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**Characterizing the Travel Nurse Market During Covid-19: A Tale of Two
Markets for Interchangeable Labor**

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Abstract

The Covid-19 pandemic produced a significant shock to US hospitals from 2020 to 2023. Increased and unexpected patient demand for hospital services resulting from Covid-19 and the reduced demand for other non-Covid-19 services due to shutdowns and infection risk resulted in variable elevated demand for registered nurses (RNs). Hospitals have long leveraged a dual market system for RN labor to reduce total labor costs by tapping into the contingent labor market via staffing agencies during times of increased patient demand for services or reduced availability of full-time staff. Covid-19 created a natural experiment through which to study the contingent labor market, and, with the emergence of online travel nurse staffing marketplaces, the data is available for that purpose. This paper uses US Centers for Disease Control and Prevention (CDC) Covid-19 data, Bureau of Labor Statistics data, and online travel nurse marketplace data to characterize the contingent RN labor market during Covid-19, to theorize the interplay between these dual markets, and to introduce the value of travel nurse marketplace data. This analysis demonstrates a clear temporal correlation between Covid-19 hospitalizations (i.e., patient demand for hospital services) and wages in the contingent RN labor market, details the trends in contingent RN labor market wages from 2019 to 2023, demonstrates RN specialty-level wage variation that correlates with patient demand for certain hospital service lines, and discusses the interplay between the full-time staff RN market and the contingent market from 2019 to 2023.

Introduction

The market for contingent health care clinical staff (commonly referred to as the travel nursing or temporary labor markets, which for the purpose of this paper will be used interchangeably) gained significant household and new academic attention from 2020 to 2023 during the Covid-19 pandemic given the significant demand for nursing services driven by the elevated incidence of disease and subsequent increase in hospitalizations. While there are workers of a wide range of clinical specialties and disciplines that participate in the wider contingent health care staffing market, this paper will focus specifically on registered nurse (RN) labor in acute care settings and short stay hospitals.

Historically, hospitals have been and still are the largest employer of RNs; the majority of which they hire from their local communities¹. RNs typically commute to the hospital and work three days a week for twelve-hour shifts². When a hospital's local hiring and scheduling operations fail to meet the internal demand for nursing labor hours given a current or predicted inpatient census (i.e., the volume of patients), the facility typically engages a for-profit staffing firm (also known as a staffing agency) to recruit RNs from outside the local geographic area of the hiring hospital facility. These nurses "travel" to the distant hospital worksite. This "secondary" hiring system, forming a dual labor market, allows the hospital to tap into the regional and national supply of RNs during typical seasonal fluctuations, population changes, pandemics, and disasters. This has been common practice for decades as it theoretically allows hospitals to obtain a higher quantity of RN labor hours without increasing wages across the board for full-time staff³. Indeed, early evidence from the Covid-19 pandemic in the United States suggests

that the contingent RN labor market is particularly sensitive to elevated patient demand during a public health emergency^{4 5}. States that were hot spots for Covid-19 over the summer of 2020 showed significant increased demand for travel RNs illustrated by increases in both available jobs and wages as measured from an online travel nurse staffing marketplace data source⁶.

The Covid-19 pandemic led to several definable periods of exponential growth in demand for hospital services (i.e., RN staffed beds)⁷. To service the patients, hospitals had to tap into the contingent RN labor market as their full-time staff were unable to support the surge requirements. The Covid-19 event exposed the contingent RN labor market as distinct from the traditional views of the “local hospital-based nursing labor market” in terms of wage trends and geographic scope. It is fair to say that the contingent RN market exhibited distinct characteristics (e.g., elevated wages, specialty-level wage variation) prior to the Covid-19 event, but, until recent years, there has been insufficient data sources available to elucidate the differences between the contingent labor and the local staff markets for RN labor.

The nurses who participate in the contingent labor market help facilities meet their state-defined, or internally determined, patient-to-nurse staffing ratios or level of desired employment at any given time. It is well established that lower patient-to-nurse ratios are safer and lead to a variety of well-established health and safety outcomes which highlights the importance of this topic⁸. Staffing ratios above a certain level are potentially unsafe⁹. The contingent RN labor market helps facilities maintain their desired staffing levels with a high degree of flexibility and customizability¹⁰. In the absence of state staffing ratio legislation, the facilities themselves determine their target staffing levels. Despite the importance of nurse staffing, very little literature exists about the contingent RN labor market.

This is an emerging area of research given new data sources and the growing policy concerns surrounding the availability of RN labor to hospitals and other health care delivery organizations. The rise of online travel nurse marketplaces and Covid-19 have provided a natural experiment to study the contingent market and begin to understand the interplay between these dual markets for RN labor. The purpose of this paper is to characterize the contingent labor market during Covid-19, to identify a basic relationship between Covid-19 hospitalization rates and contingent labor market wages as an indication that the market wage is highly sensitive to patient demand for hospital services, and to discuss the hypothesized interplay between the *full-time local* and the *contingent* markets for RN labor via a novel travel nurse marketplace-derived wage data source that allows for the real-time monitoring of the contingent RN labor market. Our conclusions suggest that the contingent labor market functions in a more competitive fashion than the full-time local market (which is marked by monopsonist behavior), is highly sensitive to Covid-19 incidence and hospitalization rates, and demonstrates wage variability at the RN specialty level for a given patient demand for that particular service line.

The State of the Nursing Workforce and Workplace

The hospital RN labor force is plagued by inefficiencies and issues likely driven by the emotionally challenging and physically difficult nature of the job and inadequate health care

financing structures that do not account for the intensity and volume of nursing services required for a given patient (i.e., the Diagnostic Related Grouping payment model in Medicare Part A). Hospitals experience high RN job turnover rates, a general exodus from bedside clinical roles, and reports of significant dissatisfaction among RNs. At a national level, evidence suggests that general RN labor force drop out continues to occur¹¹. Covid-19 led as many as 30 percent of RNs to report a desire to leave the workforce due to the pandemic¹². Another study found that Covid-19 greatly exacerbated the existing reports of nurse desires to leave the profession and hospital-based bedside roles¹³. Much of the facility-level turnover and labor force dropout is attributable to burn-out resulting from overwork and inadequate staffing levels¹⁴. In addition to these elements, results from the 2020 National Nursing Workforce Survey suggest that 20 percent of nurses planned to retire within 5 years¹⁵. These observations indicate that there is a significant desirability problem with the hospital bedside workplace.

Licensure, License Portability, and Specialization in the RN Labor Force

When discussing the interplay between the full-time local RN market and the contingent RN market, it is important to outline the role of licensure and license portability¹⁶. RN licenses in the US are issued and regulated by the states, resulting in 51 unique license application processes in each state and the District of Columbia (not including the US territories which have their own processes). The Nurse License Compact (NLC) has, as of June 2023, been adopted by 41 US states to allow for license reciprocity¹⁷. Prior to the NLC, nurses were required to obtain a new license in each state in order to work as an RN. The growth of the NLC has reduced barriers for nurses to obtain work in other states and has likely contributed to the growth of the contingent labor market during Covid-19¹⁸. Indeed, it is an important factor considered by staffing agencies during the recruitment process. The 2022 National Nursing Workforce Survey shows 24 percent and 30.3 percent of nurses held an interstate license in 2020 and 2022, respectively¹⁹.

RNs specialize and sub-specialize in certain clinical or operational areas. While the license itself is portable across the majority of US states and jurisdictions, RNs perform a wide array of tasks and procedures and maintain highly specialized knowledge of specific clinical domains within their particular specialty. The RN labor force generally shares a core set of basic knowledge, educational attainment, and skills required for basic RN licensure, but are a fairly heterogeneous group with respect to hospital demand. A seasoned RN specializing in intensive care is not necessarily interchangeable with a seasoned RN who specializes in operating room surgical procedures. For example, a hospital with a level one trauma center in a major metropolitan area has a higher demand for emergency room or trauma trained RNs than does a suburban hospital with a relatively small emergency department. That same suburban hospital may have a larger elective surgery service line and therefore may have a higher demand for operating room RNs than the other hospital. The data commonly used to study RN labor markets, Bureau of Labor Statistics (BLS) data, does not provide the specialty-level granularity. Data from travel nurse marketplaces do have the specialty and sub-specialty information available, which allows for unique insights into the contingent labor market and hospital demand for certain skills.

The Full-Time, Local RN Hospital Labor Market

Short stay, acute care hospitals (NAICS 622000) employ the greatest proportion of RNs in the United States. The Bureau of Labor Statistics estimates 1,724,510 of the approximately 3,072,700 employed nurses worked in the hospital environment in 2022²⁰. These nurses are employed with the mean hourly wage of \$43.56 as of May 2022²¹. While The Health Resources and Services Administration (HRSA) generally projects that our current supply of RNs and educational production of new RNs is sufficient to meet projected patient demand by 2035, these RNs are very unequally distributed across the United States²². Their distribution is also not evenly matched to patient demand over time and, importantly, many of these nurses may not be participating in the labor force or willing to work in a “hospital bedside environment” now or in the future. RNs perform a wide variety of functions and roles across the continuum of health care services, so not only is there a general geographic maldistribution with respect to licensed RNs, but there is also further maldistribution with respect to skillset and specialty.

The US full-time local nurse labor market is marked by significant monopsony power in many geographies. In recent decades, consolidation in hospital services markets, which are typically the overwhelmingly largest local employer of RNs in any given local community, has accelerated. Indeed, since 2020, several mega mergers have been announced such as the Advocate Aurora-Atrium Health deal and Kaiser Permanente’s merger with Geisinger Health, further contributing to not only local RN monopsonist market power, but also potentially multi-state, regional, and national effects^{23 24}. Hospital organizations, both for-profit and non-profit have expanded from local community organizations to large-scale entities over the past several decades. In addition to horizontal integration, hospitals have also been integrating vertically through the acquisition of outpatient services organizations²⁵. A recent study by Allegretto et al. (2023), found that for every 0.1 increase in consolidation in smaller-MSAs, real hourly nurse wage growth decreased by \$0.70 and RN wages grew less than that of comparable workers by \$4.08²⁶. A 2010 study by Staiger et al. studied the impact of a Veterans Health Administration increase in nurse wages on surrounding facilities and further confirmed the existence of substantial hospital employer wage setting power in the full-time local nurse labor market²⁷. Another 2019 study by Prager and Schmitt illustrates that consolidation in the hospital market has a negative effect on wage growth for nursing jobs²⁸.

Regardless of monopsony influence over full-time RN wages, the wage growth for hospital employed nurses has been slow (Table 1) compared to the Social Security Average Wage Index (AWI) from 2013 to 2022 in most years²⁹. In each year displayed in Table 1, the AWI grew at a faster rate than hospital employed nurse median hourly wages, with the exception of 2016 (1.13 percent growth in AWI). During the pandemic years, hospital-employed nurses saw 3 percent median wage growth from 2020 to 2021 while the AWI grew 8.89 percent. From 2021 to 2022, the AWI increased by 5.32 percent compared to 4.7 percent wage growth among hospital-employed RNs.

Table 1. Bureau of Labor Statistics National Hospital RN Hourly Wage Data 2013 to 2023

Year of Job Posted	Specialty Group	10%	25%	50% (Median)	75%	90%	IQR	Median Wage Growth
2013	All RN	\$21.94	\$26.05	\$31.84	\$38.55	\$46.31	12.5	-
2014	All RN	\$22.06	\$26.26	\$32.04	\$38.98	\$47.54	12.72	0.6%
2015	All RN	\$22.29	\$26.59	\$32.45	\$39.66	\$48.86	13.07	1.3%
2016	All RN	\$22.65	\$27.01	\$32.91	\$40.27	\$49.52	13.26	1.4%
2017	All RN	\$23.41	\$27.57	\$33.65	\$41.33	\$50.05	13.76	2.2%
2018	All RN	\$24.42	\$28.25	\$34.48	\$42.47	\$51.22	14.22	2.5%
2019	All RN	\$25.04	\$28.9	\$35.24	\$43.64	\$53.47	14.74	2.2%
2020	All RN	\$25.68	\$29.63	\$36.22	\$44.99	\$55.88	15.36	2.8%
2021	All RN	\$28.58	\$29.71	\$37.31	\$46.91	\$57.81	17.2	3.0%
2022	All RN	\$29.45	\$32.06	\$39.05	\$48.6	\$62.21	16.54	4.7%

Hospital payment models from insurance providers and government payors may partially explain the desire for hospitals to suppress growth in nurse wages. As profit maximizing firms, hospitals (majority of which are non-profit) are paid for services by public and private insurance using a methodology known as the diagnostic-related grouping (DRG)³⁰. DRG payments to hospitals are based on several criteria such as patient condition severity, admitting condition, and the average length of stay. This is colloquially known as a “room rate.” Nursing services and their necessary intensity (e.g., patient-to-nurse ratios and volume of nursing care) are absent from the DRG model and thus nurse labor is not directly factored into revenue models for the hospital on a per patient basis. The productivity of the actual nurse in this payment model is not related to the revenue associated with the nurse services rendered. Increases or decreases in the quantity of nurse labor demanded by any given hospital facility is most often dictated by patient demand and influenced further by state patient-to-nurse staffing ratio laws, other regulatory requirements, or professional practice standards. The hospital seeks to minimize its

nursing costs such that it can maximize profit, or net revenue. Hospitals can do this by employing fewer nurses who are distributed among more patients and minimizing wages. Nurse employment is among the largest operating costs for a health care facility and thus the financial incentives encourage both potentially unsafe staffing ratios and suppressed wages below the “market wage” that would exist in a more competitive market³¹. This paper demonstrates that the contingent market wage may represent the wage in a more competitive market given a certain national patient demand at any given time. The workplace desirability issue coupled with a slow wage growth rate is likely a contributing factor to the high rates of turnover from hospital nursing roles and general bedside labor force drop out³².

The Travel, or Contingent Nurse

There is economic literature that describes nonstandard employment, such as in contingent health care jobs, as “bad” as they are often associated with low pay, lack of benefits, and the absence of other protections³³. The market for contingent RN labor may deviate from that thesis. The market for contingent RNs is comprised of RNs that typically seek to maximize their wages at rates higher than full-time staff RN roles, gain increased flexibility, better vacation time, control over their schedules, and enjoy traveling to new locations^{34 35}. There are many reasons why an RN may choose to travel, as the group is heterogeneous. In nursing, particularly during the pandemic, these travel RN roles are likely “good” jobs compared to the common understanding of temporary labor jobs in other industries as “bad jobs”. Travel nurses are most often W-2 employees of a travel nurse staffing firm, or agency, that functions as both the recruiter and the employer of record of the nurse. Staffing firms sign contracts with hospitals to service their staffing needs as determined, typically, by a chief human resources officer (CHRO) and chief nursing officer (CNO) with significant input from the hospital chief financial officer (CFO). Hospitals pay a *bill rate* per hour worked for the nurse to the staffing firm that comprises the total hourly cost of employment for the nurse (wage, taxes, FICA, workers compensation, travel stipend) and the agency fee (typically around ~23%). The travel nurse receives an hourly wage and if they meet the IRS definition of “traveling for work” they also receive a daily nontaxable per diem rate for food and housing. In many circumstances, the nurse also receives common employment benefits such as health insurance. Some agencies choose to pay nurses as an independent contractor, or 1099, as opposed to a W-2 employment relationship. It is important to note that when an RN is employed by a travel nurse agency as a W-2 they are often offered very similar benefits to RNs employed in hospitals, thus elevated wages are not necessarily in lieu of these common staff RN benefits as is often stated. Independent contractor RN hiring practices have caused significant contractual, liability, and tax issues in the industry so most major staffing companies opt for W-2 employment. The standard assignment length for a travel nurse is 13 weeks, thirty-six hours per week, with some variation (e.g., forty-eight hours per week, varying shift lengths). Shift types (e.g., night/day) are typically established in advance but may vary by facility, and the same credential (e.g., licensure, certifications, experience) requirements are required by the facility for both full-time staff and contingent RN labor. Approximately 6.2 percent of RNs in 2022 self-identified as a travel nurse³⁶.

Historically, travel nurses contact a travel nurse staffing firm recruiter or vice-versa and discuss via telephone or email a proposed assignment, its characteristics, pay rate, and start dates. Nurses may shop around to a number of staffing agencies to obtain the highest pay rate in their desired travel location. The nurse then accepts the employment, or not, and shows up to the job at the agreed upon date and time. These nurses then receive some degree of facility-level orientation and policy education, and then start work on their designated unit alongside staff RNs.

The Pandemic Travel Nurse Subtypes

Through anecdotal and limited published evidence, there are three archetypes of RN that participate in the contingent RN labor market^{37 38}. The first one, Type A, is that of the self-identifying travel nurse that would consider travel nursing to be their profession. The second, Type B, is a nurse that has typically worked full-time for a large portion of their career but that may from time to time choose to offer labor through the contingent labor market³⁹. Type B nurses may work a full-time role and take per diem, or daily shift, roles or may float in and out of travel and staff roles over time. There is evidence from survey work that suggests new travel nurses emerged during the pandemic out of staff roles due to the elevated wages⁴⁰. The third, Type C, is the nurse that was not participating in the labor market as a nurse in a bedside role due to retirement or other reasons until elevated wages in the contingent labor market produced a signal for that nurse to re-enter the labor market as a contingent nurse^{41 42}. There were professional calls to relicense retired nurses and accelerate student licensure during the pandemic to encourage additional nurses to enter the nurse labor force⁴³. Nurse subtypes are important to consider when discussing the interactions between the full-time, local nurse markets and the regional and/or national contingent labor markets. Type A may spend years accepting travel nurse assignments across the country as a lifestyle, due to a desire to travel, and to control assignment details including pay, location, and time off. Type A nurses may choose, at some point, after years of traveling in the early career to stop traveling and accept full-time employment perhaps to fulfill familial, caregiver, or other obligations or desires. Type A travel nurses can also emerge later in life after reduced familial obligations allow for more employment flexibility. Most travel nurses are younger RNs in their early careers⁴⁴. Type B nurses may elect to accept travel nurse assignments during short stints but may not self-identify as a travel nurse, or may emerge as a travel nurse during certain events, like Covid-19, due to wages or other factors. During the pandemic, it became clear that Type B nurses rose in number significantly due to the disparity between the standard full-time nurse wage (i.e., the 2022 median of \$43.56) and travel nurse wages many of which were greater than \$80 per hour^{45 46}. Neoclassical labor economic theory presents a basis for the growth of Type B and Type C travel nurses (i.e., wages increased enough to drive market entry of workers from both non-participants or from the full-time, local market as the opportunity cost of staying in the full-time, local job at the prevailing full-time rate or “on the sidelines” became too high). It is unclear how prevalent Type B and Type C nurses are in the contingent labor market.

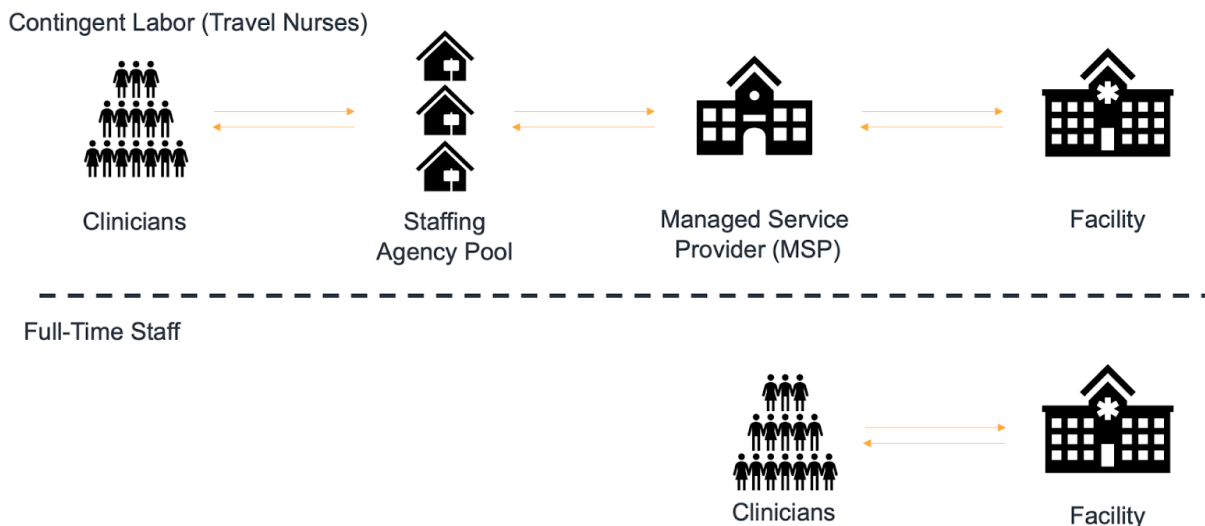
Interestingly, the information available on wages to RNs in the contingent labor market during the pandemic was theoretically near perfect. Marketplace job postings provide the specialty,

desired skills, educational requirements, and wage information for most available jobs via easy-to-use and searchable software platforms. This, along with significant mainstream media coverage of travel nurses, helps support the hypothesis that Type B and Type C nurses could have supplied a larger quantity of labor to hospitals through the contingent labor market as it is plausible that a high percentage of the individuals with active RN licenses that were employed, unemployed, and non-participants were aware of the elevated wages in the contingent market.

Market Participants and Structures in both Markets

The markets for contingent RNs and full-time, local RNs are accessed via different structures and participants which contributes to the theory that these two markets are independent, but deeply intertwined as they involve an interchangeable supply. Local, full-time RN hiring, and recruitment is most often performed by the hospital facility itself and is governed by labor union agreements and oversight as well as constrained in scope by the local geography of the facility itself (Diagram 1). Travel nurses are most often obtained via recruitment and employment services performed by a range of staffing agency suppliers ranging from small local businesses to major publicly traded managed service providers (MSPs) like AMN Healthcare Services, Inc. and Cross Country Healthcare, Inc. (Diagram 1). While hospitals in the full-time, local market are wage setters that seek wage minimization, RN staffing firms seek wage maximization and can be rate setters depending on their relationship with their contracted facilities and size. The urgency of the facilities hiring needs also can dictate the degree to which staffing firms can maximize hourly bill rates and wages.

Diagram 1. Nurse Recruitment Supply Chain



Importantly, job visibility, wage transparency, recruitment resources, and advertising practices differ between the two labor markets. The hospital-based full-time recruitment operations may advertise locally via online job boards (e.g., ZipRecruiter, Indeed, Google), print media, and local career fairs as well as through targeted recruitment from both local and non-local nursing

schools. Staffing agencies historically employ a larger number of recruiters to actively recruit from the pool of both Type A and Type B nurses, with a preference for Type A nurses as they represent a higher probability of placement for a recruiter whose compensation is tied to the volume of nursing hours worked by RNs accepting assignments from said recruiter. Staffing firms enjoy economies of scale with respect to recruitment operations as recruiters can place prospective employees in a variety of roles compared to a hospital recruiter who only has jobs at one organization. Similarly, that same recruiter can work on multiple accounts and is tasked with a relatively focused pool of desired candidates. Staffing firms also have better structures in place to obtain labor from regional and national markets given their scope servicing multiple accounts. Staffing firms maintain large databases of RN contact information to support their high-volume recruitment operations. Hospital recruitment operations, aside from career fairs and school-based recruitment operations, are typically less aggressive and active than those of staffing firms. Type C nurses likely remain on the sidelines due to retirement, family obligations, other household income, and other reasons until wage signals or other drivers compel them to offer their labor within either market⁴⁷. Type C nurses, though, will still be contacted by staffing firm recruiters as they may have been a Type A or B nurse prior to labor force drop out due to the high-volume recruitment practices of staffing firms (e.g., email campaigns, phone calls, text messaging). This practice makes it plausible that Type C nurses may have been drawn back into the labor force via the contingent labor market during Covid-19.

Per their contracts with hospital facilities and industry norms, travel nurses often require a minimum of two years of experience to be eligible for a contingent job. During Covid-19 this practice was largely waived which opened the door for new graduates and early career nurses to leave school or their early staff roles for higher paying travel assignments during the pandemic. Typically, the new graduate pipeline of nurses is available exclusively to the full-time, local market for nurses in which facilities compete on the basis of new nurse training programs, pay, availability of specialization opportunities, mentorship, prestige/reputation (e.g., academic medical centers), and career advancement opportunities^{48 49}.

Advertising and price transparency practices are important and different between the two labor markets. In recent years, beginning in circa 2017, new internet-based, software companies (e.g., Wanderly, NurseFly, SnapNurse) and tech-enabled staffing firms entered the travel nurse market with digital solutions to enhance the recruitment process for travel nurses via digital advertisement (e.g., online marketplaces, social media advertisement), wage transparency, and reduced administrative burden. Replicating the success of digital travel search marketplaces such as Kayak.com, Priceline, and Expedia, these companies entered the market offering a digital job search experience with heretofore unseen wage transparency and administrative ease for travel nurses. These marketplaces reduce administrative burden by functioning as a universal application for a nurse to multiple staffing agencies. Marketplace companies require staffing firms to display pay information to provide nurses with all assignment and job details upfront prior to speaking with a recruiter or applying for the job. Prior to the growth of these software marketplaces, neither market provided wage transparency at scale. Nurses were required to contact a recruiter and initiate the application process in order to obtain wage information. In this structure, staffing firms were incentivized to minimize nurse wages via

confidential and individual negotiations to maximize gross profit for a given bill rate. The growth of these platforms during Covid-19 has led to complete wage transparency in the contingent RN labor market whereas the full-time local market remains without significant wage transparency practices. This likely affected the behavior of both Type B and C nurses and contributed to the exponential growth rates of travel nurse wages experienced during the pandemic. Travel nurses were able to seek out and negotiate only the highest wages with staffing firms given the degree of information available. During the pandemic years and even still after, there exist significant information asymmetries between nurses and nurse employers, favoring nurses.

This dual market structure is supported by the concept of markets with search friction outlined by Mortensen in 2011⁵⁰. Hospitals likely have higher per RN recruitment costs in their internal operations than staffing firms who can produce a higher probability of placement per recruiter and thus a lower cost per nurse hired. This helps explain part of the reason for outsourcing these operations, although employment by the external firm also serves to allow for different wages and employment practices that can benefit the hospital. However, the growth of online marketplaces may result in a trend of in-sourcing contingent labor operations via hospital-owned and -operated staffing firms which already do exist (see Healthtrust Workforce Solutions of HCA). These online marketplaces function to reduce search friction for hospitals and serve to centralize recruitment, distribute perfect information, and standardize hiring practices in the contingent labor market, thus moving the market from one with significant search frictions towards a model closer to perfect competition with reduced search frictions.

The Present Study, Methods, and Data

Data included in this analysis is derived from the Wanderly travel nurse marketplace. Wanderly (www.wanderly.us) is a for-profit technology company that acts as a central aggregator of actively available travel nurse job postings. Nurses register for Wanderly and create a profile that functions as a universal application and includes resume, certifications, licensures, and skills training information. These nurses can then return to Wanderly each time they are seeking a contingent job to apply. Job information is obtained directly from staffing agency employers. Interactions between nurses and recruiters occur directly on the platform so the information utilized in the present analysis is obtained from the original source. The dataset in this analysis has over 1.5 million job postings from greater than 100 staffing firms and hospital facilities in the US from January 2019 to July 2023. Data is sub-grouped by specialty (emergency room (ER), intensive care unit (ICU), medical surgical (Med Surg), medical surgical telemetry (Med Surg Tele), operating room/perioperative (OR), and all other RN specialties (Other RN). Travel nurse hourly wages from Wanderly include the nontaxable food and housing stipend components (calculated daily) of travel nurse wages converted to an hourly equivalent. The nontaxable component of the wage also serves to increase the effective wage which is not factored into this analysis. Data about hospital (NAICS 622000) RN employment is obtained from the Bureau of Labor Statistics (BLS). Covid-19 data included in the analysis is obtained from the US Centers for Disease Control and Prevention (CDC). Covid-19 data is used to graphically display the relationship between percent positivity of Covid-19 tests as a measure of the rate of Covid-19

community spread, the Covid-19 hospitalization rate per 100,000 people, and contingent RN wage data over time.

Results of the Analysis

Figure 1, below, displays new Covid-19 hospitalizations per 100,000 people in the US and percent Covid-19 test positivity juxtaposed with median travel RN wages for OR, ICU, and All RN specialties by week. The temporal correlation between the Covid-19 related metrics and travel nurse wages is clear, indicating the sensitivity of the contingent RN labor market to patient demand. This contrasts with the BLS data in Table 1 where growth rates did not accelerate at the same rates given the increased patient demand. Generally, as more patients were hospitalized with Covid-19, demand for contingent RN labor increased and vice versa. ICU nurses' wages are particularly sensitive to Covid-19 hospitalization rate due to the clinical presentation of the disease that often requires treatment for respiratory failure via a ventilator.

Figure 1. Covid-19 Hospitalizations and Travel ICU, OR, and All RN Wages 2019 to 2023

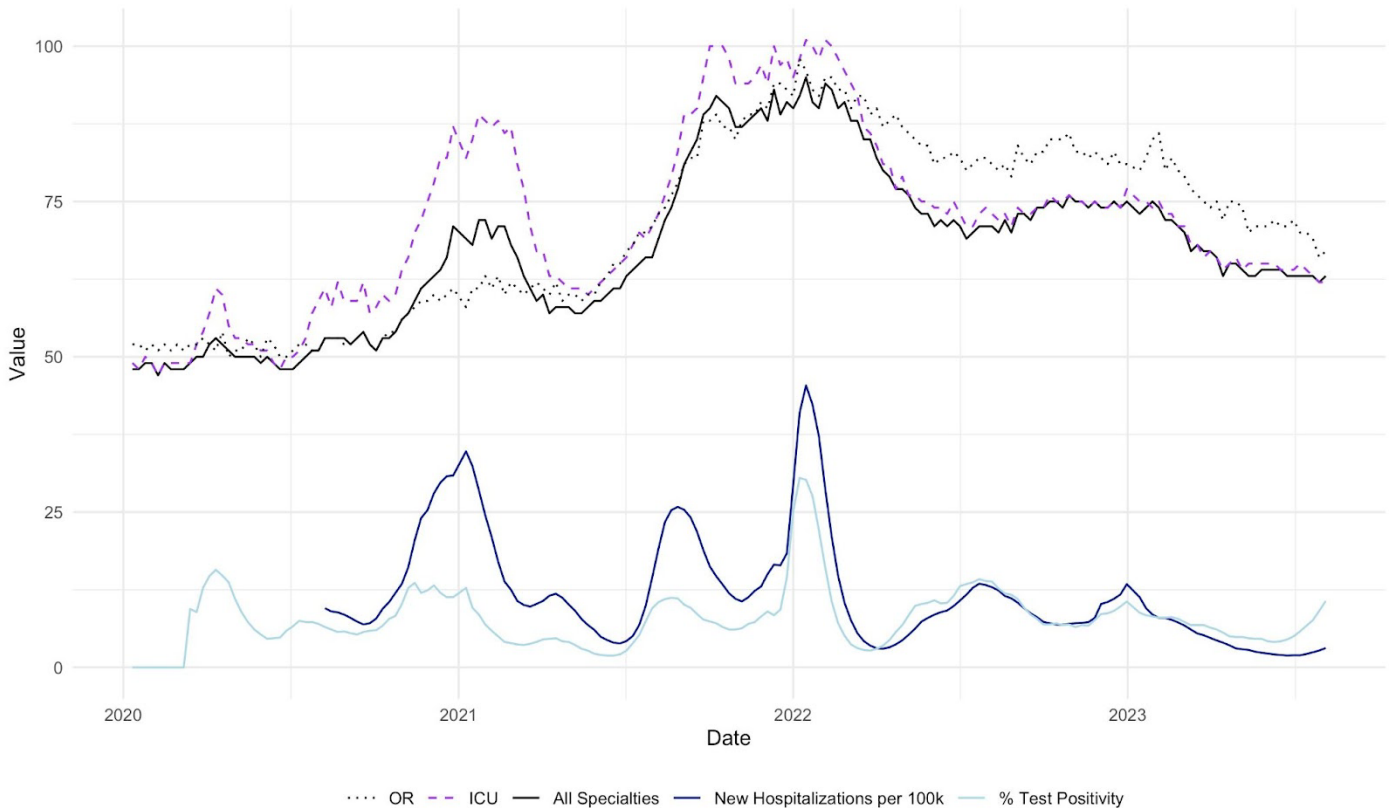


Figure 2, below, displays historic BLS median wage data for hospital-employed RNs from 2014 to 2022, which, for the sake of this paper, is the basic measurement of the wages in the full-time, local RN market. This is juxtaposed with the median travel nurse wage by year from 2019 to 2023. In 2019, the median hourly wage for a hospital employed RN was \$35.24 compared to a median of \$46.54 for a travel RN, a 32 percent difference. In 2020, that difference increased to 49 percent. In 2021, that difference further expanded to a 95 percent higher hourly wage for

travel nurses. In 2022, it reached its peak with the travel RN wage 96 percent higher than the hospital employed RN wage as measured by BLS.

Figure 2. Travel RN Wages Compared to BLS Hospital Staff RN Wage Data 2014 to 2022

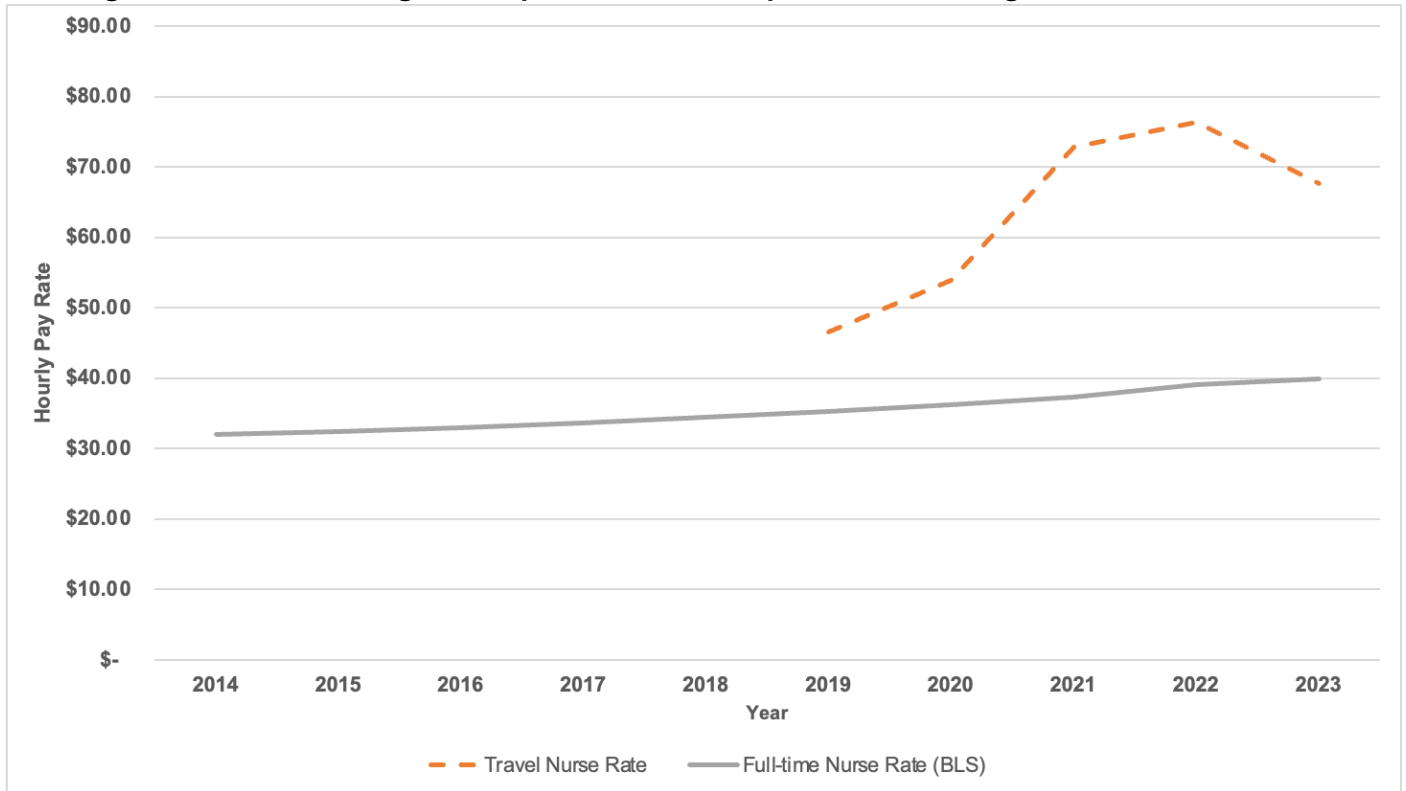


Table 2 below shows the more granular distribution of travel nurse wages by specialty type from 2019 to July 2023. The median wage for all travel RNs and specialties increased each year from 2019 (pre-pandemic baseline) to 2022 (peak Covid-19). From 2022 to 2023, wages for all travel RN specialties declined in correlation with falling Covid-19 hospitalizations. Travel ICU RN wages grew from a median of \$47.58 in 2019 to a peak of \$81.53 (71% higher than 2019) in 2021 and then fell back down to \$67.56 (42% higher than 2019) in 2023. Certain specialties experienced different wage growth patterns each year and the distribution of pay varied between each specialty. From 2020 to 2022, the interquartile range (IQR) of ICU nurse wages was much higher than other specialties. Comparing the IQRs in Table 1 to Table 3 suggests a generally higher level of variance in wages within the contingent labor market compared to the full-time labor market. IQR appears to be correlated with elevated patient demand in both the hospital employed BLS and the contingent labor data.

Table 2: Travel Nurse Hourly Equivalent Compensation 2019 to 2023

Year of Job Posted	Specialty Group	10%	25%	50% (Median)	75%	90%	IQR	Median Wage Growth
2019	Emergency Room	\$ 39.83	\$ 43.00	\$ 46.94	\$ 51.89	\$ 57.73	8.89	--
	ICU	\$ 40.06	\$ 43.31	\$ 47.58	\$ 52.86	\$ 59.53	9.55	--
	Med Surg	\$ 36.78	\$ 39.72	\$ 43.39	\$ 47.45	\$ 51.72	7.73	--
	Med Surg Tele	\$ 38.94	\$ 41.83	\$ 45.28	\$ 49.72	\$ 55.44	7.89	--
	OR	\$ 40.38	\$ 44.94	\$ 50.05	\$ 56.45	\$ 63.14	11.51	--
	Other RN	\$ 34.75	\$ 40.86	\$ 46.00	\$ 52.15	\$ 59.92	11.29	--
2020	Emergency Room	\$ 43.67	\$ 47.61	\$ 53.58	\$ 62.81	\$ 78.17	15.20	14%
	ICU	\$ 44.00	\$ 49.81	\$ 60.00	\$ 77.08	\$ 92.31	27.27	26%
	Med Surg	\$ 39.88	\$ 44.39	\$ 50.50	\$ 60.83	\$ 76.89	16.45	16%
	Med Surg Tele	\$ 42.08	\$ 47.00	\$ 55.25	\$ 70.28	\$ 87.39	23.28	22%
	OR	\$ 42.50	\$ 47.72	\$ 53.78	\$ 61.38	\$ 69.64	13.66	7%
	Other RN	\$ 37.60	\$ 43.72	\$ 50.33	\$ 59.31	\$ 71.75	15.59	9%
2021	Emergency Room	\$ 52.00	\$ 61.00	\$ 75.69	\$ 93.31	\$ 111.00	32.31	41%
	ICU	\$ 51.85	\$ 64.38	\$ 81.53	\$ 98.61	\$ 114.81	34.23	36%
	Med Surg	\$ 47.25	\$ 57.83	\$ 71.61	\$ 88.33	\$ 105.06	30.50	42%
	Med Surg Tele	\$ 50.72	\$ 59.19	\$ 73.31	\$ 89.74	\$ 106.10	30.55	33%
	OR	\$ 49.14	\$ 58.03	\$ 70.25	\$ 86.00	\$ 103.00	27.97	31%
	Other RN	\$ 42.08	\$ 51.53	\$ 64.00	\$ 81.89	\$ 98.39	30.36	27%

2022	Emergency Room	\$ 56.42	\$ 65.56	\$ 76.94	\$ 88.36	\$ 102.19	22.80	2%
	ICU	\$ 57.39	\$ 66.67	\$ 78.64	\$ 91.50	\$ 109.00	24.83	-4%
	Med Surg	\$ 52.64	\$ 62.22	\$ 71.63	\$ 82.50	\$ 96.00	20.28	0%
	Med Surg Tele	\$ 59.61	\$ 67.78	\$ 76.28	\$ 86.53	\$ 99.97	18.75	4%
	OR	\$ 60.25	\$ 72.78	\$ 84.08	\$ 96.95	\$ 111.80	24.17	20%
	Other RN	\$ 45.75	\$ 57.36	\$ 70.50	\$ 83.68	\$ 98.89	26.32	10%
2023	Emergency Room	\$ 54.39	\$ 60.31	\$ 67.67	\$ 77.36	\$ 86.14	17.05	-12%
	ICU	\$ 55.67	\$ 61.00	\$ 67.56	\$ 76.92	\$ 85.00	15.92	-14%
	Med Surg	\$ 51.11	\$ 56.83	\$ 64.06	\$ 72.00	\$ 79.06	15.17	-11%
	Med Surg Tele	\$ 56.50	\$ 61.06	\$ 67.47	\$ 75.00	\$ 82.78	13.94	-12%
	OR	\$ 58.00	\$ 65.05	\$ 75.07	\$ 86.25	\$ 97.61	21.20	-11%
	Other RN	\$ 45.75	\$ 54.53	\$ 63.58	\$ 73.50	\$ 83.50	18.97	-10%

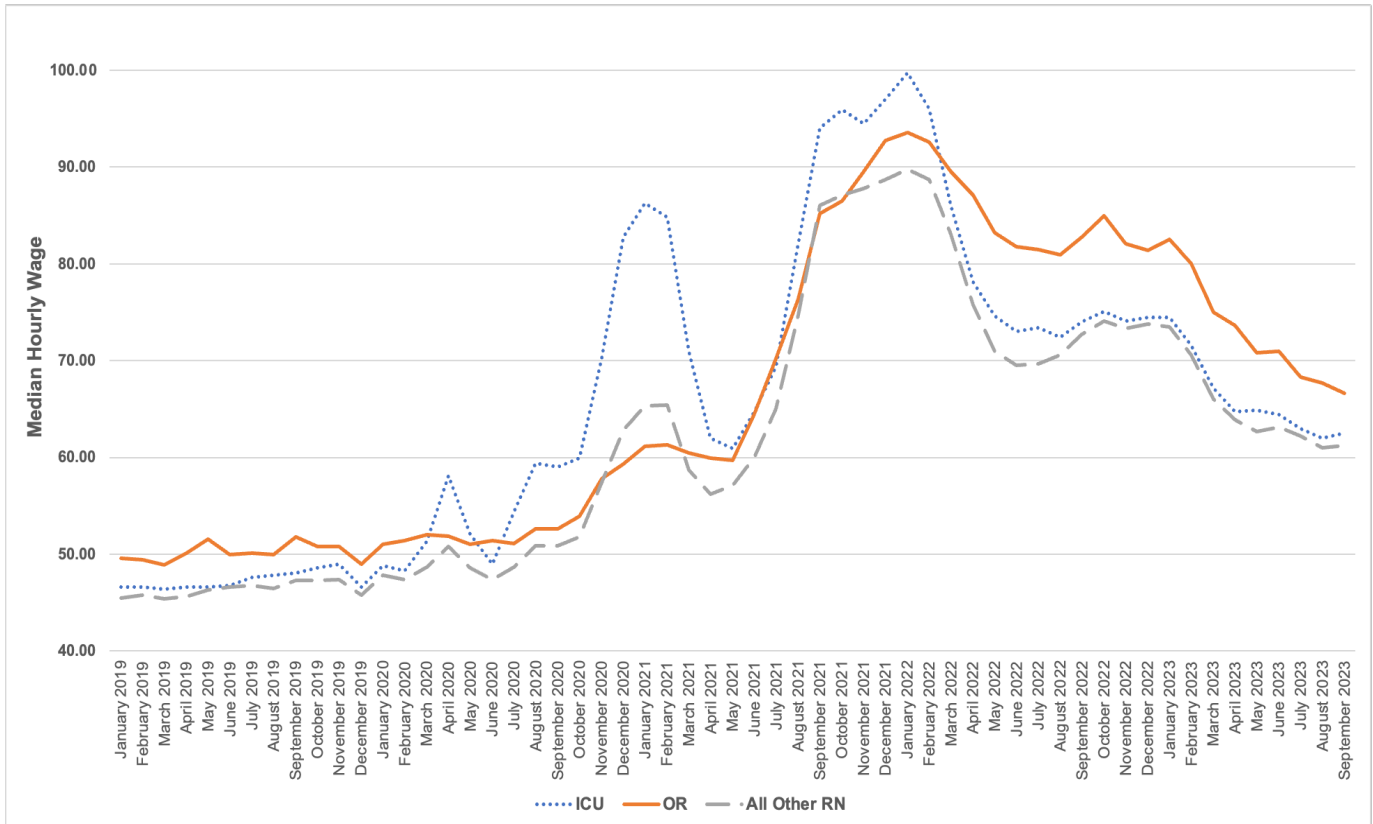
The trends in Med Surg and Med Surg Tele are important to note (Table 2). Telemetry clinical monitoring services were critical for Covid-19 patients and thus the wage differences between Med Surg and Med Surg Tele demonstrate the premium placed on nurse labor with experience monitoring patients who require telemetry services. While ICU RNs have a more defined set of specialized skills and knowledge compared to a Med Surg RN and operate in a physically separate unit, Med Surg Tele RNs are often very similar in experience to a Med Surg RN, but have specific additional knowledge on how to perform telemetry monitoring. This slight skill premium is interesting to note in the data as it is related to the care of Covid-19 patients and may explain the elevated Med Surg Tele wages.

Specialty-level Wage Sensitivity to Patient Demand for Services

The contingent labor market demonstrates distinct demand fluctuations by RN specialty. In any month during 2019, prior to the pandemic, median travel OR nurse wages ranged from 5 percent to 11 percent higher than ICU wages and 7 to 11 percent higher than All Other RN wages. In April 2020, travel OR nurse wages were 11 percent lower than ICU wages, but 2 percent higher than All Other RN wages. During 2020, as Covid-19 hospitalizations increased,

ICU nurse wages grew rapidly, eventually expanding the relative difference with OR wages to 29 percent in January 2021.

Figure 3. Travel Nurse Hourly Wage from 2019 to 2023 by Month (ICU, OR, and All Other)



The data shows an inverse relationship between the relative demand for ICU travel nurses and OR nurses. Common procedures such as hip and knee replacements, oncologic surgeries, and spinal surgeries require OR nurses. During the early part of the pandemic, hospitals shut down elective procedures that commonly leverage operating room nurses. Thus, the demand for OR travel nurses decreased significantly and did not produce wage elevations at the same rate as ICU. In 2022, after mass distribution of Covid-19 vaccines and improved clinical management protocols, the demand for OR nurses rebounded while ICU nurse wages fell both relative to OR and absolutely as hospitalizations declined (Figure 1). Specifically, CDC data indicates that 73.53 percent of the population received at least one dose of Covid-19 vaccine by January 1, 2022. Post-vaccination, patients and hospitals felt more comfortable receiving and offering surgical procedures requiring OR nurses. Surgical procedures are higher margin services, thus there is a strong preference among hospital executives to drive OR volume and the willingness to pay higher OR wages may be higher due to better profitability. In 2023, OR wages remain elevated above ICU indicating reduced patient demand for intensive care services and a return to the pre-pandemic relativity between OR and ICU wages.

Discussion

The results of the analysis demonstrate a correlation between Covid-19 hospitalizations and wages in the contingent labor market. This observation is explained via the assumption that, pre-pandemic, hospitals were staffed to maintain their current levels of patient demand with travel nurses only filling temporary staffing shortages or long-term supply shortages for certain facilities with a lower local supply of RNs, or they were generally understaffed. As Covid-19 led to patient demand for care from specific units (intensive care, step down units, medical surgical units), the hospital's existing staffing was insufficient, and therefore, hospitals required additional nurses in those specific specialties (Med Surg, Med Surg Tele, and ICU).

This paper builds on early Covid-19 travel nurse labor work by Gottlieb and Zenilman (2020) that demonstrates similar findings that, indeed, labor supply to the contingent staffing market is remarkably elastic⁵¹. The authors also perform a state-level analysis to further quantify the relationship between Covid-19 infection rates and travel nurse wages with the implication that future less isolated and more widespread outbreaks nationally would stretch the 2020 supply of travel nurses in the contingent labor market. Covid-19 did expand nationally and grow to much higher rates from the early hotspots included their analysis. Our findings support that this likely drove wages higher due to the elevated demand for travel nurses in every state. Those elevated wages may have helped increase the quantity of travel nurses available, nationally. Our data represents a larger measurement of the market given that it is sourced from a marketplace with greater than 100 participating staffing agencies and greater than 1.5 million job posting observations as opposed to a single firm. We also expand on the study's use of early 2020 data by examining a longer period of observation from 2019 to 2023 that encompasses additional waves of Covid-19, adding to the reliability of the observations and reinforcing the previous study's conclusions.

However, much of the trend in the contingent wage data is likely also due to factors affecting the full-time staff RN labor supply in addition to elevated demand. The magnitude of the wage growth rate during the periods outlined above (Figure 1) is affected by both the demand and supply dynamics but may also be impacted by additional exogenous factors. Factors affecting the availability of full-time staff RN supply as well as the disparity in wages between the full-time, hospital employed RNs and travel RNs will also be discussed in the following section.

Drivers of Staff and Travel Nurse Demand

Hospitals seek to maximize profit by maximizing revenue from patient services and minimizing costs. Nurse labor costs have been estimated to represent 25 percent to 30.1 percent of hospital operating costs⁵². The American Hospital Association (2022) reports⁵³ that the percent of total nurse labor expenditures on travel nurses rose from a median of 4.9 percent in 2019 to 38.6 percent in January 2022 resulting from both elevated bill rates (prices) and increased quantity. Pre-pandemic, hospitals were likely comfortable understaffing full-time nurses in favor of occasional temporary travel nurse utilization as the difference in cost was smaller in 2023 than during the pandemic period and may have generated a net total annual savings. However,

during the pandemic and now in 2023, that practice was and is likely too expensive due to the continued elevation of rates. The median wage for a travel Medical Surgical RN in July 2023 was \$64.06 compared to \$43.39 in 2019 (Table 3), while the BLS data shows that the median wage for a hospital employed RN in 2022 was \$39.05 compared to \$35.24 in 2019 (Table 1). This has produced a strong reaction in favor of full-time staff nurses among hospital human resources decision makers. But, given the continued wage disparities between the two markets and the aforementioned hospital workplace dissatisfaction among nurses, it is likely difficult for hospitals to obtain that additional full-time labor.

The demand for health care services, particularly hospital beds, appears to be a major driver of demand for travel nurses. During the pandemic, we illustrate above how Covid-19 incidence and hospitalization rates are likely correlated with demand for nursing labor (Figure 3). Additional analysis to quantify the relationship and control for other factors influencing travel nurse wages is merited. Covid-19 created significant, exponential increases in hospitalizations and deaths for certain units and therefore provided for patient services demand far in excess of normal operations in those units⁵⁴. Indeed, a 2020 study by Weinberger et al, demonstrated significant excess deaths during the early months of pandemic--a trend that likely continued with the subsequent waves of infection growth⁵⁵. In addition to the direct incidence of Covid-19, the impact of patient demand for surgical procedures also impacts demand for OR RNs. The backlog of surgical procedures delayed during the pandemic years has likely resulted in the continued elevation of wages for OR nurses in the contingent market^{56 57}. However, other factors aside from patient services demand likely contributed to the observed wage trends in the contingent RN labor market as well. Analyzing wages at the RN specialty level is important as hospital demand for a given specialty is variable over time (Figure 3).

Staffing ratio legislation and other regulatory requirements also impact demand for RN labor to meet minimum expectations. In the long run, an aging population coupled with a theorized increase in chronic disease prevalence due to delayed preventive care during the 2020 to 2022 will continue to contribute to increasing patient demand for hospital services into the future⁵⁸.

The Vicious Cycle Affecting RN Supply during the Pandemic

The quantity of full-time, staff labor supplied to a hospital affects theoretically the quantity of labor demanded from the contingent labor market. Driven directly by Covid-19, a vicious cycle likely factored into the observed trends from this analysis. There are four components to this cycle, outlined below.

First, nurses, both travel and full-time, were susceptible to Covid-19 illness during the periods of high community spread and likely too sick leave from work to prevent spreading the disease to patients and to care for their own conditions⁵⁹. This absenteeism likely reduced the availability of both actively working travel and staff nurses at any given time in a facility and likely led to further increased demand for nurses from within the contingent RN labor market.

Second, there is evidence to suggest that full-time, staff nurses chose to reduce hours or quit during the pandemic for a number of reasons. This reduced labor force participation rate⁶⁰ among full-time nurses during the pandemic occurred⁶¹ due to the following reasons: safety related to infection risk (e.g., nurses with preexisting conditions), well-documented burnout from overwork⁶², moral injury⁶³ from unsafe staffing and facility policies, increased violence toward healthcare workers⁶⁴, and childcare issues associated with virtual school⁶⁵. The trends in burnout existed prior to the pandemic and evidence suggests burnout was exacerbated⁶⁶.

Third, there is evidence that the pay rates in the contingent labor market may have pulled full-time RNs from their staff roles⁶⁷. This third trend kept the nurses at the bedside as travel nurses, but it fueled the demand for travel nurses through a positive feedback cycle (e.g., as one nurse leaves a full-time job, the facility is forced to fill that role with a travel nurse). Each time that cycle occurs and at scale, it theoretically leads to an increase in demand and wages for travel nurses. This represents an increase in the relative proportion of Type B nurses, outlined above. Neoclassical labor economic theory suggests each individual nurse has a wage at which they would choose to leave their standard full-time employment. Specifically, this is a wage at which the marginal utility gained from leaving the stability of their staff role in favor of the elevated wage is higher than the marginal utility of staying.

Fourth, related to the third effect, new graduate nurses who are often locked into employment via signing bonuses and other incentives at their first bedside staff role were likely pulled into the travel nurse market early in the pandemic due to the waiver of the “2 years of experience” standard. Younger nurses are more likely to desire travel roles and thus this rule waiver coupled with the elevated wages likely reduced the availability of new graduates for staff roles and facilitated the vicious cycle outlined above⁶⁸. The degree to which this occurred is unknown.

While Covid-19 is at lower reported levels in 2023 than 2022, it is still contributing to elevated hospital utilization⁶⁹. This is likely resulting in continued elevation in travel nurse wages. However, the continued elevation of the travel nurse wages above 2019 rates in 2023 may also be an indicator or measurement of the full-time RN labor force dropout and exodus from the hospital bedside. In the absence of Covid-19, many hospitals may not have recovered full-time staff to pre-pandemic levels in order to reduce contingent labor demand and near 2019 wage levels. In addition, Type B nurses may have remained as participants in the contingent labor market and not yet returned to their full-time status due to the advantages.

Drivers and Inhibitors of Staff and Travel RN Supply

The supply of nurses in the country is a commonly discussed topic given the national importance of the workforce. It is well established that minimum patient-to-nurse staffing ratios produce safer, better, and more cost-effective patient services⁷⁰. Factors in both labor markets affect the ability of hospitals to maintain both mandated and self-determined staffing ratios for particular care units. The quantity of RN labor supplied to hospitals in the full-time, staff market affects the demand for RNs in the contingent labor market. As demand increases, so does wage, which presumably increases the quantity of RN labor supplied in the contingent market.

As hospitals prefer to select for the lowest cost labor, this relationship is important to outline when discussing factors affecting the supply of RN labor in both markets.

The Health Resources and Services Administration (HRSA) is the primary US government agency responsible for health workforce policy. HRSA manages and updates state-by-state projection models of demand and supply of nurses⁷¹. There is a colloquial belief that there is a shortage of nurses and projection models produced by the HRSA report project increased shortages through 2025 with alleviation expected by 2035. The HRSA report also indicates that the perceived shortage is more likely a geographic distribution issue caused by uneven levels of resident RNs in certain communities due to migration trends, regional desirability, and lack of nursing educational resources. Certain geographic areas have a larger disparity between RN demand and supply. This, coupled with the trends related to retention and nurse labor force participation rates could help explain the effects observed during the pandemic and the importance of understanding the national, contingent labor market, which serves to alleviate some of the gaps. Analyzing the travel nurse market at the national level does not provide the opportunity to observe the local, state, and regional effects that are likely driving continued demand and supply imbalance. The contingent labor market appears to effectively serve these supply imbalances via more competitive market forces than within the full-time nurse labor market.

Thus, the supply of nurse labor in the full-time, local nurse market also impacts the supply of and demand for travel nurses in the contingent labor market. Declining “clinical” labor force participation rates and local retention issues among full-time staff RNs can increase the demand for travel nurses and as mentioned, in some cases, increase the quantity of RN labor supplied at the higher wage level. Due to the increased wages, the RNs who choose to work in the contingent labor market may be more resilient to the same undesirable workplace environment that drives full-time staff to drop out.

Control over schedules and increased flexibility also impact the supply of nurses in the travel nurse market⁷². While these attributes are attractive to nurses who enter the contingent market for nurse labor, they also likely reduce the quantity of labor hours supplied. Nurses who both make higher wages and accept temporary assignments in the contingent market often take additional vacations between assignments⁷³.

Alternative employment opportunities also impact the supply of nurse labor to hospitals in both the full-time and contingent markets. The pursuit of alternative non-nursing employment by RNs is well-understood, but there is evidence that it may have been accelerated during the Covid-19 pandemic years⁷⁴. Nurses have been and still are primarily employed by acute and post-acute care facilities at the clinical bedside. Common alternatives to the hospital bedside have been school nursing, nurse manager, hospital administration, nurse educator, and outpatient clinic roles. The growth of non-bedside, office-clinical jobs for RNs has also increased within health insurance and pharmaceutical industries⁷⁵. Managed care firms in both the Medicare and Medicaid insurance markets have grown significantly over the past two decades with both clinical and administrative roles well-suited for nurses^{76 77}.

During the Covid-19 pandemic, telemedicine and telenursing programs grew rapidly, and, coupled with the growth of office-clinical jobs has created an environment in which nurses have choices in light of undesirable workplaces. Telenursing and telemedicine grew significantly during the pandemic years and has sustained elevated utilization^{78 79}. Nurses are often core clinicians in these clinical models providing telephonic triage, chronic care management, annual wellness visits, health coaching, diabetes education, and other remote care services⁸⁰. Early research on nurse perceptions toward telehealth and telenursing models indicates good acceptance and interest^{81 82}. Many of these new opportunities require a large volume of nurse labor and often provide work-from-home opportunities and a standard 9 to 5 Monday through Friday schedule. Indeed, eight percent of nurses with an interstate license in 2022 report using it for telehealth purposes, a substantial proportion⁸³.

We hypothesize that the growth of remote work in non-nursing professions may have contributed to additional reductions in bedside labor supply given the preference for remote work among the general population⁸⁴. In short, nurses may observe other professions working from home and desire to do so as well, thus causing further attrition from the unpleasant acute care bedside workplace to either non-clinical remote jobs (e.g., administration, consulting) or telehealth/telenursing roles. The theory of social comparison supports the idea that nurses may observe other professionals' desirable job attributes and seek to obtain the same attributes for themselves⁸⁵. In the era of social media, the observability of work-from-home roles and the awareness of non-bedside opportunities for nurses has increased drastically⁸⁶.

It is well understood that new nurses, generally, and new Generation Z nurses leave their first nursing jobs at high rates. The transition from nursing school to practice can be stressful and challenging with turnover rates estimated in the range of 35 - 60 percent⁸⁷. New generations of nurses have different workplace preferences and needs⁸⁸. Thus, the Covid-19 pandemic, which exacerbated existing stressors, likely increased turnover, and decreased labor force participation rates among the new nurse population, in addition to the experienced nurses, generally.

The 2022 Nursing Workforce survey also indicates that nurses, as a profession, did make more money in 2022 compared to previous years⁸⁹. The percentage of all US RNs making over \$100,000 annually increased from 20.5 percent to 28.7 percent in 2022. This shift to higher annual income distribution, likely driven by an increased proportion of RNs accepting jobs in the contingent market, may have reduced the quantity of labor supplied during certain periods of the pandemic era (2020 to 2023) as nurses in the contingent labor market took more time off between time limited contingent jobs (an income effect). Anecdotal evidence supports this assertion as does previously cited nurse surveys that cite time off flexibility as attractive to travel nurses⁹⁰.

The retirement, disabling, or death of RNs during the pandemic may have also increased during the pandemic years^{91 92}. Indeed, evidence suggests that many nurses were planning to retire based on the Nursing Workforce Survey in 2022 with 22.1 percent and 28.7 percent planning to

retire within 5 years in 2020 and 2022, respectively⁹³. Retirements could also have been accelerated during Covid-19 due to increases in stock and housing wealth. Some evidence suggests that burn out and Covid-19 related fatigue may have accelerated retirement plans as well⁹⁴. As most travel nurses are younger, this would have increased demand for travel nurses due to a loss of labor in the full-time staff market.

Connecting the Data to Neoclassical Labor Economic Theory

Staff workers who otherwise planned to remain a full-time nurse likely became readily aware of the significant earnings opportunity in the travel nurse market versus the full-time local nurse market⁹⁵. The opportunity cost of remaining in the stable staff role may have driven many nurses to enter the travel nurse market when they otherwise would not. The anecdotal exodus from the full-time local nursing market can also be explained by the flexibility and schedule control provided by the travel nurse market. This allows for both an increase in wages and control and therefore the ability to increase the quantity of leisure time. For example, a full-time staff nurse may receive 15 days of paid time off annually and make \$40 per hour on average. Whereas during the peak of the pandemic, certain specialties of travel nurses could yield greater than \$90 per hour and schedule 13-week assignments at that rate. Assuming 2,080 working hours in a year, the staff nurse yields an annual equivalent salary of \$83,200 with 15 days of paid time off for leisure activities. A travel nurse could yield a full-time equivalent salary of \$208,000 assuming the worker works the entire 2,080 hours in the year. If the nurse desired to work half the number of hours the annual equivalent salary of the nurse would be \$104,000 from 1,040 hours with an additional 1,040 hours available for leisure activities. Jobs in the contingent market appeal to RNs that are seeking a higher degree of schedule flexibility and control over their lives compared to staff roles with rigid and inflexible scheduling. The theory does suggest, however, that as wages increased in the contingent market, the opportunity cost of leisure increased and may have prompted RNs to supply a larger quantity of labor to hospitals through the contingent market. This effect could explain some portion of the dynamic swings in the travel RN wages as nurses who made money at the top of the curve (income effect) may have reduced their working hours in favor of leisure time after a Covid-19 wave and then the subsequent reduction in the quantity of labor supplied coupled with the next wave produced the rapid increase in wages to satisfy the demand.

Other Factors Affecting Exponential Wage Growth in the Contingent Labor Market

The periods of exponential growth in wages correspond temporally with the periods of exponential growth of Covid-19 hospitalizations. There are likely other factors that affect the magnitude of the exponential growth observations. These factors can be grouped into the following categories: staffing agency/MSP factors, government and health care reimbursement factors, and RN labor factors.

Staffing agencies and MSPs have an incentive to maximize bill rates to hospitals. By convincing hospitals that the competitive market for RN labor requires a higher pay rate, agencies and MSPs can also increase revenue per nurse hour. There have been anecdotal reports and

lawsuits suggesting price gouging practices in the contingent labor market by staffing agencies and MSPs⁹⁶. Organizations in the contingent labor market are primarily private companies that seek to maximize profit, thus there were incentives to increase wages and bill rates to facilities to drive volume, revenue growth, and margin expansion. Both factors could have contributed to the exponential growth of travel nurse wages during the pandemic over and above the effects of Covid-19. Given the lack of market wage data available to staffing firms outside of their own internal data and that there is no existing national market wage (illustrated by the variance in Table 2, in contrast to commodity markets), it is difficult to prove that these firms inflated wages beyond the supply and demand determined wages to obtain nurses at the quantity and speed at which their hospital customers requested⁹⁷.

Both state and federal governments specifically allocated funds to support additional staffing needs and general operations at hospital facilities during the Public Health Emergency period via the Federal Emergency Management Agency (FEMA). The Coronavirus Aid, Relief, and Economic Security (CARES) Act provided billions of dollars in funding to support health care services and facilities. Medicare provided increased payments for hospital inpatient services via Medicare Part A for New Covid-19 Treatments and supported Accelerated and Advanced payments to facilities as they lost services revenue from non-Covid-19 patients^{98 99}. This program provided a significant influx of cash to facilities in the form of loans from Medicare Parts A and B. Medicare also increased reimbursement rates to hospitals for patients admitted for Covid-19 by 20 percent¹⁰⁰. These policy changes, essentially subsidies, likely also contributed to the exponential increase in travel nurse wages by increasing hospital facilities' ability and willingness to pay and compete for RN labor, nationally. States, hospital facilities, and health care providers were in a "bidding war" for RN labor across the country.

In addition to being in limited supply, travel RNs had significantly more information available to them than the staffing agencies, MSPs, or hospitals. The growth of digital marketplaces and digital advertising has provided nurses with advertised pay details for each job from the vast majority of agencies and MSPs, whereas the staffing firms and hospitals rely on their own internal data and word of mouth. This information asymmetry allowed nurses, via these online marketplaces (e.g., Wanderly, Vivian Health, Incredible Health), to seek out only the highest paying jobs. During wage negotiations with staffing agencies, RNs presumably had more information about market rates in any given geography than did the employers. We hypothesize that this was an additional driver of the exponential growth rate of wages. A nurse with close to perfect information about their market rate at any given time has the upper hand in a market with extreme demand for nurse labor. Nurse staffing agencies are very unsophisticated in their pricing practices given the lack of market information outside of their own biased internal data, and, prior to Covid-19, had very little experience in such a dynamic wage environment¹⁰¹. Given the critical need, nurses may have been able to negotiate higher wages on par with other advertised positions and had those negotiations accepted by agencies after consultation with their hospital clients.

The Disparity in Growth Rates between the Full-Time, Local and Contingent Market

Table 1 and Table 2 show differences between the wage growth by year between the full-time, local, and contingent labor markets for RN labor. First, these two markets exhibit distinct behavior given the same demand shock. The difference in growth rates between the Other RN category from 2020 to 2021 was 27 percent (Table 2) compared to 3 percent in the BLS data (Table 1). This is, perhaps, further indication of monopsony in the hospital market where the full-time local market is marked by classical monopsony characteristics and the contingent market is far more competitive in nature.

Limitations

It is important to note that there are some limitations to the Wanderly data. First, the wages in this analysis are advertised wages not actual wages paid. The wages paid to nurses that accepted a job with the agencies advertising on Wanderly may differ from the advertised wages. It is Wanderly's policy to enforce accurate advertisements on the marketplace platform, so there is reason to believe that the actual wages paid to the nurse should not differ significantly. The use of advertised wages does provide the advantage of measuring the wage at which a nurse decided to engage with a particular job or staffing agency. Thus, when discussing the interplay between the full-time and contingent markets, this may be advantageous as these are the rates that would attract labor into the contingent market. These advertised jobs are also posted at pay rates which the staffing agency believes will maximize the probability of hiring a nurse for the role. The CDC data for Covid-19 has some well understood limitations^{102 103}.

Additionally, the purpose of this paper is to be descriptive and theoretical. Many of the relationships discussed in this study are observational in nature and supported by other empirical evidence or theory. We do not intend to imply causality in this paper. Further research is needed to confirm and quantify many of the relationships discussed in this paper while accounting for some of the other factors discussed in this paper.

Conclusions

In summary, the full-time, local market likely saw labor supply shrink whereas the travel nurse market saw nursing labor supply increase given the elevated wages and other job benefits. The net impact on total RN labor availability is hard to measure with the Type C nurses creating a potential inflow of nurses to the system. Some evidence suggests that RN employment is at its highest level as of 2022¹⁰⁴. This piece of evidence corresponds with the peak of wages in the contingent labor market (January 2022). The degree to which the wages in the contingent market pulled these previously non-participant nurses back into the total RN labor force is unknown. Interestingly, travel nurse wages may increase the resiliency of nurses to the workplace burnout, moral injury, and other drivers of bedside dropout. Essentially, particularly for Type B nurses, if a nurse is going to work in the same stressful, high-pressure, high-risk work environment, they are more likely to do so for a higher wage and their tolerance of

negative workplace factors may increase. From a societal benefit perspective, during a time in which nurse labor is essential for a given patient demand, it is hypothetically preferable for a staff nurse who chooses to leave full-time employment to take a job from the contingent market than to cease providing their services entirely. The contingent market's competitive elements that drove wages up may have produced the market forces and wage signals necessary to allow the labor market to self-correct to a given demand. Notwithstanding the hospital financing challenges associated with rapidly elevated wages, this dual labor market, despite the bad press, may have ensured the maximum labor supply possible during this critical time. Additional research is called for to confirm some of the assumptions and early evidence discussed in this paper.

In addition to characterizing the contingent labor market during Covid-19, theorizing the relationship between these dual markets, and introducing a novel data source for research; this analysis is the first, to our knowledge, to characterize the contingent staffing market during Covid-19 at this scale. This paper demonstrates that there is definable wage variation between RN specialties indicating a sensitivity to patient services demand in hospitals at the unit level. Nurse scope of practice is non-specifically regulated by states, so while we often group RNs into a single group for analysis, there is non-uniform demand for specialty sub-groups (e.g., operating room vs. intensive care unit nurses). Academic and government analysis of the nurse workforce is most commonly performed at the RN license-level, whereas it may be more useful and accurate to analyze trends at the specialty sub-group level. This is difficult to perform given limitations in the employment data sources commonly used and the often-ambiguous nature and non-standardized nomenclature associated with RN specialization.

¹ Bureau of Labor Statistics, U.S. Department of Labor. Occupational Employment and Wage Statistics. 2022. <https://www.bls.gov/oes/current/oes291141.htm>

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⁴ Longyear, Robert, Boxer, R., & Kelley, J. (2023). Travel ICU Nurse Concerns Across Covid-19 Hot Spots. *NEJM Catalyst*, 1(5). <https://doi.org/10.1056/CAT.20.0504>

⁵ Gottlieb, J. D., & Zenilman, A. (2020.). *When Workers Travel: Nursing Supply During COVID-19 Surges*. NBER Working Paper 28240. National Bureau of Economic Research. DOI 10.3386/w28240

⁶ Ibid. 4.

⁷ Centers for Disease Control and Prevention. COVID Data Tracker. Atlanta, GA: U.S. Department of Health and Human Services, CDC. (2023). October 06. <https://covid.cdc.gov/covid-data-tracker>. Accessed October 6, 2023.

⁸ Driscoll, A., Grant, M. J., Carroll, D., Dalton, S., Deaton, C., Jones, I., Lehwaldt, D., McKee, G., Munyombwe, T., & Astin, F. (2018). The effect of nurse-to-patient ratios on nurse-sensitive patient outcomes in acute specialist units: a systematic review and meta-analysis. *European journal of cardiovascular nursing*, 17(1), 6–22. <https://doi.org/10.1177/1474515117721561>

⁹ Lasater KB, Aiken LH, Sloane D, *et al.* (2021). Patient outcomes and cost savings associated with hospital safe nurse staffing legislation: an observational study *BMJ Open*;11:e052899. doi: 10.1136/bmjopen-2021-052899

¹⁰ There is disagreement about the optimal staffing ratio for RNs to patients across various units, but it is fair to say that hospitals, by and large, do not have incentives to staff at lower patient to RN ratios. This is the role of staffing ratio legislation at the state level.

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