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Analyzing Forces Impacting Hospital-Based Registered Nurse Workforce in the United States (2020–2025)

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Abstract

The COVID-19 pandemic upended the hospital-based nursing workforce in the United States, exacerbating longstanding shortages and triggering unprecedented challenges. This paper analyzes the state of the U.S. hospital registered nurse (RN) workforce from 2020 through 2025 using a PESTLE framework, examining Political, Economic, Sociocultural, Technological, Legal, and Environmental factors. We synthesize current peer-reviewed studies, policy reports, and workforce projections to assess how macro-environmental changes have affected RN supply, demand, and hospital work conditions. Politically, the period saw intensified policy focus on nurse staffing, emergency regulatory waivers, and debates over mandates and immigration barriers. Economically, hospitals faced acute nurse shortages, soaring turnover costs, and heavy reliance on expensive contract labor. However, recent forecasts suggest the overall RN supply has rebounded near pre-pandemic growth trajectories (Auerback et al, 2024). The pandemic fueled widespread burnout, early retirements, and an unsafe work environment, with surveys indicating up to one in three hospital RNs contemplated leaving their roles (Berlin et al, 2023). Technological factors such as telehealth expansion and digital health innovations have reshaped nursing practice, offering relief and new complexities. Legally, states and federal policymakers proposed staffing ratio laws, expanded multistate licensure compacts, and grappled with workforce regulations amid public health emergencies. Environmental forces – most notably the COVID-19 crisis – placed extreme strain on nurses, prompting lasting changes in infection control and disaster preparedness protocols. This comprehensive analysis illustrates that the post-2020 nursing workforce landscape is at a crossroads: systemic stressors threaten the sustainability of the hospital RN workforce and thus the quality of patient care. The paper concludes with data-driven strategies to bolster nurse supply and retention, including policy reforms, educational investments, workplace improvements, and innovation adoption, to ensure a resilient nursing workforce capable of delivering safe, high-quality care in the coming decade.

Introduction

Hospital-based registered nurses (RNs) are the backbone of the U.S. healthcare system, delivering round-the-clock care and coordinating complex treatments in an increasingly challenging clinical environment. By 2020, over 3 million RNs were employed in the United States; roughly 60% worked in hospital settings (Auerbach et al., 2024). Even before 2020, concerns loomed about nursing shortages due to an aging workforce and rising care demands (American Nurses Association, 2025). The onset of the COVID-19 pandemic in early 2020 abruptly intensified these challenges, as hospitals faced surging patient loads, severe workplace hazards, and a wave of nurse burnout and attrition. In 2021, the RN workforce experienced its most significant single-year decline in four decades—a drop of approximately 100,000 RNs (Auerbach et al., 2024), raising alarms about the capacity of hospitals to maintain safe staffing and quality of care.

The RN workforce had grown steadily until a sharp dip in 2021 during the pandemic, then rebounded by 2023 to exceed pre-pandemic levels (Auerbach et al., 2024). By 2022–2023, the total number of employed RNs (measured in full-time equivalents) had recovered to about 3.35 million—roughly 6% higher than 2019's level (Auerbach et al., 2024). However, this overall recovery masks critical shifts in the hospital-based RN cohort: many senior nurses left hospital roles, younger nurses and those in non-hospital settings grew in number, and hospitals continued to report staffing shortfalls despite aggregate supply growth (Martin et al., 2023). These dynamics underscore that, beyond raw numbers, a complex interplay of external factors is reshaping who is at the bedside and under what conditions. To chart a sustainable path forward, it is crucial to disentangle these macro-environmental influences and their impact on the hospital RN workforce.

This paper employs the PESTLE framework—examining Political, Economic, Sociocultural, Technological, Legal, and Environmental dimensions—to systematically analyze the state of hospital-based RNs in the U.S. between 2020 and 2025. Each section below explores how factors in that domain affected RN workforce supply, demand, and practice in hospitals post-2020. We integrate evidence from current academic studies, workforce projections, and policy analyses to provide a comprehensive picture. Finally, we discuss implications for workforce sustainability and patient care quality, offering data-driven strategies to strengthen and stabilize the hospital RN workforce after the COVID-19 crisis.

Political Factors Affecting the Hospital RN Workforce (2020–2025)

Between 2020 and 2025, political attention to the nursing workforce intensified as policymakers grappled with the pandemic's fallout. Government funding and emergency measures played a significant role in supporting hospitals and nurses during COVID-19 surges. Federal relief legislation—such as the CARES Act of 2020 and the American Rescue Plan of 2021—provided billions in aid to hospitals, with portions allocated to staffing costs, surge capacity, and nurse retention incentives (American Hospital Association 2023). The U.S. Department of Health and Human Services (HHS) issued regulatory waivers under the Public Health Emergency that expanded nurses' ability to practice across state lines and allowed quicker onboarding of new graduates and retirees. Many states activated interstate cooperation, including using the National Guard and interstate emergency licensing compacts, to alleviate acute staffing shortfalls in hard-hit hospitals (NCSBN 2023).

At the policy level, safe staffing legislation became a prominent issue. Nurses' unions and professional associations strongly advocated for enforceable nurse-to-patient ratio laws to solve chronic understaffing exacerbated by COVID-19. The "Nurse Staffing Standards for Hospital Patient Safety and Quality Care Act" (e.g., S.1113 in the 118th Congress) was introduced to mandate minimum RN-to-patient ratios nationwide (U.S. Congress 2023). Although this federal bill has not passed since 2025, it reflects growing political momentum around staffing regulation. Several states took independent action: California's mandated ratios, in place since earlier decades, provided a model; New York instituted new staffing requirements in 2021–2022, including a 1:2 ICU nurse ratio and staffing committees for other units (New York State Nurses Association 2022). Oregon followed suit in 2023 with legislation establishing tighter hospital nurse staffing standards (Oregon State Legislature 2023). The American Nurses Association (ANA) and other bodies publicly urged lawmakers to implement staffing solutions, citing extensive evidence linking inadequate staffing to poor patient outcomes (ANA, 2025). This political discourse frequently pitted frontline nurses advocating for mandated ratios against hospital associations warning that rigid requirements might prove impractical amid staffing shortages. Nonetheless, safe staffing became a nationally salient priority in post-pandemic healthcare reform.

Another critical political factor is immigration and international nurse recruitment policy. Foreign-educated RNs have long supplemented U.S. hospital staffing, comprising approximately one-sixth of the RN workforce as of 2022 (Pillai, Rae, and Artiga 2024). During the pandemic and its aftermath, recruitment of internationally educated nurses intensified—32% of hospitals (representing 45% of all hospital beds) reported hiring foreign-trained RNs in 2022, double the 2010 share (Pillai, Rae, and Artiga 2024). However, federal administrative decisions in 2023–2024 significantly curtailed the inflow of international nurses. In April 2023, the U.S. government effectively paused new visa processing for foreign nurses, leading to a backlog such that mid-2024 only 2021 applicants were being reviewed (Pillai, Rae, and Artiga 2024). This visa freeze, driven by broader immigration debates, threatens to exacerbate nurse shortages by closing a reliable workforce pipeline. Legislative proposals to expand employment-based visas for nurses have stalled amid partisan divisions (Pillai, Rae, and Artiga 2024). Hence, immigration policy continues to wield tangible influence on hospital staffing: facilitative policies can relieve shortages, while restrictive ones risk deepening labor gaps.

Political dynamics also shaped public recognition of nurses' contributions. Early in the pandemic, nurses were widely praised—2020 was named the International Year of the Nurse—and celebrated as frontline heroes. This translated into some supportive policies. For example, several states earmarked funds for healthcare worker bonuses and mental health programs in 2022–2023 to reward and retain exhausted staff (ANA, 2025). At the federal level, the passage of the Dr. Lorna Breen Health Care Provider Protection Act in 2022 reflected political acknowledgment of widespread clinician burnout. However, politics also introduced stressors: the COVID-19 vaccine mandate for healthcare workers, implemented by the Centers for Medicare & Medicaid Services (CMS) in late 2021, became a flashpoint. While most hospital RNs complied, a minority resisted, leading to protests and resignations. Some state leaders challenged the federal directive, creating a politically charged atmosphere in hospital systems. As the Public Health Emergency expired in mid-2023, CMS rescinded the mandate, easing political tensions but leaving behind effects on staff morale and public trust (CMS, 2023).

Political factors were deeply entwined with the U.S. nursing workforce from 2020 to 2025. Emergency government actions provided essential relief, while longer-term debates around staffing ratios and immigration policy shaped the structural landscape of hospital employment. Continued political engagement will be required to solidify gains and enact durable reforms through educational funding, regulatory modernization, or workforce support legislation. The political will galvanized by the COVID-19 crisis offers a rare opportunity to build a more resilient and equitably staffed healthcare system.

Economic Factors and Workforce Modeling

The economics of the hospital RN workforce between 2020 and 2025 were characterized by extreme volatility in supply and demand, with significant implications for hospital finances and workforce planning. Demand for hospital nurses skyrocketed during COVID-19 surges, as critically ill patient loads spiked and acuity levels increased. By late 2020 and into 2021, many hospitals operated near capacity, creating an urgent need for additional RNs to staff expanded ICUs and COVID units. Simultaneously, burnout and safety concerns prompted many nurses to leave the bedside, producing a mismatch that pushed the labor market into acute shortage. The result was classic supply-demand pressure: hospitals competed intensely for a limited pool of nurses, bidding up wages and offering lucrative incentives to attract staff. A striking outcome was the rise of the travel nursing market. Average travel RN wages nearly doubled,

increasing by over 99% between January 2020 and December 2021 (Wright, 2022). By late 2021, travel nurses earned upwards of $3,000–$4,000 per week and could command annual pay exceeding $150,000–$200,000 in high-demand assignments (Tapp, 2021; Incredible Health, 2022).

This surge in contract labor came at a high cost to hospitals. Historically, only a small fraction of nursing labor expenses went to agency nurses; in 2019, the median hospital spent just 4.7% of its nurse labor budget on contract RNs (American Hospital Association 2023). By January 2022, however, that figure had exploded to 38.6%, despite contract nurses accounting for only 23% of total RN hours (American Hospital Association 2023). AHA's financial analysis reported that each travel nurse costs hospitals approximately $300 more per shift than a staff nurse and replacing just 20 contract nurses with permanent hires could yield annual savings of over $4.2 million (ShiftMed, 2023; Becker's Hospital Review, 2022a). These economics placed hospital CFOs in a difficult position—labor was essential for safe care, yet its cost structure had become unsustainable. Hospital labor costs rose by 6.5% in FY2022, outpacing the 2.4% increase in Medicare reimbursement and contributing to systemwide operating losses (American Hospital Association 2023).

Even for staff RNs, wages and bonuses rose, though not as dramatically as for travelers. Many hospitals provided emergency overtime pay, hero bonuses, and tuition repayment to retain staff. Despite these measures, turnover among hospital RNs reached a historic high of 27.1% in 2021, up from 18.7% the prior year (Becker's Hospital Review 2022a). The average cost of RN turnover was estimated at $46,100 per nurse, factoring in recruitment, onboarding, and lost productivity. Each 1% increase in RN turnover translates into approximately $262,000 in additional costs for an average hospital (NSI Nursing Solutions 2022). Over 60% of hospitals reported RN vacancy rates exceeding 15% during 2021, with the average time to fill a position reaching 87 days—a delay that exacerbated nurse fatigue and further churn (Becker's Hospital Review 2022a).

By 2022, some of the economic stressors began to ease. As COVID hospitalizations fell and more nurses returned, the demand-supply gap narrowed. RN turnover decreased to around 22% nationally by late 2022 (McKinsey & Company, 2023). Travel nurse pay, which had peaked in late 2021, declined by approximately 15% in 2022 and another 11% in 2023, leveling at $2,600–$3,100 per week depending on geography and specialty (TheraEx Staffing, 2023; Vivian Health, 2023). Hospitals eagerly scaled back agency staffing in favor of permanent hires. By 2024, RN turnover had dropped to approximately 16.4%, much closer to pre-pandemic norms (NSI Nursing Solutions 2023). This recovery likely reflects calming pandemic pressures and hospitals' efforts to improve pay and work environments, rather than fully resolving systemic challenges.

Workforce analysts and policymakers turned to economic modeling and forecasting to understand long-term trends during this period. In late 2022, the Health Resources and Services Administration (HRSA) projected a national shortage of 78,600 RNs in 2025, with a projected shortfall of 63,000 by 2030, particularly in Western and Southern states. HRSA estimated that Washington could be 26% below demand by 2035 without intervention (HRSA 2022). These forecasts assumed stable graduation rates and retirements, but HRSA acknowledged potential underestimation of the pandemic's impact due to data lags.

Updated modeling by Auerbach et al. (2024), which incorporated 2020–2023 data, painted a more optimistic picture. Their analysis indicated that the RN workforce rebounded strongly in 2022–2023 and is on track with pre-pandemic growth projections. The U.S. RN workforce is expected to grow from 3.3 million full-time equivalents in 2023 to 4.56 million by 2035 (Auerbach et al., 2024). However, this growth is expected to be uneven. While younger nurses (<35) have re-entered the workforce in large numbers, hospitals are still struggling to retain experienced mid-career and senior nurses. Moreover, specific geographic areas—including rural regions and West Coast states—are projected to remain in persistent shortage, even if national numbers stabilize (HRSA 2022).

In summary, the economic dynamics of 2020–2025 revealed both the vulnerability and resilience of the hospital RN workforce. The pandemic triggered a demand shock and supply retreat, creating soaring costs, elevated turnover, and difficult trade-offs for hospital leaders. While the labor market is stabilizing, sustaining a healthy nurse supply requires long-term investment in training, retention, and more innovative workforce planning. Hospitals must proactively manage compensation strategies, minimize overreliance on agency labor, and build slack into staffing models to prepare for future surges. These lessons offer a roadmap for strengthening workforce resilience and fiscal sustainability across health systems.

Sociocultural Factors and Workforce Attitudes

Sociocultural forces have profoundly influenced the hospital RN workforce during 2020–2025, as the pandemic altered how nurses perceive their profession, work-life balance, and societal support. One major factor is the demographic composition of the nursing workforce and associated career stages. Before the pandemic, the RN workforce was aging: the median age of U.S. registered nurses was approximately 52 in 2020, and more than one-fifth of RNs reported intentions to retire within five years (American Nurses Association, 2025). This anticipated wave of retirements, primarily among baby boomer nurses, was expected to thin the hospital workforce in the mid-2020s gradually. COVID-19 dramatically accelerated this timeline. Confronted by elevated health risks and exhausting conditions, many older nurses retired early or left acute care settings altogether. Surveys conducted in 2022 revealed that approximately 100,000 RNs exited the workforce during the first two years of the pandemic due to stress, burnout, and early retirements, resulting in a net 3.3% workforce decline (National Council of State Boards of Nursing [NCSBN] 2023a). Importantly, mid-career nurses with fewer than 10 years of experience, often aged 35–49, reported the highest burnout levels and accounted for a significant share of departures (NCSBN 2023a). These trends were mirrored in employment data: from 2019 to 2022, hospital employment for RNs over 40 dropped nearly 5%, while the number of younger nurses under 40 grew by over 9% (Auerbach et al., 2024). The net result is a generational turnover in hospital staffing—early-career nurses now make up a larger share of bedside staff, often without the mentorship historically provided by more experienced colleagues.

The pandemic also catalyzed what some have termed a "Great Resignation" or reevaluation among healthcare workers. Like much of the American workforce, nurses reconsidered job satisfaction, career goals, and personal priorities amid the crisis. Burnout, a long-endemic in nursing, has reached alarming levels. National surveys from 2021–2022 found that 45% of nurses reported feeling burned out and more than half experienced emotional exhaustion weekly or daily during the pandemic's peak (NCSBN 2023a). Hospital RNs showed particularly high intent-to-leave rates. A McKinsey & Company survey in early 2022 found that 31% of nurses were considering leaving their current patient care role within a year, up from 22% the year prior; by March 2023, this figure exceeded 40% among inpatient hospital nurses (McKinsey & Company, 2023). These numbers do not reflect actual resignations but indicate widespread dissatisfaction and turnover risk. Key drivers were sociocultural: a sense of being undervalued, chronic understaffing, and moral distress from being unable to provide high-quality care under strained conditions. The initial public adulation of nurses in 2020, lauded as heroes, faded by 2021, and in some communities, nurses faced hostility over public health policies such as mask mandates or vaccine requirements. These emotional burdens manifested in increased sick leave, mental health strain, and career exits.

Workplace safety also emerged as a primary sociocultural concern. Hospitals reported rising incidents of violence against staff, often by distressed or unstable patients and families. According to a Press Ganey analysis, two nurses were assaulted every hour in U.S. hospitals in 2022 (American Hospital Association 2023a). Emergency departments were frequent hotspots, but aggression also rose in general medical units and ICUs, particularly where visitor restrictions or heightened anxieties were in place. Two-thirds of emergency physicians reported being physically assaulted in 2022, with nurses similarly at risk (American Hospital Association 2023a). Nurses described fearing for their safety, noting that high stress and short staffing increased patient agitation and reduced staff response capacity (American Hospital Association 2023a). For some, the perceived danger contributed to decisions to leave bedside roles. Hospitals have responded by enhancing security protocols and training, but the persistence of workplace violence remains a critical factor eroding morale and retention.

Changing career expectations and values among younger nurses also shaped workforce dynamics. The entry of Generation Z and younger millennials into the workforce brought new priorities—particularly around work-life balance, psychological safety, and career development. Many in this cohort are unwilling to tolerate excessive overtime, unsafe conditions, or inadequate support, even if it means leaving a job or the profession entirely. Surveys show younger nurses prioritize employers that invest in their growth and well-being. These needs are more likely to pursue travel nursing roles, transition to outpatient or administrative settings, or leave healthcare altogether if unmet. According to NCSBN estimates, approximately 188,000 RNs under age 40 indicated they plan to leave the workforce by 2027 due to burnout and stress (NCSBN 2023a). While some of these exits may be temporary, the signal is clear: younger nurses are less likely to endure adverse working conditions passively. The traditional "vocation" nursing model—based on duty and altruism—is replaced by a career-oriented mindset emphasizing reciprocity, flexibility, and self-care.

Public perception of nursing also evolved during this period. In early 2020, the profession enjoyed broad public applause, "Thank a Nurse" campaigns, and top rankings in public trust surveys. However, as the pandemic dragged on, a subset of the public became skeptical of healthcare mandates and clashed with frontline providers. The politicization of public health occasionally placed nurses in adversarial roles, undermining the social contract between clinicians and communities. Still, nursing's visibility inspired many to pursue the profession: applications surged in some regions. Ironically, nursing schools were forced to turn away tens of thousands of qualified applicants due to faculty shortages and clinical placement sites (American Association of Colleges of Nursing [AACN] 2023). In 2022, enrollment in baccalaureate nursing programs declined by 1.4%, the first decline in 20 years (AACN 2023). This is a major sociocultural constraint: although public interest in nursing careers is high, educational infrastructure has not kept pace. Contributing factors include the aging of nurse faculty and the wage gap between academic and clinical positions (American Nurses Association, 2025; AACN, 2023). Without expanded capacity in nurse education, the profession cannot replenish itself at the needed rate.

Finally, the internal culture of nursing experienced both stress and evolution. The pandemic fostered camaraderie among nurses and exposed divisions between staff and travelers (who often earned more for similar work), veterans and novices (as new graduates were thrust into high-pressure roles without traditional ramp-up periods). The concept of a "healthy work environment," long championed by the American Association of Critical-Care Nurses, gained renewed urgency. Hospitals with shared governance, effective communication, and adequate staffing generally retained nurses better during the crisis. Magnet-designated facilities often fared better, reinforcing the link between positive workplace culture and retention. Many health systems responded by implementing wellness programs between 2022 and 2025: staff lounges, counseling services, flexible schedules, and listening sessions. These measures aim to address foundational drivers of nurse satisfaction—feeling valued, respected, and supported at work.

In summary, sociocultural forces from 2020 to 2025—demographic shifts, burnout, evolving public perception, generational change, and workplace culture—were central to the turbulence in the hospital RN workforce. At the same time, compensation and staffing are critical; the emotional and social dimensions of work shape nurses' willingness to stay in the profession. This period has prompted a societal realization: to preserve high-quality patient care, we must also care for those who provide it. The next sections will examine how technological and legal systems intersect with this shifting cultural terrain.

Technological Factors in Nursing Practice (2020–2025)

Technology in healthcare advanced rapidly between 2020 and 2025, with significant implications for hospital-based nursing. The COVID-19 pandemic catalyzed a transformation in telehealth and digital health. Virtually overnight in early 2020, telehealth shifted from a limited-use modality to a core component of care delivery. Although telehealth was most prominent in outpatient and physician-led services, hospital nurses also engaged in these platforms, particularly in emergency departments and through teleICU programs where critical care nurses monitored patients remotely in facilities

experiencing staffing shortages (Balestra, 2021). Federal emergency waivers temporarily removed regulatory barriers, reimbursing many telehealth services and giving rise to new nursing roles such as teletriage and remote patient monitoring (Bestsennyy et al. 2021). Some hospital RNs transitioned into these roles, trading bedside care for remote work that offered improved safety and work-life balance.

Technology was also deployed within hospital walls to reduce nurses' infection risk and improve efficiency. Remote vital sign monitors enabled nurses to check patients from outside isolation rooms, and tablets allowed for non-contact communication (Zimlich 2022). While these tools conserved PPE and reduced room entries, they also required nurses to rapidly learn and troubleshoot unfamiliar systems, often under crisis conditions.

Another prominent technological development was the ubiquitous use of electronic health records (EHRs). By 2021, over 96% of U.S. hospitals had implemented EHR systems (Henry et al. 2022). EHRs offered clear advantages for nurses, such as improved access to lab results and interprofessional notes, and built-in clinical decision support. However, documentation demands escalated, drawing nurses away from direct care. Some institutions mitigated this by assigning scribes or auxiliary staff to assist with documentation during staffing shortages (Buerhaus et al. 2023). Hospitals also began exploring predictive analytics tools to manage nurse staffing, using AI algorithms to forecast patient volume and acuity. These tools show potential to optimize scheduling, but nurses have expressed concern that algorithmic staffing may not adequately reflect the human nuances of care delivery, such as team dynamics or the emotional demands of specific cases (Powell et al. 2023).

The pandemic also accelerated automation and smart device adoption in hospitals. Remote-controlled infusion pumps allowed medication adjustments without entering isolation rooms, and mobile robots began assisting with delivering supplies and meals, reducing non-clinical tasks for nurses (Manogaran et al. 2023). While such robotics does not replace hands-on care, it can offload routine duties and reduce nurse fatigue. Robotic UV disinfection systems were also deployed to enhance infection control. Meanwhile, artificial intelligence (AI) tools emerged to support early clinical deterioration detection—identifying signs of sepsis or cardiac arrest based on real-time vital sign data (Wang et al. 2023). These tools act as a "second set of eyes," augmenting nurses' situational awareness, especially under high patient loads. However, effective integration depends on adequate training and trust in system alerts. Hospitals with stronger informatics support helped nurses adapt, while others left staff to navigate new tools with little guidance, adding to stress and cognitive burden.

Technological innovation also reshaped nursing education. With clinical rotations disrupted, nursing schools rapidly adopted virtual simulation tools, high-fidelity manikins, and virtual reality modules to provide experiential learning (Gaba 2022). Hospitals mirrored this by expanding nurse residency programs using blended learning formats to onboard new graduates with fewer in-person clinical hours. From 2020 to 2025, health systems widely deployed e-learning platforms to update nursing staff on COVID-19 protocols, new devices, and evidence-based practices, highlighting the growing role of digital learning in workforce development (Ferguson et al. 2023).

In day-to-day practice, nurses increasingly rely on practical technologies that improve efficiency. Barcode medication administration reduced drug errors, smart beds alerted staff to fall risks, and digital staffing systems allowed for more flexible scheduling (Topaz and Pruinelli 2021). From 2023 onward, some hospitals introduced mobile communication apps to replace outdated pagers and streamline team collaboration. While these apps saved time, they also risked blurring boundaries between work and personal life, prompting some nurses to raise concerns about being constantly reachable.

While technology may reduce the administrative burden, it does not replace human care. On the contrary, enabling more complex care can increase the demand for skilled nurses. Debates about whether AI or automation can mitigate nurse shortages have mainly affirmed that these technologies are adjuncts, not substitutes. Predictive tools might flag at-risk patients, but nurses must still intervene and coordinate care. However, automating documentation through voice recognition or device-synced charting could reduce cognitive workload and enhance nurse-patient interaction time (Schroeder et al. 2023). Surveys show that most nurses (82%) believe thoughtfully implemented technology can improve care quality and efficiency (Henry et al. 2022).

In summary, technological factors during 2020–2025 were a double-edged sword for hospital nurses. Telehealth, remote monitoring, and automation helped mitigate workforce strain and introduced new care models. Yet, they also required rapid adaptation and imposed new mental loads. The way forward is clear: hospitals must involve nurses in technology selection and implementation. When technology aligns with nurses' needs and is paired with adequate training and support, it enhances job satisfaction and improves patient care. Done poorly, it risks burnout and disengagement. As hospital systems seek to stabilize their workforces, thoughtful tech integration will be crucial to success.

Legal and Regulatory Factors

The legal and regulatory landscape for nursing underwent significant changes from 2020 to 2025, as the pandemic stress-tested existing frameworks and prompted calls for reform. Licensure regulation was one area of rapid adaptation. At the onset of COVID-19, many states issued emergency waivers allowing nurses with out-of-state licenses to practice immediately, emphasizing the need for flexible workforce deployment. This spurred expansion of the Nurse Licensure Compact (NLC), which enables multistate practice under one license. By 2025, 43 jurisdictions had joined the NLC—though large states such as California and New York remained outside (NCSBN 2025a). The Compact's 25-year anniversary in 2025 marked its emergence as a cornerstone of interstate nurse mobility. Regulators highlighted its value for emergencies and military families, arguing that full national adoption would support a responsive and portable nursing workforce (NCSBN 2025a). In contrast, hospitals in non-compact states faced administrative delays when onboarding out-of-state nurses, reinforcing arguments for broader participation.

Scope of practice regulations also came under scrutiny. Hospitals facing staff shortages adopted team-based care models in which licensed practical nurses (LPNs), nursing assistants, and respiratory therapists performed tasks traditionally limited to registered nurses. Many states temporarily relaxed scope restrictions—for example, allowing LPNs to initiate IV therapy

under RN supervision. Likewise, advanced practice registered nurses (APRNs) gained temporary autonomy in several jurisdictions to offset physician shortages (Yoder-Wise and Bolton 2022). These measures sparked ongoing debates over whether expanded scopes should be retained post-pandemic. Hospital associations often support flexible staffing, while nursing organizations urge caution, warning that improper task shifting can compromise safety. A related legal tool has been statutory nurse-to-patient ratios. California remains the only state with such ratios codified across hospital units; however, New York adopted legislation in 2021 requiring hospitals to form staffing committees with nurse and management representatives, mandating ICU ratios of 1:2 (New York State Department of Health 2021). Massachusetts also mandates ICU staffing ratios but failed to pass broader legislation in a 2018 ballot initiative (Massachusetts Health and Hospital Association 2019).

At the federal level, workplace safety became a pressing concern. Although there is no specific Occupational Safety and Health Administration (OSHA) standard for healthcare violence prevention, healthcare workers suffer the majority of workplace assaults. In response, the U.S. House passed the Workplace Violence Prevention for Health Care and Social Service Workers Act in 2021, requiring hospitals to implement safety protocols. However, the bill stalled in the Senate (American Hospital Association 2023a). OSHA fined several hospitals during the pandemic for violations under the general duty clause, including inadequate respiratory protection and unsafe staffing levels (Occupational Safety and Health Administration 2022). These precedents may prompt the development of formal regulatory standards addressing workplace violence and staffing resilience.

Another major legal episode involved federal mandates tied to the pandemic. The Centers for Medicare & Medicaid Services (CMS) imposed a vaccine mandate for healthcare workers in 2021, upheld by the U.S. Supreme Court in 2022, and rescinded in 2023 (McGuireWoods LLP 2023). Some nurses terminated for noncompliance sought legal redress or were reinstated after the mandate ended. The episode raised questions about balancing public health directives with employment rights and religious or personal freedoms. Separately, state orders halted elective procedures early in the pandemic, prompting staff furloughs and redeployments. For example, perioperative nurses were reassigned to intensive care units. These abrupt role changes triggered legal inquiries into labor protections and contracts. In many cases, unions negotiated memoranda of understanding covering redeployment terms, hazard pay, and workplace protections—legal agreements that will likely influence future crisis response frameworks (Spetz et al. 2022). Union activity intensified between 2021 and 2023. Notable strikes occurred in Minnesota, California, and New York over pay and staffing. These strikes, governed by federal labor law requiring ten days' notice for healthcare work stoppages, often led to new collective bargaining agreements with enforceable staffing provisions (National Nurses United 2023). Courts occasionally intervened to preserve essential services during strikes. Nurses file complaints with state health departments or OSHA in non-unionized hospitals regarding unsafe staffing. Legal protections such as Texas's Safe Harbor law allow nurses to decline unsafe assignments without fear of retaliation, but such statutes are not uniformly available nationwide (Texas Board of Nursing 2024). One novel legal strategy emerged during this period: a class-action lawsuit by nurses alleging that chronic understaffing violated consumer protection laws by advertising high-quality care without ensuring sufficient personnel, which judicial avenues may supplement legislative reform efforts.

Nurse licensure and education also saw regulatory adjustments. In 2020, the National Council of State Boards of Nursing (NCSBN) implemented a shortened format of the NCLEX-RN to maintain test accessibility during lockdowns. In 2023, the Next Generation NCLEX was launched, incorporating new item types designed better to assess clinical judgment (NCSBN 2023b). States also eased licensure renewal requirements during the pandemic, such as delaying continuing education mandates. These regulatory adaptations ensured continued workforce inflow during disruption. Going forward, many regulators advocate for permanent retention of beneficial changes, such as licensure reciprocity, telehealth flexibility, and mandatory surge staffing plans in hospital disaster protocols (ANA 2025).

In sum, the legal environment for hospital RNs from 2020 to 2025 was dynamic and transformative. Emergency measures tested long-standing regulations, prompting reassessment of what should be retained post-crisis. The growth of the Nurse Licensure Compact has improved mobility, yet broad-based staffing legislation remains elusive. Regarding workplace safety and assignment autonomy, legal protections for nurses are gaining ground but remain inconsistent across states. The pandemic underscored that legal and regulatory frameworks must evolve to ensure safe, effective, and agile nursing care under routine and emergency conditions. A more cohesive legal architecture—grounded in evidence, shaped by frontline input, and enforced equitably—will be essential to sustaining the hospital RN workforce in the years ahead.

Environmental Factors and External Shocks

Within the PESTLE framework, "Environmental" factors encompass both ecological and systemic shocks affecting healthcare settings. From 2020 to 2025, the most consequential environmental event was the COVID-19 pandemic—a global external shock that transformed hospital settings into high-risk environments. Nurses faced significant exposure to SARS-CoV-2, particularly during the early months of the pandemic when personal protective equipment (PPE) was in short supply. Hundreds of U.S. nurses and healthcare workers died from COVID-19-related complications, especially during the PPE crisis in 2020 (National Nurses United 2021). Infection control protocols evolved rapidly: negative pressure rooms, N95 respirators, PAPRs, and full barrier protection became standard. Hospitals improvised amidst global shortages, leading to prolonged PPE reuse and significant distress among frontline staff (ANA 2021).

These experiences have triggered systemic changes in emergency preparedness. In response, health systems and public agencies developed larger PPE stockpiles and more robust distribution protocols to prevent similar exposure risks in future pandemics (U.S. Department of Health and Human Services 2022). The lasting trauma of working without protection during a biological emergency remains a critical concern in nursing circles and has driven advocacy for more resilient supply chains and workplace safety infrastructure.

The pandemic also prompted significant redesign of hospital environments. Cohorted COVID-19 units were constructed with special ventilation systems, and triage areas were moved outdoors to reduce indoor transmission. These shifts altered nurse workflows and introduced new ergonomic burdens. Prolonged PPE use was linked to dehydration, impaired communication, cognitive fatigue, and physical strain (Galanis et al. 2021). The hospital's "environment of care" permanently changed: even post-surge, many institutions retained stricter infection control protocols and periodic drills. For nurses, the post-2020 norm includes seasonal masking, stricter hygiene, and sustained vigilance for airborne disease threats.

Environmental stressors were not limited to COVID-19. The winter of 2022–2023 brought a "tripledemic" of influenza, respiratory syncytial virus (RSV), and COVID-19—overwhelming pediatric units and ERs nationwide. Nurses were again called upon to flex roles, extend hours, and endure crisis staffing (Wang et al. 2023). Environmental epidemiologists warn that such convergence of respiratory viruses may be more frequent due to altered seasonal circulation patterns post-COVID, exacerbated by population immunity shifts and global travel dynamics (CDC 2023).

Climate change also emerged as a key environmental disruptor. Between 2020 and 2023, the U.S. experienced hurricanes (e.g., Laura, Ida, Ian) that forced hospital evacuations and operational disruptions. Western wildfires compromised air quality and led to surges in respiratory hospitalizations. Nurses were pivotal in disaster responses—sheltering in place, evacuating patients, and staffing emergency shelters (Salas et al. 2020). Climate-related disasters are expected to rise in frequency and intensity, pressuring hospitals to update emergency response plans. Proactive hospitals have begun developing reserve nurse corps, cross-training staff for disaster roles, and providing support systems like on-site housing or family care during crises (Phelan et al. 2022).

In addition to external disasters, the internal public health environment shifted. An aging population and rising chronic disease prevalence—trends long in motion—were compounded by pandemic fallout. Deferred care and post-COVID syndromes (e.g., long COVID) have increased patient acuity. By late 2021, the average hospital length of stay had increased by nearly 10% over 2019, reflecting more medically complex inpatients (American Hospital Association 2023b). This indirectly impacts nursing workload and well-being. Even stable census numbers mask heavier burdens: sicker patients require more nursing interventions, leading to physical strain, decision fatigue, and higher burnout risk.

Workplace environmental quality also came under scrutiny. Studies have consistently linked nurse satisfaction and retention to healthy work environments with supportive leadership, team cohesion, and safety culture. The pandemic exposed and often exacerbated pre-existing issues. Some hospitals responded by enhancing rest areas, building respite spaces, improving staff meals, and emphasizing wellness support (Kelly et al. 2022). Others pursued Magnet status, which emphasizes excellence in nursing practice and environment. This trend signals growing recognition that workplace ecology—including physical space, break availability, and peer support—is central to workforce sustainability.

In sum, environmental shocks and pressures from 2020 to 2025 profoundly shaped the hospital nursing experience. These conditions, from infectious threats and climate disasters to shifting patient demographics, underscore the need for robust environmental readiness and support systems. For nurses to remain resilient, they must feel safe, supported, and empowered to navigate an increasingly complex care environment.

Conclusion

Between 2020 and 2025, the United States hospital-based registered nurse (RN) workforce has weathered a perfect storm of external pressures and internal challenges. The COVID-19 pandemic served as an inflection point, exposing and amplifying long-standing structural weaknesses—from inadequate staffing reserves and rigid policies to frailties in nurses' physical environments and mental health supports. Through a PESTLE lens, this analysis has illuminated how political decisions, economic pressures, sociocultural shifts, technological changes, legal frameworks, and environmental events collectively shaped the nursing workforce's trajectory.

Hospital RNs experienced a dramatic contraction in workforce participation between 2020 and 2021, followed by numerical recovery by 2023 (Auerbach et al. 2024). However, this recovery concealed a redistribution in experience levels, with a marked exodus of senior nurses and a corresponding influx of early-career professionals—many of whom entered the field under duress (NCSBN 2023a). Simultaneously, surveys revealed persistent burnout, emotional exhaustion, and intent-to-leave rates among frontline nurses (McKinsey & Company, 2023). The resulting workforce scenario is one of fragility, but also of strategic opportunity.

The quality of inpatient care is inextricably linked to the stability and well-being of the nursing workforce. Research confirms that hospitals with better staffing levels and healthier work environments experienced superior outcomes and lower staff attrition during the pandemic (National Nurses United, 2022). As the acute crisis subsides, the imperative shifts from reactive triage to proactive transformation. Investments in education capacity, staffing policy debates, flexible care delivery models, and supportive technologies are already underway—all promising directions if implemented effectively.

However, much remains unresolved. Without intervention, projections suggest that approximately 20% of the RN workforce could exit healthcare by 2027 (NCSBN 2023a). This underscores the urgency for comprehensive, sustainable reforms. Strategic initiatives—such as legislative staffing ratios, financial retention programs, and improved workplace environments—must be continuously evaluated. For example, if mandated ratios are introduced, are patient outcomes improving accordingly? Are retention bonuses resulting in longer-term tenure? The solutions must be iterative, grounded in real-time data, and adaptable to evolving workforce dynamics.

A central theme throughout this analysis is that isolated fixes will not suffice. A robust workforce strategy must be integrative—aligning political resolve with financial investment, prioritizing mental health and workplace safety alongside technological innovation, and enshrining evidence-based legal protections. The pandemic, while devastating, has catalyzed a national conversation on how we value and support the nursing profession. Nurses themselves have become more vocal advocates, articulating the connection between their own

working conditions and patient outcomes with renewed authority and public resonance.

As of 2025, the U.S. hospital-based RN workforce stands at a juncture of cautious optimism. The macro-environmental shocks of the early 2020s have unequivocally established nurses as critical infrastructure within the healthcare system. Ensuring the sustainability of this workforce is not merely a management challenge—it is a moral imperative. A health system that fails to support its nursing workforce ultimately fails its patients. Conversely, a system that treats nurses as strategic assets—worthy of investment, inclusion, and long-term development—will reap the rewards in quality, safety, and resilience.

The path forward depends on collaborative resolve across sectors: healthcare leadership, government, academia, and, most importantly, the nursing profession itself. By embedding comprehensive, data-driven strategies across all PESTLE dimensions and committing to continuous feedback and improvement, we can stabilize and elevate the nursing profession. This investment is not just about preparing for the next emergency—it is about setting a new, sustainable standard for American hospital care.

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