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Brief Report

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Drivers of frontline registered nurse turnover: evidence from the 2022 National Sample Survey of Registered Nurses

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Abstract

Introduction **The consequences of the COVID-19 pandemic on the nursing workforce persist.**

Methods **We analyzed the latest National Sample Survey of Registered Nurses data to identify the drivers of actual, self-reported turnover among 8953 frontline registered nurses using multivariable regression.**

Results **The turnover rate was 28.7%. Nurses dissatisfied with their primary position were over 2.5 times more likely to turnover. Nurses enrolled in school or holding graduate degrees demonstrated higher actual turnover rates, likely due to the incompatibility of rigid work schedules with academic demands and increased marketability. Participation in a labor union/collective bargaining participation was significantly associated with a lower likelihood of nurses' turnover.**

Conclusion **Our findings identify immediate policy levers—such as flexible or nontraditional scheduling options—that organizations can deploy to improve job satisfaction and work–life balance and curb costly turnover.**

Keywords: nursing, health workforce, COVID-19

Key points

- Following historic workforce difficulties during the COVID-19 pandemic, hospital leaders continue to report nurse retention challenges.
- Our analysis of the 2022 National Sample Survey of Registered Nurses provides insights into predictors of actual, self-reported turnover behavior of nurses.
- Key predictors of nurse turnover include job dissatisfaction, holding a secondary position, degree program enrollment, holding a graduate degree, and burnout. Union or collective bargaining participation was protective against turnover.

Introduction

The COVID-19 pandemic, beginning in early 2020, triggered historic changes for the nursing profession. The "Great Resignation" led to dramatic turnover—a loss of 100 000 nurses in 2021—predominantly those aged 35 years and younger.[1] While the total nursing supply has since rebounded to just above prepandemic levels, the geographic and care setting distribution of nurses remains problematic, and nationally, shortages are projected through 2036.[2]

Hospital leaders report higher vacancy rates and turnover compared with prepandemic levels, coinciding with an increase in nurses employed in nonhospital settings.[3,4] Persistent nurse turnover threatens care continuity, safety, and health system recovery postpandemic. Turnover is costly to organizations both economically and non-economically, with replacement costs related to recruitment, hiring, and training new staff.[5] Turnover of a single nurse can cost $45 100 to $67 500.[6] Additionally, turnover has been associated with compromised quality of care and outcomes for patients and nurses who remain.[7]

A 2022 systematic review on nurse turnover and retention from the past decade highlighted 2 interrelated points: first, most research on nurses' actual turnover is limited and instead focuses on turnover intentions, and second, there are few studies evaluating system-level interventions to address turnover.[8] The focus on turnover intention is prevalent across the turnover literature and presents a challenge because intent represents a thought, while actual turnover is a behavior.[8,9] This distinction has important

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consequences for health care leaders regarding decision making and allocations of organizational resources aimed at reducing costly turnover. For example, interventions based on turnover intention might not target the key drivers of actual turnover.

Given the limited analyses of recent actual turnover among nurses on a national level, we analyzed the newest data from the 2022 National Sample Survey of Registered Nurses (NSSRN). A prior analysis of nurse turnover using 2018 NSSRN data was limited by variable availability, which lacked data about the type of position held by nurses and the amount of time spent in direct patient care.[10] In our study, we describe factors predictive of turnover rates of frontline nurses during the COVID-19 pandemic period in a nationally representative sample. A snapshot of characteristics of our sample by turnover status is shown in Figure 1.

Data and methods

This observational study used publicly available cross-sectional data from the 2022 NSSRN, which was administered from late 2022 to early 2023. Conducted by the Health Resources and Services Administration (HRSA), the NSSRN provides comprehensive workforce information on nurses in the United States. We selected the analytic variables by using prior research on turnover across key categories including individual, work, and organizational characteristics.[9-11] The authors' institutional review board (UT Health Houston Committee for the Protection of Human Subjects) determined that the study was not human subjects research and required no further review.

Participants

A total of 49 234 registered nurses (RNs) completed either an online or paper survey, yielding a response rate exceeding 40%. The survey used a complex sampling design incorporating stratification by state and nursing license type to enhance representativeness. Additionally, a set of 80 replicate weights was provided to adjust for nonresponse bias and improve generalizability.

Three inclusion criteria were as follows: (1) hold active RN license but not be an advanced practice registered nurse, (2) be employed in nursing, and (3) have a primary job title Staff Nurse or Direct Care Nurse. Finally, all included nurses needed to provide complete data on key variables. The final unweighted analytic sample size was $n = 8953$, corresponding to a weighted population estimate of $N = 1\,633\,455$. All population-level estimates were calculated using replicate weights and survey design corrections via the srvyr package in R.[12]

Measures

Turnover was assessed by a yes/no question (question C40 in the 2022 NSSRN questionnaire: "Have you left the primary nursing position held on December 31, 2021"). Burnout was assessed by a yes/no question (C38: "Thinking about the primary nursing position you held on December 31, 2021, have you EVER felt burned-out?"). Job satisfaction was assessed with a 4-point Likert scale response to question C36: "How satisfied were you with the primary nursing position you held on December 31, 2021?" Salary per hour was calculated using 2 US Census Bureau–derived variables included in the NSSRN dataset, by dividing the annual salary by annual number of hours worked. Self-reported sociodemographic characteristics (eg, sex, race/ethnicity, marital status, dependents), professional characteristics (eg, fall degree enrollment, highest nursing degree), and employment characteristics (eg, labor union or collective bargaining unit, full- vs part-time position, secondary position) were also included.

Statistical analysis

Bivariate associations between categorical variables and turnover were tested using the Rao–Scott adjusted chi-square test, while continuous variables were evaluated using design-based *t*-tests. A weighted logistic regression model was then fitted to examine predictors of nurse turnover. Natural splines were used to allow nonlinear dependence on continuous variables,

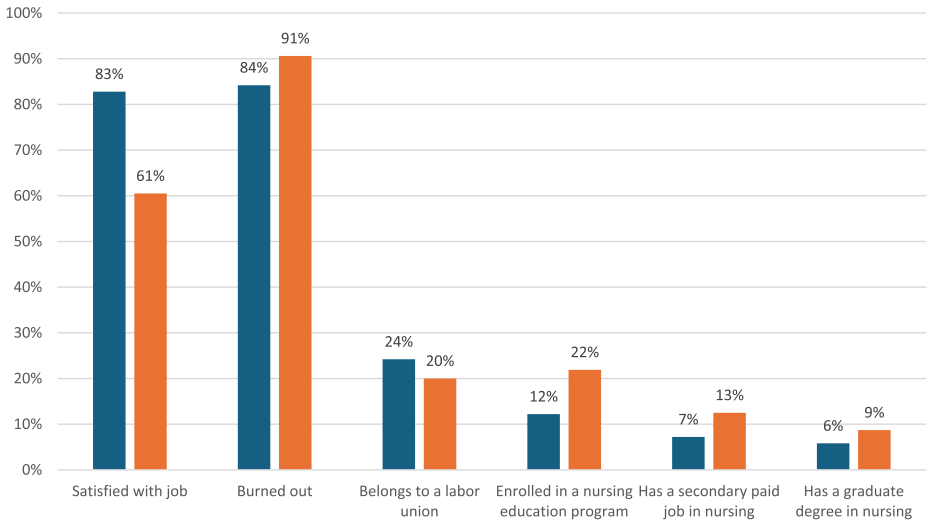

Figure 1 Characteristics of frontline registered nurses by actual turnover from their primary position. Source: Authors' analysis of data from the 2022 National Sample Survey of Registered Nurses (NSSRN).

Table 1 Study variables by turnover from their primary position among frontline registered nurses.

Variable	Level	Turnover = no				Turnover = yes				*P*
		Estimate	[95% CI]	Population, *N*	Sample, *n*	Estimate	[95% CI]	Population, *N*	Sample, *n*	
Individual										
Age, years	(mean)	43.89	[43.38, 44.40]	1152	6381	40.08	[39.41, 40.75]	481	2572	<.001
Years since graduation from initial nursing degree	(mean)	15.51	[15.02, 16.00]	1152	6381	11.50	[10.91, 12.09]	481	2572	<.001
Sex, %	Female	85.8	[84.6, 87.0]	989	5676	86.7	[84.7, 88.7]	417	2256	.503
	Male	14.2	[13.0, 15.4]	164	705	13.3	[11.3, 15.3]	64	316	
Dependent at home, %	None	46.1	[44.1, 48.2]	532	3134	52.4	[48.9, 55.9]	252	1413	.002
	1 or more	53.9	[51.8, 55.9]	621	3247	47.6	[44.1, 51.1]	229	1159	
Enrolled in degree program, %	Not enrolled	87.8	[86.4, 89.3]	1012	5751	78.1	[75.0, 81.2]	376	2126	<.001
	Enrolled	12.2	[10.7, 13.6]	140	630	21.9	[18.8, 25.0]	105	446	
Nursing degree, %	BSN	63.5	[61.6, 65.4]	732	3809	62.9	[59.9, 65.9]	303	1563	.005
	Diploma/AD	30.7	[29.2, 32.1]	353	2258	28.4	[25.9, 30.8]	137	814	
	MSN/DNP/PhD	5.8	[4.7, 6.9]	67	310	8.7	[6.7, 10.7]	42	195	
Marital status, %	Married/domestic partnership	66.1	[64.2, 67.9]	761	4500	62.1	[59.1, 65.1]	299	1657	.004
	Widow, divorced, separated	12.1	[10.9, 13.4]	140	860	11.0	[9.3, 12.7]	53	351	
	Never married	21.8	[19.9, 23.7]	251	1021	26.9	[23.9, 29.9]	129	564	
Race and ethnicity, %	White, non-Hispanic	60.4	[58.6, 62.3]	696	4956	61.1	[58.0, 64.3]	294	2018	<.001
	Hispanic	9.2	[8.1, 10.2]	106	308	14.5	[12.2, 16.9]	70	177	
	Black, non-Hispanic	11.1	[9.8, 12.4]	128	302	13.0	[10.5, 15.5]	63	161	
	Asian, non-Hispanic	14.1	[13.1, 15.2]	163	619	7.2	[5.5, 8.9]	35	138	
	American Indian, non-Hispanic	0.3	[0.1, 0.5]	3	21	0.5	[0.2, 0.7]	2	18	
	Pacific Islander, non-Hispanic	4.9	[4.1, 5.6]	56	175	3.6	[2.6, 4.7]	18	60	
Work										
Job dissatisfaction, %	Satisfied	82.8	[81.2, 84.4]	954	5324	60.5	[57.9, 63.1]	291	1583	<.001
	Dissatisfied	17.2	[15.6, 18.8]	198	1057	39.5	[36.9, 42.1]	190	989	
Burned out, %	Not burned out	15.8	[14.5, 17.1]	142	871	9.4	[7.2, 11.7]	27	167	<.001
	Burned out	84.2	[82.9, 85.5]	756	4208	90.6	[88.3, 92.8]	260	1429	
RN residency completion, %	No	74.0	[72.2, 75.8]	852	4872	62.4	[59.1, 65.7]	300	1768	<.001
	Yes	26.0	[24.2, 27.8]	300	1509	37.6	[34.3, 40.9]	181	804	
Full- or part-time work, %	Full time	77.6	[76.2, 78.9]	894	4730	82.5	[80.1, 84.8]	397	2009	.003
	Part time	22.4	[21.1, 23.8]	259	1651	17.5	[15.2, 19.9]	84	563	

(*continued*)

Table 1 Continued

Variable		Level	Turnover = no				Turnover = yes				*P*
			Estimate	[95% CI]	Population, *N*	Sample, *n*	Estimate	[95% CI]	Population, *N*	Sample, *n*	
Secondary nursing position, %	No		92.8	[91.7, 93.9]	1069	5906	87.5	[84.9, 90.0]	421	2299	<.001
	Yes		7.2	[6.1, 8.3]	83	475	12.5	[10.0, 15.1]	60	273	
Salary per hour, $	(mean)		51.16	[50.27, 52.06]	1094	6065	50.11	[48.45, 51.78]	452	2410	.290
Labor union or collective bargaining, %	No		75.8	[74.0, 77.6]	873	4996	80.0	[77.3, 82.7]	385	2150	.015
	Yes		24.2	[22.4, 26.0]	279	1385	20.0	[17.3, 22.7]	96	422	
Organizational											
Organization promoting evidence-based care	(mean)		3.58	[3.55, 3.61]	1135	6275	3.42	[3.38, 3.46]	473	2534	<.001
Organization promoting patient-centered care	(mean)		3.69	[3.66, 3.71]	1136	6294	3.55	[3.51, 3.59]	475	2544	<.001
Organization promoting quality improvement	(mean)		3.41	[3.38, 3.44]	1075	5952	3.23	[3.18, 3.27]	450	2420	<.001
Organization promoting team-based care	(mean)		3.58	[3.55, 3.60]	1129	6248	3.39	[3.34, 3.43]	469	2518	<.001
Organization promoting value-based care	(mean)		3.30	[3.27, 3.34]	1107	6123	3.14	[3.08, 3.20]	462	2494	<.001
Care for medically complex patients	(mean)		3.18	[3.14, 3.21]	1152	6381	3.32	[3.27, 3.36]	481	2572	<.001
Participated in evidence-based care	(mean)		3.52	[3.49, 3.55]	1152	6381	3.47	[3.42, 3.52]	481	2572	.061
Care for mental health conditions	(mean)		2.83	[2.79, 2.86]	1152	6381	2.96	[2.90, 3.03]	481	2572	<.001
Participated in patient-centered care	(mean)		3.77	[3.75, 3.79]	1152	6381	3.73	[3.70, 3.77]	481	2572	.060
Work on quality-improvement measures	(mean)		2.84	[2.80, 2.88]	1152	6381	2.78	[2.72, 2.83]	481	2572	.118
Care for substance use disorders	(mean)		2.70	[2.65, 2.74]	1152	6381	2.89	[2.83, 2.96]	481	2572	<.001
Participated in team-based care	(mean)		3.61	[3.58, 3.64]	1152	6381	3.53	[3.49, 3.57]	481	2572	.004
Participated in value-based care	(mean)		3.15	[3.11, 3.18]	1152	6381	3.10	[3.05, 3.14]	481	2572	.164

Source: Authors' analysis of data from the 2022 National Sample Survey of Registered Nurses (NSSRN). Sample size = 8953. Population *N* = population *N* in thousands. Turnover was assessed by a yes/no question (question C40 in the 2022 NSSRN questionnaire: "Have you left the primary nursing position held on December 31, 2021"). Burnout was assessed by a yes/no question (C38: "Thinking about the primary nursing position you held on December 31, 2021, have you EVER felt burned-out?"). Job satisfaction was assessed with a 4-point Likert scale response to question C36: "How satisfied were you with the primary nursing position you held on December 31, 2021?" Salary per hour was calculated from annual salary and weekly work hours. Categorial variables and turnover were tested using the Rao–Scott adjusted chi-square test to account for the complex sampling design. Differences in continuous variables were evaluated using design-based *t*-tests.

Table 2 Multivariable logistic regression of turnover from their primary position among frontline registered nurses.

Term	Variable/level	OR	[95% CI]	*P* value
(Intercept)	(Intercept)	0.3918	[0.17, 0.89]	.027
Sex	Male	0.8408	[0.68, 1.04]	.114
Race and ethnicity	Hispanic	1.2590	[0.95, 1.66]	.103
	Black, non-Hispanic	1.2472	[0.93, 1.67]	.141
	Asian, non-Hispanic	0.6504	[0.49, 0.85]	.002
	American Indian, non-Hispanic	1.9267	[0.84, 4.27]	.111
	Pacific Islander, non-Hispanic, and multiple ethnicities	0.6845	[0.44, 1.03]	.078
Marital status	Widowed, divorced, separated	0.8762	[0.71, 1.07]	.199
	Never married	0.9556	[0.78, 1.17]	.655
Age (spline)	Spline basis 1	0.7222	[0.48, 1.09]	.121
	Spline basis 2	1.3304	[0.55, 3.22]	.527
	Spline basis 3	2.9359	[1.47, 5.80]	.002
Years since graduation from initial nursing degree (spline)	Spline basis 1	0.3491	[0.23, 0.54]	<.001
	Spline basis 2	0.5888	[0.31, 1.13]	.112
	Spline basis 3	1.0734	[0.60, 1.91]	.810
Enrolled in degree program	Enrolled	1.8388	[1.52, 2.22]	<.001
RN residency completion	Yes	1.0878	[0.93, 1.28]	.303
Dependent at home	One or more	0.8999	[0.77, 1.05]	.190
Nursing degree	Diploma/AD	0.9937	[0.85, 1.16]	.935
	MSN/DNP/PhD	1.5469	[1.19, 2.01]	.001
Labor union or collective bargaining	Yes	0.8401	[0.71, 0.99]	.042
Secondary nursing position	Yes	1.6452	[1.31, 2.07]	<.001
Job dissatisfaction	Dissatisfied	2.6223	[2.26, 3.05]	<.001
Full or part-time work	Part-time	1.1851	[1.00, 1.40]	.045
Burned out	Burned out	1.4015	[1.12, 1.76]	.003
Salary per hour (spline)	Spline basis 1	0.3103	[0.21, 0.47]	<.001
	Spline basis 2	0.5933	[0.21, 1.70]	.326
	Spline basis 3	1.4391	[0.66, 3.09]	.356
Organization promoting evidence-based care	4-point Likert scale, mean	0.8839	[0.77, 1.01]	.068
Organization promoting patient-centered care		0.9992	[0.86, 1.16]	.991
Organization promoting team-based care		1.0152	[0.89, 1.16]	.820
Organization promoting value-based care		0.9671	[0.87, 1.08]	.543
Organization promoting quality improvement		0.9730	[0.87, 1.09]	.635
Participated in evidence-based care		1.0213	[0.92, 1.14]	.700
Participated in patient-centered care		1.0261	[0.89, 1.19]	.733
Participated in team-based care		0.9255	[0.82, 1.04]	.193
Participated in value-based care		0.9673	[0.88, 1.06]	.493
Care for mental health conditions		0.9545	[0.86, 1.05]	.359
Care for substance use disorders		1.1957	[1.09, 1.31]	<.001
Care for medically complex patients		1.0330	[0.95, 1.12]	.449
Work on quality-improvement measures		1.0921	[1.00, 1.19]	.044

Source: Authors' analysis of data from the 2022 National Sample Survey of Registered Nurses. Sample size = 8953. The area under the receiver operating characteristic (ROC) curve was 0.71 and Tjur's R^2 was 0.12, which is the difference between weighted mean predicted probability for turnover and non-turnover cases.

including age, years of experience, and salary per hour. Missing data were handled using listwise deletion; all regression models were estimated with complete cases. All analyses were conducted in the *Positron* development environment (version 2025.12.1).

These data had limitations. Data are cross-sectional; results reflect associations not causation. These data may not fully represent the trends that continued throughout 2022, such as the "Great Resignation" or shifts in travel nursing at the time. The NSSRN data, like other surveys, are subject to both recall bias and nonresponse bias, although complex sample weighting and nonresponse adjustments are used to help correct for this.

Results

The primary position turnover rate was 28.7%. Our sample was a majority female and White, non-Hispanic (78%). Most

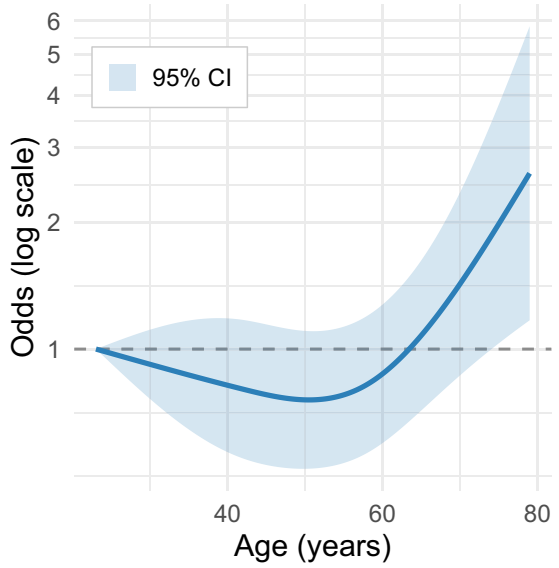

Figure 2 Nonlinear dependence of turnover from their primary position on age among frontline registered nurses. Source: Authors' analysis of data from the 2022 National Sample Survey of Registered Nurses (NSSRN). Odds are relative to the youngest RN (23 years). Sample size = 8953.

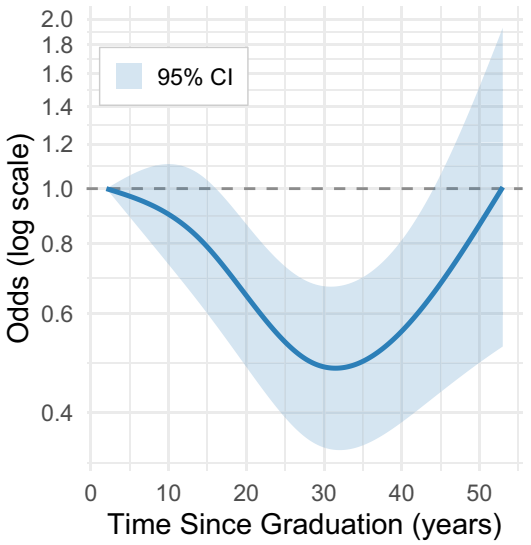

Figure 3 Nonlinear dependence of turnover from their primary position on experience among frontline registered nurses. Source: Authors' analysis of data from the 2022 National Sample Survey of Registered Nurses (NSSRN). Odds of turnover are relative to the lowest experience (2 years). Sample size = 8953.

participants were married or partnered (69%), and approximately half reported having dependents at home. Nearly two-thirds of the sample held a Bachelor's degree and 12% were enrolled in school at the time of the survey. Full participant characteristics by turnover status are displayed in Table 1.

Several variables in the full regression model were statistically significant predictors of turnover. Notably, dissatisfaction with one's primary position was a robust predictor of turnover (odds ratio [OR] = 2.62; $P < .001$) as well as enrollment in a nursing degree program (OR = 1.84; $P < .001$), having a second nursing job (OR = 1.64; $P < .001$), a graduate nursing degree (OR = 1.55; $P = .001$), and burnout (OR = 1.40; $P = .003$), among others shown in full in Table 2. Being Asian, non-Hispanic compared with White (OR = 0.65; $P = .002$) and being a part of union (OR = 0.84; $P = .042$) were associated with a lower turnover likelihood. Age, experience, and salary had a nonlinear relationship with turnover. Relative to their respective minimum values, lower odds of turnover were found over ranges of experience (16-44 years) and hourly salary ($56-$120), while odds of turnover did not change significantly with age until after 74 years (see Figures 2-4).

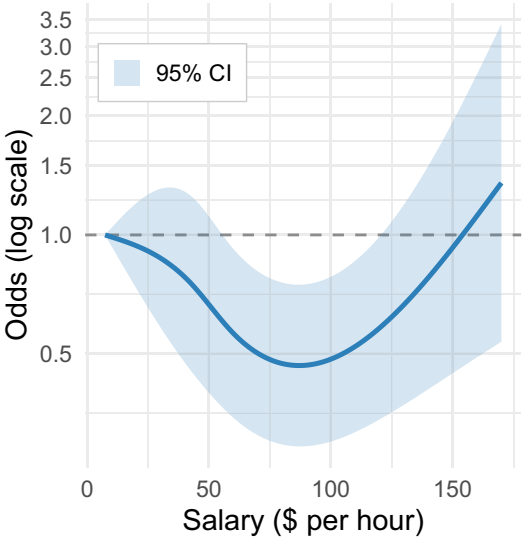

Figure 4 Nonlinear dependence of turnover from their primary position on salary among frontline registered nurses. Source: Authors' analysis of data from the 2022 National Sample Survey of Registered Nurses (NSSRN). The odds of turnover are relative to the minimum salary per hour ($7.33). Sample size = 8953.

Discussion

Nurse turnover has important impacts on patient safety, organization finances, and staffing stability. Several modifiable factors increased the likelihood of actual nurse turnover. Nurses who were dissatisfied with their job were more than 2.5 times more likely to have left their primary position. This finding, along with nurses who reported burnout, of having higher odds of turnover is consistent with existing literature.[11,13] Nurses with education-related factors, including current school enrollment and those holding graduate degrees, were more likely to leave than those with a Bachelor's degree. School enrollment is a leading indicator of a planned transition,[14] given that an advanced degree reflects upward career and financial mobility. For current students, the combined demands of a graduate program and employment in a secondary position may become incompatible, leading nurses to seek more flexible options—for example, a per diem role. A graduate degree makes a nurse more mobile and marketable as an advanced practice provider or manager, and thus more likely to leave their current position.

Conversely, 1 modifiable variable—participation in a labor union/collective bargaining—was associated with a lower

likelihood of turnover. A recent scoping review found mixed results on the impact of union membership on nurses' job satisfaction and retention[15] but suggested that the processes by which unions function may help illuminate needs and concerns of frontline staff to leadership. Contextualizing our data, the pandemic has been viewed as a catalyst for nurses' surge in union participation, with rates above the national average of private-sector workers. Historic strikes and contract negotiations across the country over the past few years have been focused on improvements in not only pay but nurse-to-patient ratios, protection against workplace violence, and guaranteed work breaks.[16] Unionized workplaces may reflect organizational environments with stronger labor protections or improved working conditions, aligning with our central finding associating job dissatisfaction as the strongest predictor of turnover.

Actionable strategies for organizations seeking to reduce turnover involve improving nurses' job satisfaction, including efforts to reduce burnout and improve employment opportunities to promote better work–life balance. Unlike resource-intensive options that take considerable time to implement, such as credentialing programs, our data suggest more immediate policy levers to reduce turnover. For example, employers can adopt flexible scheduling policies—for example, self-scheduling or nontraditional shift lengths—which may appeal to nurses balancing work and other obligations such as child or elder care or school. Previous research has endorsed support for innovative scheduling to promote work–life balance and flexibility.[17] Another actionable strategy is reviewing and potentially increasing RN salaries. Ratliff et al[18] pointed out that RN wages have shown the smallest growth from 2012 to 2023 compared with other health professionals. While RN salaries often are the largest cost center in hospitals' budgets, the value of increasing wages to offset financial losses due to RN turnover needs to be considered.

Conclusion

We present novel analysis of the most recent, nationally representative sample of RNs in the United States and predictors of their turnover behavior. As policymakers and health systems confront widespread staffing shortages, an understanding of nurse turnover during the pandemic and the motivations of actual turnover in nurses is critical to help provide actionable evidence to inform retention strategies and improve workforce planning and sustainability.

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Supplementary material

Supplementary material is available at *Health Affairs Scholar* online.

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Conflicts of interest

Please see ICMJE form(s) for author conflicts of interest. These have been provided as supplementary materials.

Notes

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