approaches to care.

There are many reasons to believe that the changes effected by the ACA would have led to more RNs choosing to work in outpatient care instead of in a hospital. It is likely that the role of RNs in outpatient care has and will continue to expand in response to (1) the growing demand for primary care services that RNs can support including preventive care and chronic disease management, (2) the shrinking supply of primary care providers, (3) the growing number of studies demonstrating the efficacy of RN care, and (4) the acceleration of APM adoption creating financial incentives for collaborative, cost-efficient care. It is plausible that more RNs will choose to work in outpatient settings as these roles continue to expand and grow becoming more attractive to career-oriented RNs.

RNs have a notoriously high turnover rate. Turnover is defined as leaving one's current position or transferring to another position within the hospital or organization. Turnover has been shown to negatively impact hospitals and patient outcomes. In 2008, as high as 18.1 percent of full-time RNs worked for either a different employer or in a different position than in the previous year (Jones, 1990).

Turnover seems to be particularly high among recent graduates with nearly 40 percent planning to leave their current jobs within 3 years but the vast majority of whom intend to remain in the nursing profession. Only 3.3 percent of recent graduates who planned to leave their current job did not plan to stay in nursing. In comparison only 29.8 percent of all RNs under the age of 50, inclusive of recent graduates, planned to leave their current job within 3 years (of Health & Services, 2010). Studies have shown that hospital turnover is highly attributable to low job satisfaction caused by inadequate staffing, strenuous physical demands, work stress and environment. Moreover, low job satisfaction is especially concentrated in young and newly qualified RNs (Hayes et al., 2006).

Wages, in contrast, have been shown in both qualitative and econometric studies to play a far more trivial role in explaining this high rate of turnover with accumulating evidence over recent decades concluding that RN labor supply and participation is very inelastic with respect to changes in own-wage (Hayes et al., 2006; Link & Settle, 1979, 1981b, 1981a; Ault & Rutman, 1994; Shields, 2004; Chiha & Link, 2003; Di Tommaso, Strøm, & Sæther, 2009; Askildsen, Baltagi, & Holmås, 2003; Staiger, Spetz, & Phibbs, 1999). The regular day time working hours in clinics and physician offices may be more attractive than shift work in hospitals for many RNs and especially those who live with young children. An outpatient clinic setting may be a less stressful environment with more routine work and appointments scheduled ahead of time in contrast to the intense shift work and emergency care associated with hospitals (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002).

Labor supply preferences are also moderated by family situation and household income. Several studies have found that having children decreases the likelihood of working for married RNs and that the likelihood of working decreases with increasing partner income (Sloan & Richupan, 1975; Hanel, Kalb, & Scott, 2014; Link & Settle, 1979, 1981b, 1981a, 1985; Chiha & Link, 2003; Shields, 2004; Brewer et al., 2006; Bognanno, Hixson, & Jeffers, 1974). One study found that among nurse qualification holders who have children, not having a partner decreased the likelihood of working as a hospital nurse (Hanel et al., 2014). This could be explained by reasoning that having a partner to share in the responsibility of a household might be an enabling factor for the time and intensity demanded by hospital shift work. Nursing jobs in outpatient care might be more feasible for these single parents.

It is likely that with low job satisfaction driving boatloads of RNs to leave hospital positions while seeking to stay in the nursing profession and burgeoning job opportunities outside of hospitals, an increasing share of hospital turnover will seek opportunities in outpatient care. This might become more likely as demand for RNs in primary care grows and their roles in care coordination and delivery continue to expand. Together these factors contribute to an increasing elasticity of substitution for jobs in outpatient care relative to hospitals.

The demand created by the surge in the number of individuals covered by Medicaid is sure to have intensified the strain in supply for primary care providers in areas already experiencing a shortage. In response to this surge in demand, many outpatient care sites

such as health centers, nurse-led clinics and physician offices took to mobilizing resources and restructuring delivery with the adoption of more collaborative approaches to care that are more inclusive of RNs (Kanter et al., 2019; Muhlestein & McClellan, 2016). If this response was substantial, this could have resulted in a substantial surge in demand for RNs in outpatient care settings. Given the high rate of hospital turnover, RNs may have been especially receptive to demand signals for their services outside of hospitals.

In 2010, the ACA mandated that all states expand Medicaid eligibility to all non-elderly adults with household incomes of up to 138 percent of the FPL. This measure was struck down in 2012 by the Supreme Court as unconstitutional making expansion optional to each individual state. As of July 2016, thirty states and the District of Columbia opted to expand their Medicaid programs. In March 2013, just before the first enrollment period, the uninsured rate among non-elderly adults was 17.6 percent and by March 2015 it fell to 10.1 percent (Long et al., 2015). Between 2013 and 2015, the number of uninsured adults fell by over 15 million (Long et al., 2015). The fall in the overall uninsured rate was substantially larger in states that expanded Medicaid than in those that did not. In states that expanded, the uninsured rate decreased by 52.5 percent and in states that did not expand, the decrease was only 30.6 percent (Long et al., 2015).

The analysis that follows uses the ACA Medicaid expansion to examine whether more RNs chose to work in outpatient care settings such as health centers and physician offices rather than in hospitals as a result of the surge in demand for primary care. During this period when primary care is already strained in capacity, incorporating registered nurses into primary care delivery could be seen as a cost-effective way to help bridge the gap between demand and supply. It is this author's expectation that demand for RN labor in primary care settings is on the rise in the current environment of payment and delivery restructuring, physician shortages, widening scope of practice for NPs as primary care providers and the growth and efficacy of collaborative Health Centers.

2 Design and Statistical Analysis

This paper examines the effect of the 2014 Medicaid expansion on the labor participation of registered nurses in outpatient care settings relative to hospitals. The surge in newly

covered individuals from the 2014 Medicaid expansion facilitated an exogenous increase in the demand for primary care services. The analysis presented here uses that surge in demand to estimate the resulting changes in the supply of registered nurses in outpatient care settings such as health centers and nurse-led clinics.

Regressional analysis and tabulations are executed in Stata/SE 16.0 (StataCorp, 2019). Some data calculations and graphs were generated in Python (Foundation, n.d.).

2.1 Data

This analysis was carried out using data from the single-year Public Use Microdata Sample (PUMS) spanning 2010-2017. The PUMS dataset contains a sample of actual responses to the American Community Survey (ACS). The ACS was developed by the U.S. Census Bureau and surveys approximately 3 million persons each year. The single-year PUMS files contain survey units from approximately one percent of the United States population (Bureau, 2017).

The smallest geographical unit in PUMS is the Public Use Microdata Area (PUMA). PUMAs are contiguous areas dividing each state along state lines. Since the PUMS does not include a variable that distinguishes between urban and rural areas, it was merged with a crosswalk dataset containing metropolitan statistical areas (MSAs) from IPUMS USA which identifies metro areas of residence using definitions for MSAs from the U.S. Office of Management and Budget (OMB) corresponding to the survey year (Minnesota Population Center, 2011, 2013). This dataset provides MSA codes and titles linked to all overlapping PUMA codes along with the percentage of each MSA's population residing in each PUMA and the percentage of the PUMA population residing within the corresponding MSA. Since MSAs do not follow PUMA lines, many fall within multiple PUMAs and similarly multiple PUMAs fall within multiple MSAs. With the goal of categorizing PUMAs as either urban or non-urban, the dataset was reduced to a unique set of PUMA codes by keeping the PUMA with the highest MSA population among MSAs. The PUMAS designated as urban are those in which at least 50 percent of the PUMA population belong to the MSA. For the years 2010 and 2011, PUMAs were merged with the crosswalk corresponding to definitions based on the Census 2000 but starting in 2012, PUMAs were reassigned based on the 2010 Census data. For this reason, the MSA-PUMA crosswalks were merged in two stages: first,

using the Census 2000 and the ACS for those surveyed in 2010 and 2011 and second, using the crosswalk of PUMAs based on the 2010 Census with ACS survey years 2012 through 2017.

2.2 Model

A difference-in-differences model with two-way fixed effects was used to examine changes in RN labor supply to outpatient facilities relative to hospitals that may have been facilitated by the ACA Medicaid expansion. Even though the outcome under examination is binary, a difference-in-differences approach was preferred to a model based on maximum likelihood estimation (MLE) such as logit or probit due to results obtained by Greene 2004 that MLE tends to show a large finite sample bias and underestimates asymptotic variances in discrete choice models in the presence of fixed effects (W. Greene, 2004).

The model under study is as follows:

$$Outpt_{ist} = \beta_0 + \beta_1 Expan_s * EffectYear_t + \eta X_{ist} + \phi Dem_{PUMA} + \delta State_s + \tau Year_t + \varepsilon \quad (1)$$

The outcome variable is an indicator for whether RN i worked in an outpatient setting in state s and year t. The coefficient β_1 on the interaction variable is the change in the probability of an RN working in an outpatient care setting in an expansion state relative to a non-expansion state one year after the Medicaid expansion went into effect. Assuming that the model is well-specified to reliably predict the effect of the Medicaid expansion on the choice of RNs to supply labor in either outpatient settings or in hospitals, a β_1 greater than one would suggest that the demand shock for primary care resulting from the Medicaid expansion increased the probability of an RN being employed in an outpatient setting in an expansion state after 2014.

The states designated in the treatment set are Arizona, Colorado, Delaware, Hawaii, Idaho, Illinois, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Rhode Island, Vermont and West Virginia. California, Connecticut, the District of Columbia, Massachusetts and Washington were excluded from the analysis because these states had 1115 waivers federally approved to expand Medicaid eligibility before January 2014. While New

Jersey also filed a waiver in 2011, it only expanded eligibility to those with household incomes of less than 23 percent of the federal poverty level (Centers for Medicare and Medicaid Services, 2011).

X refers to the set of nurse characteristics included as controls in the analysis. These include gender, race, ethnicity, married and parental status, age, whether the RN has a BA degree and whether the RN resides in an urban-designated PUMA. For each subpopulation studied under the model, a simple univariate regression was run for the outcome variable on the difference-in-differences variable as well as a multivariate regression controlling for nurse demographics. Only RNs whose usual weekly hours exceeded 32 at the time of the survey were included in the analysis. The subpopulations examined included (1) all RNs, (2) RNs restricted to different age groups including 18-30, 21-35, 35-50, 50-60 and 60 plus, (3) unmarried RNs, (4) married RNs, (5) RNs in urban-designated PUMAs, (6) RNs in non-urban-designated PUMAS, (7) RNs located in PUMAs in which at least fifteen percent of the population is at most 250 percent of the federal poverty line, and (8) RNs with at least one child under the age of six. All combinations of the above criteria were examined.

A set of state fixed effects were included to ensure that the estimated effects of the ACA policies cannot be attributed to unmeasured time-invariant differences between states such as the number of nursing schools that may influence the baseline supply of RNs and prevailing staffing patterns that impact the number and types of alternative job opportunities available. Year fixed effects were included to control for the effects of the ACA that may coincide with trends occurring across all states over the period such as other federal policies and economic trends that may have unilaterally affected all states (W. H. Greene, 2012). All models were fit using absorbing linear regression with respect to states. Standard errors were clustered at the state level to correct for error correlation within states. When clustering, absorbing regression reports cluster-robust standard errors which reduces the degrees of freedom by the number of fixed effects swept away in the within-group transformation (Abadie, Athey, Imbens, & Wooldridge, 2017).

2.3 Limitations

There were several limitations that warrant consideration when interpreting the results of this analysis. States were the unit chosen for fixed effects but there may be important confounding factors observable at a smaller geographical scale such as those attributable to an abundance or lack of hospitals or other places of employment that affect the number of opportunities available to RNs. This may be an in important factor influencing an RN's employment-seeking behavior or mobility.

Another potential limitation is that in some areas and particularly in rural areas that have a low supply of health care professionals and facilities, primary care may be delivered in the local hospital or in an outpatient clinic located within the local hospital. This could cloud the distinction between outpatient care settings and hospitals in the PUMS. Hospitals in rural areas are sometimes a main access point to all primary care services for the whole population (National Academy of Medicine, 2005). Therefore it may not be clear if more RNs are broadening their roles to providing outpatient primary care services if they are doing so within such a hospital.

Unfortunately, the ACS does not include information on population density by PUMA in its single-year files. While each PUMA contains at least 100,000 persons, they vary in population density, and it has been shown that there are considerable differences between urban and rural areas in population characteristics, healthcare services, facilities and ACA outcomes. RNs in rural areas tend to have fewer choices and job opportunities due to a less competitive job market (National Academy of Medicine, 2005). Hospitals in rural areas tend to be smaller with 47 percent having 25 or fewer beds while 41 percent of urban hospitals have 200 or more. The rural workforce also tends to be less specialized (Meit et al., 2014).

Rural populations had a higher uptake in Medicaid coverage resulting from the expansion (Soni, Hendryx, & Simon, 2017), and similarly rural hospitals had higher increases in Medicaid revenue than urban hospitals (Kaufman, Reiter, Pink, & Holmes, 2016). There was also a steeper decrease in the proportion of costs for uncompensated care among the latter (Kaufman et al., 2016). The differential impact of Medicaid revenue on urban hospitals relative to rural hospitals may reflect a similar distribution in the impact on demand

for primary care. To minimize the potential bias these differences might expose, the data was merged with the MSA and PUMA linking crosswalk with PUMAs designated as urban if at least 50 percent of their belonged to an MSA. This could be an imperfect measure of urban status if a substantial proportion of individuals in urban-designated PUMAs live in rural pockets since PUMAs vary in size and population density.

This study focuses on the impact of a surge in demand for primary care services due to the Medicaid expansion in combination with the growing adoption of team-oriented care in which RNs play a growing role. There may have also been supply side effects of the ACA that confound these results and make it difficult to conclude that any increase in the share of RNs working in outpatient care are directly a result of a surge in demand for primary care. For example an increase in National Health Service Corps (NHSC) funding (Heisler, 2017) also could have placed more RNs in Health Centers. A deeper dive might require analysis of the Tracking Accountability in Government Grants System (TAGGS) database (U.S. Department of Health and Human Services, 2020).

2.4   Results

Table 1 contains a summary of selected demographics by each setting type and expansion status group averaged over 2010-2013 before the Medicaid expansions took effect. The percentages for female, married, age and full-time status are similar for expansion and non-expansion states across all settings. RNs were considered full-time if the number of usual weekly hours worked in the past 12 months was at least 32. Composition does vary by race and ethnicity with expansion states having a larger Hispanic population and non-expansion states having a larger black population.

Under the model, there was no change in the probability of an RN working in an out-patient setting over a hospital overall. There was a significant increase in the probability of working in an outpatient care setting among two of the subpopulations examined: (1) unmarried female RNs who live in urban-designated PUMAs between the ages of 18 and 35 with a maximum income of 501 percent of the federal poverty level (FPL) and (2) unmarried female RNs between the ages of 21 and 35 with a child under age 6. There was no change in probability among female RNs for any combinations of older age groups.

See Table 2 for a summary of the regression results for unmarried female RNs. Column one presents estimates on the population of all 8,348 unmarried female RNs between the ages of 18 and 35 who live in urban-designated PUMAs. While the 0.00826 estimate does suggest a slightly positive change in the probability of working in outpatient care, this result is insignificant and very close to zero. Column two presents estimates with this population restricted to those with a maximum household income of 501 percent of the FPL for a total of 5,065 individuals. When the population is restricted to RNs with a maximum household income of 501 percent of the FPL, the probability of working in outpatient care increases to 0.0221 points and this estimate is significant. When the same model was run with physician's office as the outcome relative to working in a hospital, there was no change in probability as shown in column three.

There were 9,432 female RNs between the ages of 21 and 35 with a child under age six, 1,161 of whom were unmarried and the remaining 8,271 were married at the time of the survey. A summary of the regression results for the subpopulation of female RNs with a young child is presented in Table 3. Column one corresponds to all married and unmarried female RNs in the sample for which results were trivially close to zero. Column two restricts this population to those aged 21-35 for which results suggest a small but statistically insignificant increase in the probability of an RN working in an outpatient setting over 2014 to 2017. Column three of Table 3 restricts the data to unmarried RNs in the same age group. For this group, the model suggests that the Medicaid expansion led to a statistically significant increase of 0.0648 points in the probability of working in outpatient care rather than in a hospital.

Columns four and five of Table 3 extend the analysis to female married RNs with a young child in the same age group. The estimates in column four indicate there was no meaningful change in the probability of working in outpatient care relative to hospitals among married mothers between the ages of 21 and 35. Column five further restricts this group to those with a maximum household income of 501 percent of the FPL. There was no practical significance for this group either.

3 Discussion

Overall, the results suggest that the ACA did not effect a measurable change in overall RN labor participation in outpatient care relative to hospitals since among all RNs, there was no change in the probability of working in outpatient care relative to a hospital. There are a few factors likely contributing to this outcome. First, the uptake in collaborative team approaches to care inclusive of RNs has not been sufficient for the number of opportunities to be high enough for RNs to even consider it. While APMs are increasingly gaining traction in the healthcare market, certain elements of FFS still prevail that discourage the inclusion of RNs in care provision particularly because their time is not directly reimbursable as it is for physicians. Secondly, RNs serve different functions in outpatient care than they do in hospitals so that switching to outpatient care entails the additional cost of time spent onboarding and training for these new roles. This would have a negative effect on the elasticity of substitution for a job in outpatient care with respect to one in a hospital. However, it may be more appealing to those hospital RNs who are seeking to leave hospital work but still remain strongly attached to the labor force and to the profession for the long haul.

The results do suggest that there was a significant increase in the probability of working in an outpatient care setting among young female RNs residing in urban-designated PUMAs who are unmarried with a maximum household income of 501 percent of the FPL. It also shows an increase among those who have a young child. These are demographic groups that previous studies have shown to exhibit high turnover rates with intentions to remain in the labor force (Hayes et al., 2006) and in the nursing profession, be less sensitive to wage changes (Shields, 2004), have more job opportunities available in urban settings (Phillips & McLeroy, 2004) and who, in the absence of a spouse and thus spousal income, are likely to have lower levels of non-labor income.

This is consistent with several findings in the literature. As discussed previously, turnover rates are substantially higher among young, recent graduates relative to other RNs and the vast majority of these job leavers do plan to continue a career in nursing. RN wage has been shown to be a trivial factor in the determination of labor supply and participation with

both being very inelastic with respect to RN wage. In contrast, job dissatisfaction and work environment is a more commonly cited cause of RN turnover. Thus it is likely that hospital RNs with intentions to leave their current job but who are still strongly attached to the labor force will seek other opportunities outside of hospitals that still allow them to practice to the fullest extent of their training. With more opportunities in outpatient care becoming available as surges in Medicaid revenue enable many Community Health organizations to expand services and create new facilities, it is likely that an increasing share of hospital turnover moved into outpatient care after the Medicaid expansion.

The demographics of this group of RNs are also consistent with those who are more strongly attached to the labor force and the nursing profession. Being single has been shown to have a significantly positive effect on both labor supply and participation in models controlling for non-labor income (Shields, 2004). Unmarried women are less likely to be in a financially codependent relationship with another income-earning individual than married women. In addition to not having the cushion of a spouse's income, they are also likely to have less non-labor income than women who are married. It has been amply demonstrated that spousal and non-labor income are negatively associated with labor supply and participation (Shields, 2004). Unmarried women are thus likely to be more strongly attached to the labor force than married women. Women who have a young child and are not married are also more likely to carry a higher financial burden in raising that child than they would if they were married which might further strengthen their labor force attachment relative to married mothers.

While column one of Table 3 shows there was a trivially insignificant increase in the probability of young unmarried RNs working in outpatient care relative to hospitals, the group of RNs in column two for which household income was restricted to 501 percent of the FPL showed a positive and significant increase. The income constraint was employed in order to limit the sample to those unmarried RNs who are less likely to be in a financially codependent relationship whose decisions may be influenced by their partner or other family members, and to those less likely to earn high levels of non-labor income which could influence labor supply choices and career attachment.

While there was an increase in the probabability among young mothers with a child under

6, there was no such increase among married mothers in the same age group. It is probable that a higher percentage of turnover amongst this demographic either exit the labor force, change positions or move to a different hospital rather than into outpatient care. One reason for this could be that RNs serve different roles in outpatient care that require more time and training and this might be less appealing to this group of RNs who are more willing to work part-time or exit the labor force entirely. There was also no change in the probability of working in outpatient care when the population was restricted to those with a maximum household income of 501 percent of the FPL. This was done in order to focus on households more likely to depend on two-person incomes. This group of married RNs is likely to be more strongly attached to the labor force but it might be the case that having a partner to share in the responsibility of both income and productivity in the household is an enabling factor to cut back on hours without leaving the labor force, and that for this group, the lure of moving into a different care setting is not strong enough to cope with the job-related changes necessary in order to do so.

4   Conclusion

The U.S. health care system is broken and this is reflected in the widening gap between supply and demand of health care professionals and in how that gap manifests in access to basic health care. While there is a wide host of factors contributing to this gap, the causes are deeply rooted in the structural elements of the U.S. health care system with the handling of payment at the center. The payment model in turn affects how health care is delivered, by whom and how much it will cost. While the ACA made many substantial investments and structural changes that ameliorated a number of deficiencies in the system, it only addressed contributing factors while ignoring the main highway from which they are driven. Without payment reform, physicians will continue to work in silos and maximize profits by choosing to engage in activities that only provide direct rewards for use of their own time or for services delivered only by them and not by others on their team. This paper shows that even though the ACA made substantial investments toward expanding insurance coverage, increasing the affordability of basic health care services, promoting the adoption of alternative payment models and augmenting the nursing workforce, these pushes were

not sufficient to effect structural changes in RN labor participation in primary care settings where they may potentially have the largest impact.

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6 Tables

Table 1: Demographics Table

Variables (%)						
	Health Care Setting (N=233,758)					
	Hospital		Outpatient Care		Physician Office	
	Expanded	Not Expanded	Expanded	Not Expanded	Expanded	Not Expanded
Overall	90.0	88.0	6.0	6.4	4.30	5.70
Female	89.1	89.1	91.5	92.1	96.8	96.2
Married	61.0	61.5	64.7	63.9	67.7	68.3
Black	8.30	11.1	7.1	12.0	4.44	6.30
Hispanic	6.22	5.01	6.96	5.41	5.67	4.65
Full Time	83.5	85.0	79.0	82.2	72.1	79.0
Has BA	60.2	56.9	52.8	46.1	46.4	40.3
Has Child*	21.4	20.8	21.5	25.1	25.9	26.9
Age (mean)	44	43	48	46	48	47
Age Group (% worked in each setting)						
18-35	91.0	91.0	4.80	4.80	4.30	4.30
35-39	88.0	88.0	6.50	6.50	5.0	5.0
50 & up	86.0	86.0	7.60	7.60	6.0	6.0
	Restricted to unmarried female registered nurses with young child (N=2,152)					
Overall	88.0	91.0	4.10	7.50	4.90	5.00
Black	13.1	24.5	37.9	13.3	14.4	13.4
Hispanic	11.0	6.2	31.2	23.5	19.2	7.2
Full Time	87.5	87.4	69.0	82.7	99.0	95.8
Has BA	53.6	54.3	46.8	28.8	53.3	45.2
Age (mean)	32.1	31.4	33.2	29.9	30.7	31.1

Table 2: Change in the Probability of Working in an Outpatient Care Clinic or Physician's Office for Unmarried Registered Nurses Aged 18 to 35

	Outpatient		Physician
	(1)	(2)	(3)
PolicyYear$_t$ X Expansion$_s$	0.00826	0.02211*	-0.0005528
	(0.00725)	(0.01247)	(0.0099692)
Demographics	Y	Y	Y
State Fixed Effects	Y	Y	Y
Year Fixed Effects	Y	Y	Y
Age Restriction	18-35	18-35	18-35
HH Income Restriction	N	501% FPL	501% FPL
Urban-Designated PUMAs	Y	Y	Y
Observations	8,348	5,065	5,031
R-squared	0.0215	0.0298	0.0305

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Change in the Probability of Working in Outpatient Care for Unmarried Registered Nurses Aged 21 to 35 with a Young Child

	All		Not Married	Married	
	(1)	(2)	(3)	(4)	(5)
PolicyYear$_t$ X Expansion$_s$	0.0068	0.0129	0.0648**	0.0073	0.0026
	(0.0085)	(0.0099)	(0.0299)	(0.0101)	(0.0169)
Demographics	Y	Y	Y	Y	Y
State Fixed Effects	Y	Y	Y	Y	Y
Year Fixed Effects	Y	Y	Y	Y	Y
Age Restriction	N	21-35	21-35	21-35	21-35
HH Income Restriction	N	N	N	N	501% FPL
Observations	12,009	9,432	1,161	8,271	4,477
R-squared	0.0167	0.0191	0.0736	0.0197	0.0303

Robust standard errors in parentheses
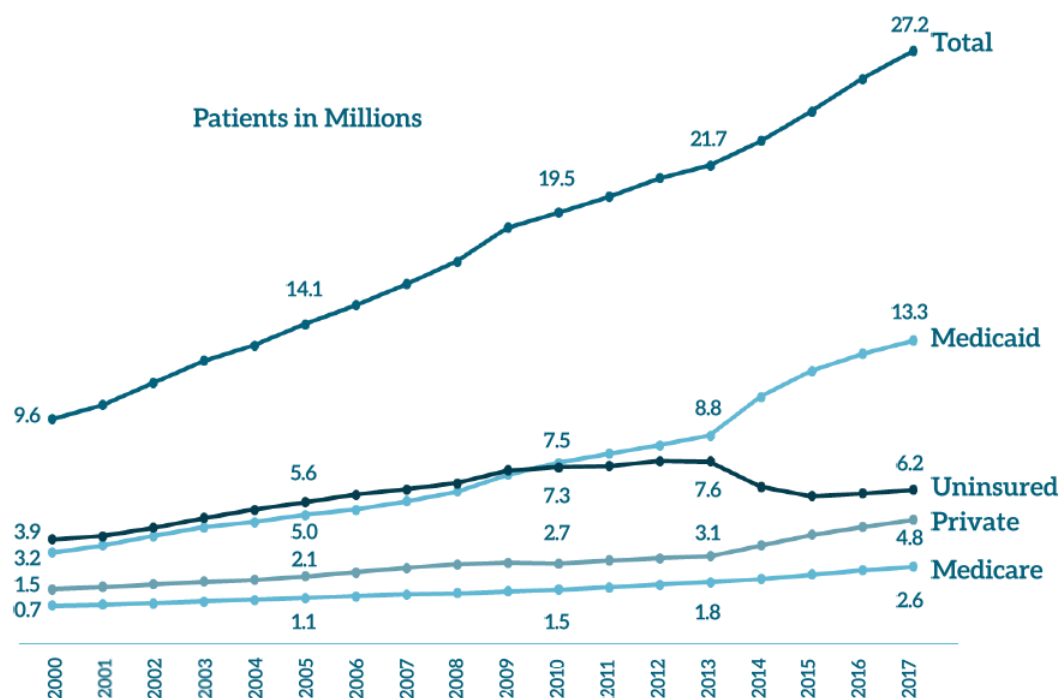*** p<0.01, ** p<0.05, * p<0.1

7 Figures

Figure 1: Health Center Patients, By Insurance Coverage Type, 2000-2017. GW analysis of data reported in the Uniform Data System national reports 2000-2017. Reprinted from Sara Rosenbaum, Jessica Sharac, Peter Shin, and Jennifer Tolbert. Community Health Center Financing: The Role of Medicaid and Section 330 Grand Funding Explained.