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From Listening to Lasting Change: A Quality Improvement Initiative to Improve CRNA and CAA Retention and Recruitment

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Abstract

Background: The COVID-19 pandemic created unprecedented workforce challenges within anesthesia departments across the United States. High turnover, burnout, and staffing shortages threatened patient access, operational efficiency, and financial performance.

Methods: We conducted one-on-one, in-person interviews with 85 Advanced Practice Providers (APPs) to identify core issues driving resignation. Interviews identified low incentives, unreliable breaks, rigid scheduling, limited team-based care, and a toxic work environment as key contributors. In response, we implemented a comprehensive retention initiative to strengthen culture and improve operational efficiency. As a control, we aligned our data against the American Society of Anesthesiologists (ASA) and Somnia Workforce nationwide benchmarks.

Results: Post-implementation, the department successfully decoupled from the collapsing national trends. While the broader U.S. anesthesia market remained unstable, our average annual voluntary resignations decreased by 53% (from 7.0 to 3.25 per year), culminating in zero voluntary resignations in 2026. Concurrently, annual recruitment volume expanded by 14.4% (increasing from 11.8 to 13.5 hires), generating a net positive variance of +41 staff over 4 years and completely reversing the 2022 staffing deficit ($p = 0.035$, Wilcoxon matched-pairs signed-rank test). The post-implementation survey revealed a 92% provider satisfaction rate, compared to persistent nationwide retention challenges. Economically, the initiative generated $4,862,840 in net financial profit, a 243.1% Return on Investment (ROI), a 5-year adjusted Net Present Value (NPV) of $5,038,139, and a Modified Internal Rate of Return (MIRR) of 35.84%.

Conclusion: One-on-one interviews with APPs are a highly effective, practical, and rapid tool for identifying specific and granular drivers of attrition. Addressing these granular and group-specific issues can significantly improve retention, boost engagement, reverse a staffing crisis, and yield substantial capital preservation and institutional wealth generation.

What is already known on this topic

Prior to this study, the post-pandemic anesthesia workforce faced severe national shortages, with up to 68% of clinicians at high risk for burnout. Traditional anonymous wellness surveys identified these broad industry trends but failed to capture the site-specific operational and cultural grievances driving individual resignations.

What this study adds: This study shows that structured, face-to-face interviews with 85 advanced practice providers quickly identified specific drivers of attrition, uncovering localized issues like "relief anxiety" over irregular breaks and clinical stagnation. By addressing these granular stressors with targeted technological, operational, and financial reforms, the institution completely decoupled from failing national or local hospital trends, eliminating voluntary resignations by 2026 and generating a 243.1% financial return on investment.

How this study might affect research, practice, or policy: These findings should encourage healthcare administrators to replace passive survey metrics with proactive, one-on-one listening frameworks to stabilize staffing. Practically, it provides a scalable, three-tiered intervention strategy, Listen, Automate, and Recognize, and proves that upfront capital allocations for permanent staff retention are highly profitable alternatives to premium contract labor.

Introduction

The COVID-19 pandemic precipitated an unprecedented crisis in the global healthcare workforce, disproportionately affecting anesthesia departments (1). As surgical volumes surged and burnout intensified, many institutions faced a "mass exodus" of skilled clinicians (1, 2). A nationwide study by the American Society of Anesthesiologists (ASA) found that the prevalence of high-risk burnout and burnout syndrome among U.S. attending anesthesiologists increased significantly (1). By late 2022, nearly 68% of surveyed anesthesiologists were at high risk for burnout, and nearly 36% indicated they were likely to leave their current positions within the next two years (1). At our institution, this manifested as a critical shortage of anesthesia APPs, including Certified Registered Nurse Anesthetists (CRNAs) and Anesthesiologists' Assistants (CAAs). Internal wellness surveys conducted during this period revealed historically low levels of engagement and a pervasive sense of professional exhaustion. Traditional, anonymous surveys (3), while useful for identifying broad trends, often fail to capture the nuanced, site-specific grievances that drive high-performing clinicians to resign (4, 5).

To address this attrition, APP leadership pivoted from passive data collection to a proactive, qualitative approach: comprehensive one-on-one interviews with 85 APPs. The primary objective was to identify the granular operational and cultural factors contributing to the staffing deficit. These face-to-face dialogues uncovered several core drivers of dissatisfaction, including inadequate incentives, a lack of predictable breaks, rigid scheduling practices, and a perceived "toxic" work environment devoid of a team-based culture.

Based on these granular, group-specific data, this initiative moved beyond simple financial adjustments, such as competitive salary restructuring and retention bonuses, to address daily quality-of-life concerns. Key operational changes included automated scheduling, optimizing existing systems, and introducing a virtual, on-demand break board to ensure reliable relief. Additionally, we implemented cultural and team-based interventions, such as establishing a specialized team-based care model, introducing a robust recognition program, and creating part-time work opportunities, to rebuild trust and recognition. To strengthen engagement and shared ownership, we established voluntary liaison roles across key operational and clinical areas.

The results of these group-specific, granular interventions, identified through one-on-one interviews, were immediate. Within one year, the department successfully reversed its staffing trajectory. More importantly, our granular intervention outperformed the national benchmark for recruitment and retention. This article outlines the practical application of one-on-one interviews as a rapid diagnostic

tool for workforce management. We describe how these qualitative insights can be translated into targeted, high-impact operational changes that improve staff engagement and stabilize the anesthesia workforce in a staffing crisis such as a post-pandemic landscape.

Methods

Setting and Participants: All methods were performed in accordance with the relevant guidelines and regulations, including the Declaration of Helsinki. This quality improvement (QI) initiative was conducted at a large academic medical center following a period of significant attrition among anesthesia APPs. The Institutional Review Board (IRB) reviewed this project and determined it to be a quality improvement/program evaluation activity that did not meet the federal definition of human subjects' research; therefore, formal IRB oversight was not required. As such, no consent was required, and a clinical trial number was not applicable. The study population comprised 85 APPs, including both CRNAs and CAAs. Participants represented a mix of senior staff and recent hires to ensure a comprehensive understanding of the departmental climate. To identify the specific drivers of attrition, APP leadership transitioned from anonymous digital surveys to a qualitative, one-on-one interview model (see Fig. 1A). In-person, semi-structured interviews (1. What do you like most? 2. What do you dislike most?) were conducted with each of the 85 APPs over a three-month period. The APP Director and APP Chief led the meetings to demonstrate leadership commitment and ensure administrative follow-through. The interviews focused on four domains: operational bottlenecks, compensation and incentives, workplace culture/toxic behaviors, and work-life balance (specifically scheduling and breaks). All responses were de-identified and thematically analyzed to identify the most prevalent "pain points" prompting staff to consider resignation. Based on interview themes, a multifaceted retention initiative was launched. The interventions were categorized into three primary pillars: 1. Operational Efficiency & Technology: Virtual Break Board; 2. Cultural and Team-Based; 3. Financial Restructuring: Compensation Alignment. The primary outcome measures were the annual number of voluntary resignations and the annual number of successful new hires. We compared data from the 60-month period preceding the intervention (the peak of the post-pandemic crisis, 2022) with the 48-month period following full implementation of the initiatives.

To evaluate how localized institutional outcomes compared to specialty-specific macro trends, a comparative timeline analysis aligned internal metrics against national datasets from the American Society of Anesthesiologists (ASA) and the Somnia Workforce nationwide benchmarks across three critical operational phases (**Table 1**): Phase 1: Pre-Pandemic Baseline (2018–2019): Institutional metrics evaluating a highly stable, expanding workforce were contrasted against baseline national historical averages of stable W-2 employment and low provider burnout (1). Phase 2: Peak Attrition Crisis (2022): Internal metrics recorded a sharp escalation to 16 voluntary resignations and a corresponding 77.8% recruitment shortfall, benchmarked against national ASA findings showing a 68% provider burnout rate and a 36% individual intent to exit the profession (6). Phase 3: Stabilization and Expansion (2023–2026): Local dataset endpoints demonstrating a plunge in attrition to zero resignations by 2026 and an

acquisition expansion of 22 new hires were aligned against national trends showing a stagnant 50% industry-wide burnout plateau and structural national supply shortages (7–9).

The financial analysis evaluated the Return on Investment (ROI) of a strategic $2,000,000 capital allocation to optimize talent retention and structural workforce reorganization by replacing premium contract labor with permanent staff. The methodology structured the cumulative 4-year economic impact into two primary financial mechanisms: premium labor displacement and recruitment cost avoidance.

To quantify premium labor displacement, the model established a fixed cost differential between temporary contract personnel (locum tenens) and permanent institutional staff. Permanent staff costs were calculated as a fully burdened hourly rate inclusive of base salary, healthcare benefits, and payroll taxes ($140/hour). Premium contract labor was modeled at an all-inclusive agency bill rate ($250/hour). The net hourly savings variable (ΔC) was defined by subtracting the burdened permanent staff rate (C_{staff}) from the contract labor rate (C_{locum}): $\Delta C = C_{locum} - C_{staff}$ (ΔC = $250/hr - $140/hr = $110/hr).

Operational capacity was standardized using the industry norm for Full-Time Equivalents (FTE). One FTE is defined as 2,080 annual productive hours (computed as 40 hours per week across 52 weeks). The total volume of operational hours recovered (H_{total}) was determined by multiplying the net shift in the permanent provider workforce (N) by the standard annual FTE hours (H_{FTE}):

$H_{total} = N \times H_{FTE}$. Evaluating performance against the pre-implementation multi-year trend baseline reveals a net positive workforce variance (N) of 21.8 providers over the 4-year cycle: H_{total} = 21.8 x 2,080 = 45,344 hours.

The total annual savings from premium labor displacement (S_{labor}) was calculated by multiplying the aggregated operational hours by the net hourly savings differential: $S_{labor} = H_{total} \times \Delta C$, S_{labor} = 45,344 hours x $110/hr = $4,987,840.

The financial benefit of turnover mitigation ($S_{retention}$) was quantified using industry-standard replacement-cost metrics for specialized Anesthesia APPs. The replacement cost benchmark ($C_{replace}$) was set at a conservative low level of $125,000 per provider, which aggregates direct costs (marketing, sourcing, interviewing, credentialing) and indirect costs (three months of diminished productivity during onboarding and clinical orientation). The total recovery was the product of the number of prevented resignations (R) and the unit replacement cost: $S_{retention} = R \times C_{replace,}$ $S_{retention}$ = 15 x $125,000 = $1,875,000. The total gross financial benefit (S_{gross}) was the sum of premium labor displacement savings and recruitment cost recovery: $S_{gross} = S_{labor} + S_{retention,}$ S_{gross} =$4,987,840 + $1,875,000 = $6,862,840. Net profit ($P_{net}$) was derived by subtracting the initial strategic upfront investment (I = $2,000,000) allocated for bonuses and structural workforce reorganization from the gross annual benefit: $P_{net} = S_{gross} – I$, P_{net} = $6,862,840 - $2,000,000 = $4,862,840. The Return on Investment percentage was calculated by dividing the net financial profit by the initial capital investment, expressed

as a percentage: ROI = (Pnet / I) x 100%. ROI = ($4,862,840/$2,000,000) x 100% = 243.1%. **Note**: To simplify the calculation, we did not incorporate data on OR time saved. However, retaining 10 APPs saves a typical surgical institution $1,440,000 to $2,304,000 annually, strictly in protected operating room (OR) time.

Statistical Analysis

Data were analyzed to compare staffing metrics before and after the implementation of the one-on-one interview-driven initiatives. The primary endpoints were the annual number of voluntary resignations and the annual number of successful hires. Measures of frequency and percentages were used to summarize changes in workforce size and the composition of the APP team. Given the small annual sample size and the likely non-normality of temporal metrics, a non-parametric approach was required. The Wilcoxon matched-pairs signed-rank test was employed to assess the statistical significance of the shift in annual recruitment and resignation counts between the pre- and post-intervention phases. A pre- and post-intervention comparison of the net annual staffing balance (Hires minus Resignations) was conducted to illustrate the acceleration of net institutional workforce growth. All statistical calculations were performed using GraphPad Prism. A p-value < 0.05 was considered statistically significant evidence of an impact from the interventions.

Results

The transition from a passive, survey-based approach to a proactive, one-on-one interview approach, followed by targeted operational and financial interventions, resulted in substantial stabilization of the APP workforce. Average annual voluntary resignations decreased by 53%, while average annual new hires increased by 14.4%. The average annual resignations dropped by over half (7.0 down to 3.25). The high turnover peak observed in 2022 (16 resignations) was eliminated, and post-implementation numbers stabilized at 5 or fewer per year. Average hiring metrics increased slightly, from 11.8 to 13.5 hires per year. Due to the optimized retention rate, the post-implementation phase generated + 41 net staff in just 4 years, outperforming the 5-year pre-implementation net accumulation of + 24 staff. A Wilcoxon matched-pairs signed-rank test was performed to analyze the shift in the resignation-to-hire ratio. The shift was significant (p = 0.035; Fig. 1B). The Odds Ratio for the workforce metrics was 2.46 (95% Confidence Interval: 1.18 to 5.14), which was statistically significant (p = 0.0154) and indicated that the odds of an APP transaction being a new hire rather than a resignation were 2.46 times higher after implementing the initiative compared to the baseline period.

As seen in Fig. 1B in 2022, the organization faced an acute retention challenge, recording a 77.8% shortfall in hiring volume relative to departures (9 hires versus 16 resignations). In 2023, voluntary departures dropped by 68.8% from 16 down to 5 resignations. At the same time, talent acquisition increased by 22.2%, reaching 11 hires. As such our approach completely reversed the previous year's deficit, resulting in a 291.1% improvement in the hiring-to-resignation ratio relative to the 2022 baseline. In 2024, recruitment remained on a steady uptrend, enabling the organization to achieve a cumulative

300.0% improvement in the hiring-to-resignation ratio compared with the 2022 crisis. This proved that the operational recovery was effective and sustainable. With a stable workplace foundation secured, the organization entered an aggressive expansion phase in 2025. While attrition remained flat at 4 resignations, the recruitment pipeline surged by 144.4% over the previous year, reaching an all-time high of 22 hires. This massive onboarding expansion drove the hiring-to-resignation ratio to a staggering 877.8% total improvement over the 2022 baseline.

As shown in Fig. 1B, our historical data from 2018 to the present capture the full lifecycle of our staffing crisis. In 2018 and 2019, we maintained a highly stable, expanding workforce. However, the onset of the pandemic triggered a sharp decline in retention. This culminated in our peak crisis in 2022, when annual resignations skyrocketed to 16. Although recruitment kept pace to prevent an absolute numerical deficit, the rapid velocity of departures pushed our remaining staff to the brink of severe burnout. In response, we launched our 1-on-1 interview intervention and comprehensive retention initiative in 2022. The impact was immediate: resignations plunged by 68.8% the very next year and have remained suppressed at 5 or fewer ever since. At the same time, our competitive restructuring supercharged recruitment, netting 22 hires in 2025. Today, in 2026, we have reached a significant milestone: zero resignations and a fully stabilized department.

The confidential, one-on-one diagnostic interviews (N = 85) provided an objective mapping of workplace sentiment. This qualitative exploration yielded 88 explicit mentions of professional satisfaction or core elements staff wished to preserve ("likes"), contrasted against 153 explicit mentions of structural or cultural grievances ("dislikes").

The 153 mentions of operational friction identified several overlapping institutional contributors to attrition. Figure 2 displays a pie chart analysis of “dislikes” **(**Fig. 2A) and “likes” (Fig. 2B). Low financial incentives were the most frequently cited concern (n = 35, 22.9%) followed by low case variety (n = 30, 19.6%), lack of allocated breaks (n = 26, 17.0%), inflexible scheduling (n = 23, 15.0%), absence of team-based care (n = 12, 7.8%), toxic interpersonal culture (n = 9, 5.9%), lack of moonlighting opportunities (n = 8, 5.2%), chronic short staffing (n = 6, 3.9%), and inadequate FTE reduction pathways (n = 4, 2.6%). The 88 positive mentions highlighted several enduring strengths of the APP role and departmental environment. The core anesthesia job scope was most valued (n = 24, 27.3%). Other positive themes included co-worker dynamics (n = 8, 9.1%), case variety potential (n = 8, 9.1%), supervisor support (n = 7, 8.0%), and a shift system design (n = 7, 8.0%).

A 2026 post-implementation survey showed 92% APP satisfaction, 8% neutrality, and no dissatisfaction. While anesthesia departments nationwide continued to experience a structural shortage and high intent-to-leave rates (~ 40%) through 2026, our department bucked the macro trend. By introducing our 1-on-1 qualitative interview framework, our resignations collapsed to zero in 2026, resulting in an aggressive staffing surplus while the rest of the country remained in a supply-and-demand deficit (**Table 1)**.

Workforce stabilization also produced substantial institutional savings by reducing turnover and reliance on external temporary staffing. Through lower attrition and systematic avoidance of locum tenens

coverage, the initiative generated $6,862,840 in cumulative gross savings over its 4-year cycle. After accounting for implementation and salary restructuring costs ($2,000,000), the intervention produced a $4,862,840 net financial gain across the 4-year period, corresponding to a 243.1% return on investment. To align the analysis with institutional financial conditions, the capital budgeting model used a tailored 7.0% discount rate, consistent with the low cost of capital typical of an elite, AA+-rated health system such as UCHealth. Under this framework, the initiative generated an adjusted Net Present Value (NPV) of $2,504,506 over 3 years and $5,038,139 over 5 years. Using the Modified Internal Rate of Return (MIRR) and a conservative 7.0% corporate reinvestment rate, the project achieved an MIRR of 38.12% over 3 years and 35.84% over 5 years. These results show that, when assessed against UCHealth's realistic hurdle rates, the workforce stabilization initiative provided a strong mechanism for capital preservation and institutional value creation (Fig. 2C).

Discussion

This quality improvement initiative shows that direct, one-on-one engagement with anesthesia APPs can serve as both a diagnostic and therapeutic strategy for stabilizing the workforce. By replacing anonymous surveys with direct conversations, leadership identified actionable stressors that aggregate data had obscured. These findings suggest that although competitive compensation remains essential, everyday operational friction, including unreliable breaks and inflexible scheduling, often becomes the immediate trigger for resignation. Addressing each major concern identified through the interviews was central to the initiative's success. In fact, prior studies suggest that although surveys are frequently used, their aggregate findings are often not translated into effective action because of limited clinical engagement, misinterpretation of results, and insufficient attention to localized workplace concerns (10).

The critical nature of this localized intervention is best understood when contrasted against national benchmarks. According to longitudinal workforce data from the American Society of Anesthesiologists (ASA), the prevalence of high-risk clinician burnout peaked at an unprecedented 68% in late 2022, with 36% of surveyed anesthesiologists indicating a high likelihood of leaving clinical practice within two years (1). This macro-level distress manifested directly within our department during the same period, culminating in a historical peak of 16 voluntary resignations in 2022 and a staggering 77.8% shortfall in hiring volume relative to departures (1). However, while the 2025 and 2026 Somnia Anesthesia Labor Market Studies confirm that the national workforce remains locked in a severe structural supply-demand deficit, characterized by a flat 50% burnout rate and an accelerated provider migration toward independent 1099 or locum tenens arrangements (9), our department's attrition plummeted by 68.8% the year following intervention (**Table 1**). By 2026, the department achieved a critical operational milestone: reducing voluntary clinician departures to zero and securing a completely stabilized staffing foundation.

The divergence between our institutional outcomes and national trends highlights the limitations of standard healthcare workforce management strategies, which frequently suffer from low response rates or "survey fatigue". Broad national trends capture generalized dissatisfaction but fail to identify

actionable, micro-level operational friction points. For example, while national literature genericizes workforce exhaustion as "workload burnout", our qualitative analysis uncovered a highly specific psychological phenomenon: "relief anxiety," or the persistent day-to-day uncertainty regarding a provider's ability to take basic biological and meal breaks. Introducing a virtual, on-demand digital break board directly combated this stressor by establishing real-time visibility, predictability, and equitable break allocation. Similarly, the 19.6% baseline dissatisfaction with low case variety was resolved by replacing a generic "pool" deployment with Specialized Care Teams. Aligning APPs with specific surgical subspecialties successfully eliminated clinical stagnation, fostering peer accountability and technical mastery while mitigating the professional isolation commonly reported in traditional staffing models.

One-on-one interviews are a critical workforce management strategy, though research or reports specifically on this topic in anesthesia departments remain unknown. These interviews serve as structured conversations between managers and anesthesia professionals to assess job satisfaction, identify concerns, and develop targeted retention strategies. Within the broader context of healthcare workforce challenges, these individual interactions have emerged as valuable tools for understanding and addressing the complex factors influencing staff retention. The anesthesia profession faced significant workforce supply and demand imbalances, particularly following the COVID-19 pandemic (11, 12). The imbalance has exacerbated burnout among anesthesiologists and other anesthesia clinicians, compromised healthcare facility operations, disrupted surgical schedules, and threatened the sustainability of training programs (13, 14). Understanding these challenges through structured dialogue is essential for developing effective retention solutions (15). Research on healthcare workforce management demonstrates that one-on-one discussions between leaders and clinical staff help identify critical retention drivers (16). Job satisfaction, burnout levels, work-life balance, and perceived organizational support emerge as central themes in these conversations (17, 18). Evidence from healthcare management studies indicates that collaborative and compromising approaches during these discussions, in which leadership actively listens and addresses concerns, are most effective at preventing staff turnover (19). One-on-one interviews provide opportunities to assess burnout prevalence, emotional exhaustion, and intentions to leave the profession (20). One-on-one interviews enable leaders to identify gaps in these areas and develop targeted improvements that resonate with individual staff members.

As such, integrating regular one-on-one interviews into anesthesia department management practices could represent a proactive future approach to workforce sustainability. Traditional wellness surveys often suffer from low response rates or "survey fatigue," providing a high-level view of burnout without offering actionable local solutions. In contrast, our use of semi-structured interviews allowed for, e.g., the identification of "relief anxiety," a specific psychological stressor in anesthesia where providers feel uncertain about their ability to take basic biological breaks. The implementation of the Virtual Break Board directly mitigated this stress by providing transparency and equity, demonstrating that technological solutions can profoundly impact wellness (21).

Although salary restructuring and bonuses were needed to remain competitive, financial incentives alone do not resolve a toxic work environment. Administratively, these upfront costs also required long-term fiscal justification. Our data show that the $2,000,000 investment was largely offset by reduced attrition, resulting in an adjusted NPV of $5,038,139, adding more than $5 million in incremental value after accounting for capital costs. For every dollar invested, the system captured $2.51 in added value. The initiative also achieved a 35.84% 5-year MIRR, a conservative measure that assumes reinvestment at the standard cost of capital. This return far exceeded the hospital's typical 8% hurdle rate, supporting the initiative as a highly profitable capital allocation.

The shift toward Specialized Care Teams was perhaps the most significant cultural intervention. By moving away from a generic "pool" of providers and toward subspecialty cohorts, we fostered clinical mastery and peer accountability. This team-based approach directly addressed the sense of isolation and lack of support reported during the initial interview phase.

For anesthesia departments facing similar shortages, our one-on-one interview results suggest a three-tiered approach to retention (**Figure 3A**):

1. **Listen**: Use direct interviews to uncover site-specific grievances.
2. **Automate**: Remove human bias and error from scheduling, break relief, etc.
3. **Recognize**: Implement formal recognition programs like "APP of the Month" or team leaders to rebuild professional value.

Limitations

This study was conducted at a single academic institution, and the specific drivers of attrition may vary by region or practice model (e.g., private practice vs. academia). However, these one-on-one interviews will provide the site-specific, granular data that are needed to increase recruitment and retention. While we do not have a specific internal control, our hospital staff are currently in a staff crisis, relying on at least 50% travel nurses. Moreover, nationwide anesthesia departments continued to experience a structural shortage and high intent-to-leave rates (~40%) through 2026 (6, 8). As such, our department bucked the macro trend and represents an anomaly, linked to our specific approach: by introducing a 1-on-1 qualitative interview framework, our resignations collapsed to zero in 2026, resulting in an aggressive staffing surplus while the rest of the country remains in a supply-and-demand deficit (**Figure 3B**).

Conclusion

One-on-one interviews are a rapid, low-cost, and highly effective way to diagnose group-specific workforce dissatisfaction. By creating an environment where providers feel valued, supported, and actively involved in shaping the department's future, organizations can strengthen recruitment, improve long-term retention, enhance operational resilience, and protect the future of anesthesia services. The primary finding of this analysis is that our department successfully decoupled from the collapsing

national anesthesia labor market, transforming a 77.8% hiring shortfall in 2022 (16 resignations, 9 hires) into a fully stabilized department with zero voluntary resignations in 2026. While national data from the American Society of Anesthesiologists (ASA) and the Somnia Anesthesia Labor Market Study show that persistent shortages, rigid schedules, and a 50% nationwide burnout rate continue to disrupt operating rooms, our localized 1-on-1 interview framework reversed the post-pandemic crisis and generated $4,862,840 in net financial profit.

Declarations

Ethics approval and consent to participate

Approval was obtained from the Institutional Review Board (Colorado Multiple Institutional Review Board [COMIRB]) at the University of Colorado Denver, USA. COMIRB: #25-2466. The need for informed consent was waived or exempted by the Colorado Multiple Institutional Review Board [COMIRB]. All relevant methods were undertaken in strict accordance with departmental and institutional regulations. All methods were performed in accordance with the relevant guidelines and regulations, including the Declaration of Helsinki.

Consent for publication

Not applicable

Availability of data and materials

All data are available upon request. Any request for additional information should be directed to the corresponding author.

Competing interests

The authors have no competing interests to disclose.

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Authors' contributions

S.S. analyzed the data and wrote the manuscript; C.S. analyzed the data and wrote the manuscript; T.E. designed and led the study, wrote the manuscript, and analyzed the data.

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***Ethical Statement*:** The authors are accountable for all aspects of the work and will ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Patient and Public Involvement: Patient and Public Involvement: Patients and members of the public were not involved in the design, conduct, reporting, or dissemination of this research. The study was developed as an institutional leadership initiative focused on improving workforce recruitment, retention, and wellness. Data collection relied entirely on primary, one-on-one interviews with anesthesia advanced practice providers about their professional experiences, so direct patient or public engagement fell outside the project's scope.

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Table

Table 1 is available in the supplementary files section

Figures

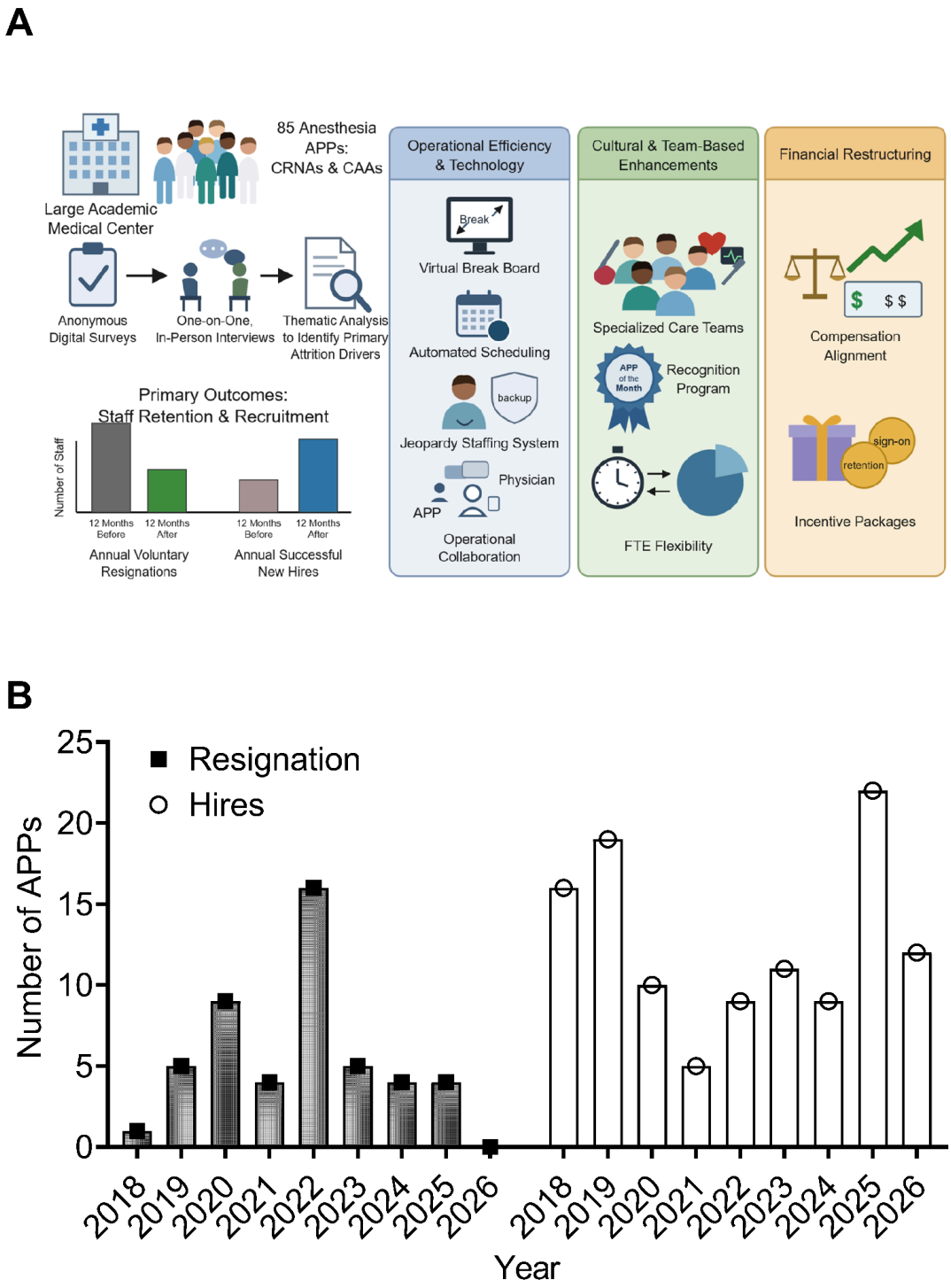


Figure 1

QI project to improve recruitment and retention of Advanced Practice Providers (APP). A. Overview of the QI project. **B.** Comparison of Annual Advanced Practice Provider (APP) Attrition and Recruitment**.** The bar graph illustrates the shift from a staffing deficit (pre-intervention, 2018-2022) to a staffing surplus (post-intervention, 2022-2026) after implementing one-on-one interviews and targeted

operational reforms; CRNA: Certified Registered Nurse Anesthetist; CAA: Certified Anesthesia Assistant; FTE = full-time equivalent.

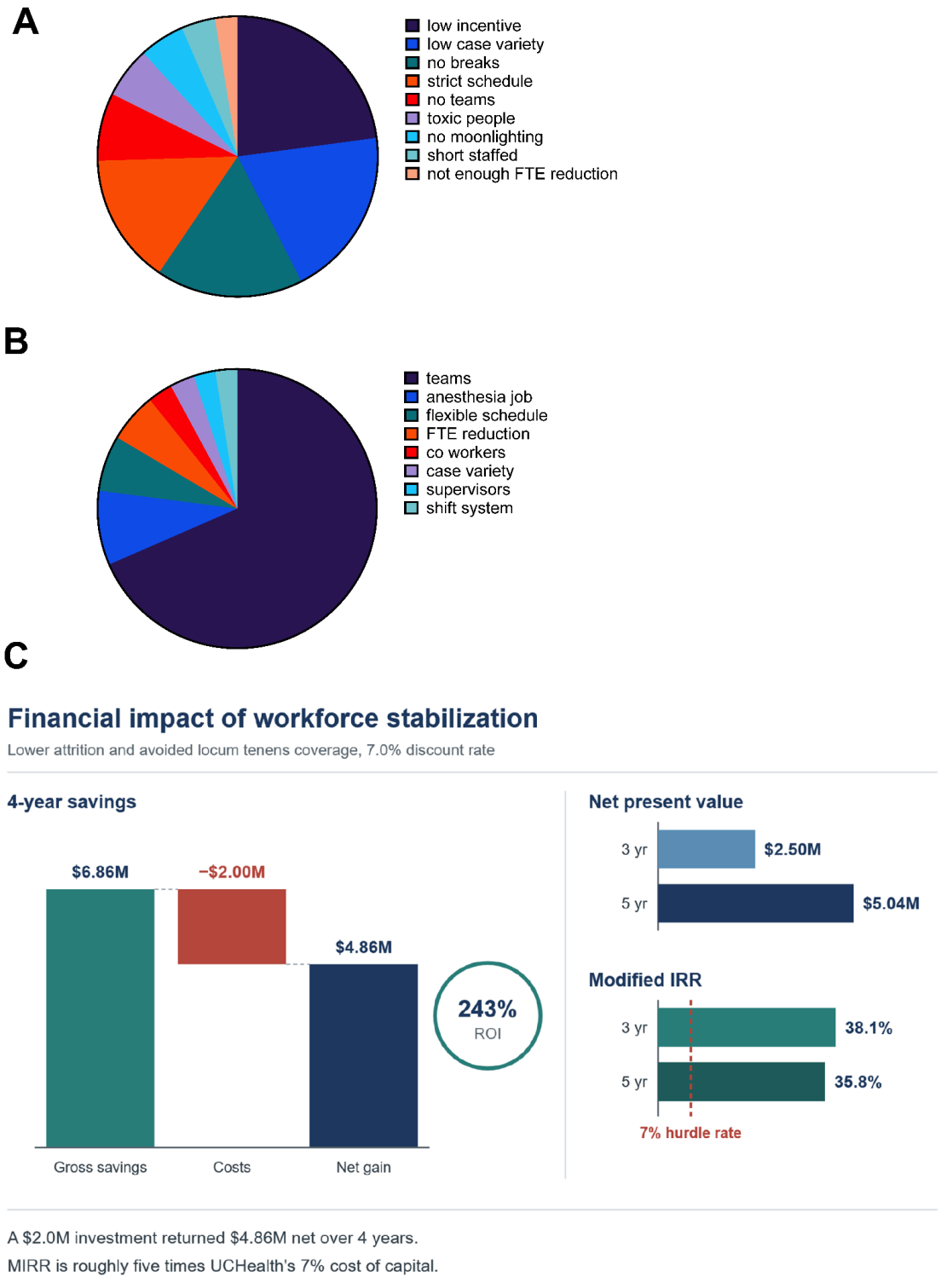


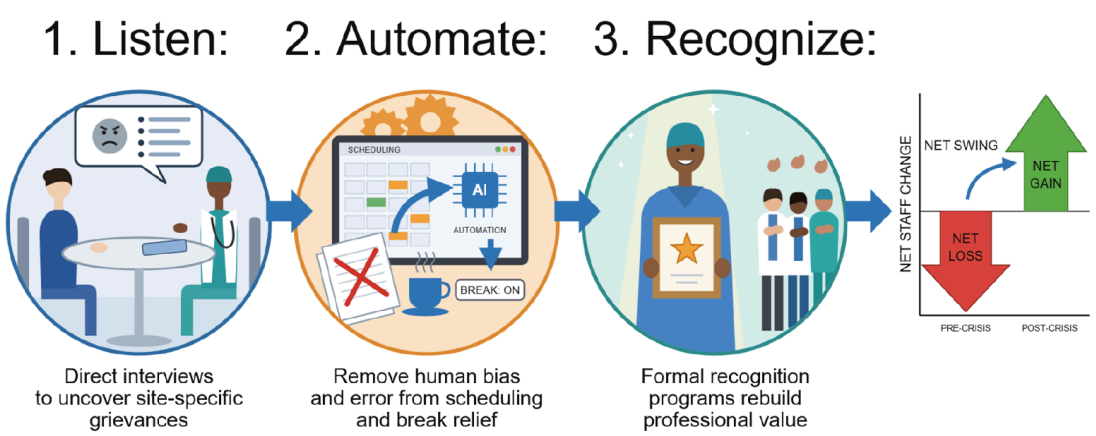
Figure 2

Detailed pie chart analysis of likes and dislikes from confidential, one-on-one diagnostic interviews and financial impact of workforce stabilization. **A** = “main dislikes”, **B** = “main likes”, **C** 4-year savings,

net present value, and modified internal rate of return. NPV tells you exactly how much extra money this project puts into the organization's pocket: 3-Year Profit ($2,504,506), 5-Year Profit ($5,038,139). The Takeaway: This isn't just breaking even; it is actively creating millions of dollars in wealth for the organization. MIRR is like the interest rate on a high-yield savings account, but for a business project. It is "Modified" because it assumes any cash the project makes is safely put back into the company at a realistic, conservative interest rate (7.0%).

3-Year Return (38.12%): For every dollar put into the project, it returns a massive 38.12% interest rate per year over the first three years. 5-Year Return (35.84%): Over five years, the annual return stays incredibly strong at 35.84%. The Takeaway: In the stock market, an 8% to 10% annual return is considered good. A return of over 35% is an absolute home run.

A



B

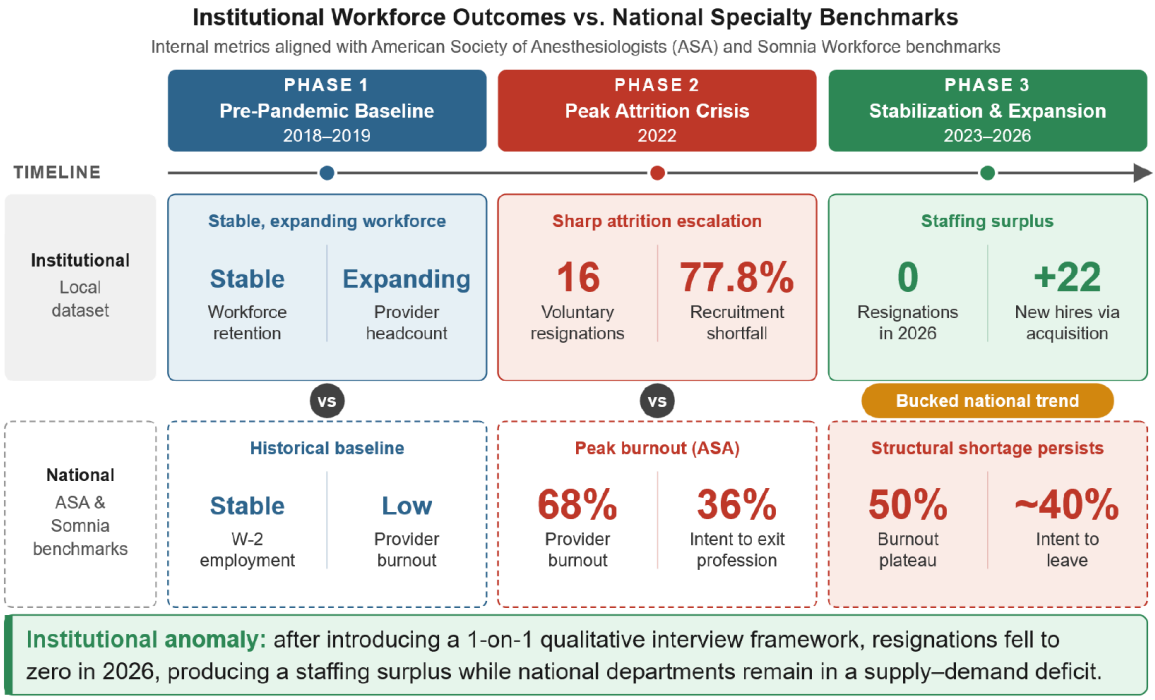


Figure 3

Three-tiered approach to workforce stabilization through retention and recruitment to beat national trends. A Three-tiered approach**; B** Institutional outcomes vs National Benchmarks.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Table1.xlsx