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Cost Benefit Analysis of Anesthesia Providers within Gastroenterology Outpatient Practices

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COST BENEFIT ANALYSIS OF ANESTHESIA PROVIDERS WITHIN GASTROENTEROLOGY OUTPATIENT PRACTICES

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Abstract

Anesthesia delivery in ambulatory and office-based settings has seen significant growth in the last 25 years. The advances in effective short-acting anesthetic drugs, combined with the rise in demand for minimally invasive surgery, allows for an increase in the number of surgical procedures to be achieved outside the hospital setting. Ambulatory anesthesia promotes patient health by reducing recovery times. It also contributes to sustainability by lowering costs otherwise associated with overnight hospital stays. Patient preferences for minimally invasive outpatient surgery, and faster recovery times have spurred an increased demand for business relationships between modern medical practices and anesthesia providers. Certified Registered Nurse Anesthetists (CRNAs) are qualified to administer ambulatory anesthesia in all settings.

However, there is a general lack of understanding of the costs and benefits related to anesthesia within small businesses. This DNP author's decade of experience within Ambulatory Surgical Centers (ASCs) instructs that ASCs lack decision-making tools for the cost-effective addition or subtraction of anesthesia providers. This project aims to answer the question: "What financial framework would empower the modern Gastroenterology outpatient marketplace to effectively add CRNAs to the medical team?"

The purpose of this project is to transform ASC profitability and sustainability by proposing a framework including costs/benefit analysis, tipping points, sensitivities, and service requirements for employing CRNAs. Analysis will result in empowering ASCs to make evidence-based decisions regarding how patient throughput contributes to CRNA profitability for small businesses.

Keywords: anesthesia business plans, anesthesiology information management system, anesthesia staffing, certified registered nurse anesthetist, outpatient anesthesia

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Chapter I

Outpatient Anesthesia is a specific form of anesthesia practice that takes place beyond hospital settings. This cost benefit analysis focuses on Outpatient Anesthesia that takes place within Offices and Surgical Centers; also referred herein as "Small Medical Practices." Hospitals, defined herein as "Large Medical Practices" are excluded from the analysis. Within the broader arena of Outpatient Anesthesia this project focuses singularly on the narrow marketplace of Gastroenterology Surgical Centers. So doing, once a specific understanding of CRNA value within Gastroenterology Surgical Centers is achieved, that understanding may be extrapolated to other types of Small Medical Practices.

In the United States, the Office-Based Surgical marketplace has experienced significant growth throughout the last three decades. In fact, the proportion of all outpatient surgical procedures performed outside a hospital setting has increased from <10 percent in 1979 to approximately 60 percent in 2019, with 15 to 20 percent being performed in office-based settings (Osman & Shapiro, 2019). Specifically, the gastroenterology segment accounted for 29% market share of the global market in 2015 and is anticipated to account for 29.7% share and 31% share of the global market in 2020 and 2026 respectively (PR Newswire, 2016). With ambulatory care needs and services growing, patients are finding numerous benefits to these services including faster access, shorter stays, and lower costs (Kumar & Parthasarathy, 2020). Physicians are benefiting from the personalized service-oriented patient settings and the ownership or shared equity ownership model of Ambulatory Surgery Centers (ASCs). For the CRNA, new advantages are presented by independent practice. More control of work schedule, the freedom to set up their own anesthesia practices, and more influence regarding their pay rates are just a few of these advantages.

As ASCs, and Gastroenterology Centers (GC) in particular, strive to improve net profits; optimizing efficiencies, and maximizing throughput emerge as central challenges. Anesthesia services offer three distinct benefits for Small Medical Practices: 1) anesthesia can become its own profit center, 2) anesthesia can contribute significantly to higher throughput, and 3) anesthesia can contribute to better patient

outcomes and higher patient satisfaction rates. For example, when CRNAs are employed, then Small Medical Practices may bill separately for anesthesia.

At the very heart of cost-benefit analysis is "breakeven analysis." Yet, "breakeven" alone does not account for a handful of other factors that may contribute significantly to decision-making regarding addition/subtraction of anesthesia providers within small business settings. Does an anesthesia provider on staff result in higher productivity or reduced workload for the physician? Does the presence of an anesthesia provider contribute to patient satisfaction, patient retention, or word-of-mouth marketing? If so, then those factors too may contribute to the secondary and tertiary benefits reaped by the addition of anesthesia services. What is anesthesia's effect on the insurance rates paid by the small medical business? Do anesthesia providers reduce or increase risks business-wide? Do anesthesia providers contribute to nursing, business, administrative or other costs/benefits within the small medical practice? If so, to what degree do anesthesia providers impact financial bottom lines and sustainability for small medical practices? Anesthesia providers impact small businesses in both direct and indirect, obvious, and not-so-obvious ways. The CRNAs within these businesses will benefit from thoughtful models designed to help their decision-making.

Purpose Statement

The purpose of this project is to transform the nurse anesthesiology profession by proposing a framework for understanding the costs/benefits, tipping points, sensitivities, and service requirements of gastroenterology ambulatory surgical centers (GI ASC) within the United States and then empowering those GI ASCs to employ CRNAs in the most effective manner. Therefore, the PICOT question is, "What framework would empower the modern Gastroenterology outpatient marketplace to effectively add CRNAs to the medical team."

Problem of Interest

Gastroenterology Ambulatory Surgical Centers (GI ASCs) typically fall under the legal business classification of "Partnership." These partnerships are usually owned and managed, if not entirely operated, by the Gastrointestinal (GI) physician "partners" of the company. Highly trained and

experienced medical practitioners, these physicians generally have far less expertise and experience in business management. With the lion's share of their time, attention, expertise, and experience focusing on their patients, one significant opportunity to increase their profitability (and improve their clinic's patient care) often escapes their grasp. Every single CRNA that a GI ASC hires, may generate gross profits of more than $1.5 million for that practice. Such profits are analyzed in the financial frameworks illustrated in Chapter IV of this paper. As such, the business of anesthesia within a GI practice represents a powerful profit center.

The fact that gastroenterology surgical centers in Northern Nevada have under-employed CRNAs throughout the past decades demonstrate how millions of dollars remain to be extracted by these businesses. These additional revenues can make the difference between profit and loss or sustainability and bankruptcy for these small businesses. Northern Nevada is a microcosm… not an anomaly… but indicative of the nationwide opportunity to grow profit and improve patient outcomes within GI ASCs. Further, the financial opportunity inherent to employing CRNAs is no paltry matter. Over a decade of professional experience, the CRNA leading this project has witnessed the vacant capacity of just three Northern Nevada GI ASCs to employ more than 6 full time equivalent CRNAs. That represents an opportunity cost of more than $90 million over a ten-year period.

Therefore, this project seeks a framework that would empower the modern Gastroenterology outpatient marketplace to effectively add CRNAs to the medical team. This is one of the most basic questions that owners of Gastroenterology practices face, "When should incremental CRNAs be added to a practice?" Stated another way, "What is the patient throughput that provides a break-even to the investment of adding a CRNA; after which, each additional patient provides a net profit to the business?" This is a fundamental question for any profit center. When will an investment pay off? When will net profit cross from negative to positive? Following that, how much will be the annual rate of return on such an investment? Simple calculations suggest that investment in each CRNA may pay off within the first quarter of each year. If patient throughput supports gross income from anesthesia delivery of $1,250,000 per year, and a practice employs a CRNA at a gross cost of $250,000 per year, then the investment cost to

the business is paid back in less than 2.5 months, and the business nets $1,000,000 per year. Once GI ASCs are empowered to better understand this opportunity, then their next question may become, "How may the employment of each CRNA be fine-tuned to extract even more profit?" This question may require more inputs to determine with accuracy, but… again… simple steps may be available to boost profit from this particular investment on the order of hundreds of thousands of dollars. In fact, evidence suggests that profits may be raised as much as an additional half-million dollars per year. Simultaneously, by fine-tuning the attracting, retaining and management of CRNAs; costs may be reduced, risks may be mitigated, and patient outcomes may be improved.

Population of Interest

The "population" targeted by this project is "Gastroenterology Ambulatory Surgical Centers." GI ASCs may comprise a single gastroenterologist, or many. Because physicians typically operate under the umbrella of a "legal entity," this project may be best visualized as targeting the population of the *businesses*… rather than the population of the *individuals*… the gastroenterologists… who form them.

It is important to distinguish between the gastroenterologists who work within these business entities, and the entities themselves. On one hand, GI ASCs typically operate as Partnerships, wherein the collective physician-partners of the organization lead the overall business decision making. Therefore, these businesses tend to follow trends that may often be understood within the context of the strengths, weaknesses, and personal psychological motivators and inhibitors common to individual physicians. On the other hand, GI ASCs usually employ some level of staff for management and administration of their practices. Even while management/administration staff runs day-to-day operations, their more business-focused approach (compared to medical-focused) has also failed to effectively value CRNAs. Both business-focused administration and medically focused physicians have failed to seize… and optimize… the opportunity of hiring incremental CRNAs.

According to the Association of American Medical Colleges, in 2015 there were 14,126 practicing gastroenterologists, 9,499 of whom held a U.S. Doctor of Medicine degree by specialty, in Gastroenterology. In a report published by the National Institute for Health in 2022, authors O'Hanlon

and Patel conclude that at the same period from 2012 through 2020, the number of gastroenterologists grew by 9%, while the number of gastroenterology practices shrank by 14%. They pointed to economic challenges to practices as one of the greatest reasons for this consolidation. Some may label motivating factors as economic "challenges," while others conclude that the practices are following pervasive market "opportunities" that encourage consolidation via cost-cutting measures like sharing staff, facilities, and equipment.

Regardless, what these demographics teach is twofold: 1) the gastroenterology marketplace is sufficiently large to signal a high, profitable demand for the proposed DNP project, and 2) the behavior of gastroenterology practices is already actively changing due to financial motivations. These two lessons are powerful indicators that gastroenterologists are already highly motivated, nationwide, to engage financially driven change.

Table 1. Relevant Definitions & Abbreviations

Abbreviation	Definition	Function
ASA	American Society of Anesthesiologists	
ASC	Ambulatory Surgical Center	
ASA unit	Base or time units billed for anesthesia care	Applies to CPT codes 00100 to 01999
Base	Base unit	Base unit reflects the complexity of the anesthetic
Base/case	Base units per case	= (tASA/y-time units/y) / (case/y)
CRNA	Certified Registered Nurse Anesthetist	
CRNA h/ staffed h	CRNA billed time to staff time	= CRNA (time units)/staffed hours
FTE	Full-time equivalent	(using 250 days/year estimate)
GI ASCs	Ambulatory Surgical Center Specializing in Gastrointestinal Health; Synonym: Gastroenterology	
h/case	Case duration = hours per case	= ([time units/y]/4) / (case/y)
h/OR/d	Billed hour per site per weekday	= ([time units/y]/4) / OR site/d) / 250
OR FTE/d	# of CRNAs needed to cover OR sites at the start of each regular workday	
OR FTE/FTE	% time spent providing care that is billed using ASA units	= # days in OR / 250 days
OR sites/d	Anesthetizing sites covered at start of each regular workday	
Time	Time units reflect total time engaged in care documented in 15-minute intervals	
Time units/y	15-min time units billed per year	
(tASA)	Total ASA units (base + time) billed	
(tASA)/h	Hourly billing productivity = total ASA units per billed hour	= (tASA/y) / ([time units/y]/4)
(tASA)/OR	Total ASA units per site	= (tASA/y) / (OR site/d))
(tASA)/OR FTE	Total ASA units billed per OR FTE	= (Tasa/y) / (OR FTE/d)
(tASA)/y	Total ASA units billed per year	(tASA)/y
WRVU	work RVU = work component of relative value unit	Applies to all other CPT codes

Literature Search Strategy

Phase I

To facilitate the search for relevant empirical and other evidence, tables are created by identifying terms for each variable in the PICOT question, such as: Anesthesia Business Plan, Outpatient Anesthesia, Anesthesia Staffing, Anesthesia Information Management System, etc. Single-term searches such as these resulted in numbers of publications as few as 1 and as many as 4,000+. Synonyms of search terms include ambulatory, CRNA, Certified Registered Nurse Anesthetist, business model, employees, anesthesia team, operating theater, anesthesia department, cost analysis, expense planning, NORA, non- operating room anesthesia, staffing models, CRNA models, ROI, and return on investment. To narrow and refine the results to provide the most relevant data for our research, search terms and synonyms were combined using "AND" and "OR" commands, as well as definition of publication attribute fields including Language, Geography, Publication Type, Publication Date, etc. Refining searches in this way utilizes both the science of searching databases as well as the art of identifying key terms as they may contribute or distract from the goals of this project.

Phase II

After Phase I resulted in relevant evidence related to the PICOT question, subsequent searches focused on how a tool might be developed to help gastrointestinal physicians understand the potential value of CRNAs to their practices. Developing such a financial model relies on a 4-step process:

1. Identify and break down fundamental elements to which the model is sensitive,
2. Establish relationships among the identified elements,
3. Challenge the sensitivities of the model to its identified elements,
4. Evolve the model. Eliminate elements to which the model is not sensitive.

Then begin again at Step 1 until the most fundamental, model-sensitive elements are achieved.

This process ultimately informs the progression of the search strategy, as identifying fundamental elements, establishing their relationships, and challenging their effects on the model, output leads to identification of new elements and relationships within the specific industry under investigation. For

example, the elements of "types of procedures" performed in gastrointestinal surgical centers evolved into a category of "other." Multiple procedures identified and introduced to early iterations of the model resulted in complicating the model, requiring more time/effort of the user to provide those inputs, yet; those procedures had such an insignificant effect on the output of the model (net revenue) that identifying those procedures became a liability, not an asset, to the tool.

As instructed by the Harvard Business Review Insight Center Report (2014) *Predictive Analytics in Practice*, Sensitivity Analysis is used in financial modeling to analyze how the different values of a set of independent variables affect a specific dependent variable under certain specific conditions. How does the number/percentage of upper endoscopies affect revenue? How do overhead facility fees affect revenue? Quite simply, revenues related to employing CRNAs are sensitive to the former and not at all sensitive to the latter. Sensitivity Analysis informs a vast difference between these two variables.
One is central to our model; the other is irrelevant and was therefore rejected from the model. Sensitivity Analysis therefore guided the search strategy in Phase II.

Literature Search Explained

Phase I: Many lessons emerged from the initial phase of searches. Among them are:

1. Synonyms can result in duplications of results. For example, when comparing "Outpatient Anesthesia" to "Office-Based Anesthesia" it becomes evident that "Outpatient Anesthesia includes both Office-Based and Hospital-Based anesthesia.
2. In a slightly different yet notable comparison, synonyms may result in arrays of results beyond the parameters of the project. For example, "Outpatient Anesthesia" includes anesthesia within the Hospital setting; a setting excluded from this project.
3. The deletion of one of multiple words of a synonym may conclude in an entirely separate set of publication results. For example, "Anesthesia Information Management System AND Cost Effective" yielded one result, while "Anesthesia Information Management System AND Cost-Effective *Anesthesia* yielded two results and both of those two results were different than that of the previous search.

4. Synonyms presented with hyphenation may present a different set of results than the identical synonym with the hyphenation removed. For example, “Office-Based Anesthesia” revealed 579 results in one database, while “Office Based Anesthesia” revealed 1,073 results.
5. Each database has its own unique set of characteristics that influence the number, type, and perspective of literature within. For example, PubMed does not present a filter for Geography, such that a publication focused on Tanzania presented in the results. CINAHL, on the other hand, presents a filter for Geography wherein results produced publications focused solely within the United States. Additionally, some databases focus on scientific publications while others focus on business matters. While some of the differences are more obvious than others, it is important to note that the skilled researcher may leverage both the art and the science of databases and their respective filters toward efficient, effective database searches.
6. Searches utilizing multiple synonyms can take many forms, utilizing “AND,” “OR” and other Boolean functions. While narrowing the field of results by an order of magnitude or more from fields with thousands or hundreds of results is important, it is easy to see how some pertinent literature could be filtered out. Reducing the quantity of results should be balanced where possible with maintaining or improving the quality and specificity of results.

This explanation of searches would not be complete without recognizing the conclusion that the question of this project will be sufficiently informed by publications of both scientific and business backgrounds. Ample evidence exists to propose a model(s) for understanding the costs/benefits, tipping points, sensitivities, and service requirements of low-to-medium throughput medical facilities within the United States.

Subsequent iterations of searches of synonyms of the PICOT question will involve more business publications, including such synonyms as: Patient Satisfaction, Patient Retention, Word-of-Mouth Marketing, Anesthesia Return on Investment, etc. Additionally, integral to this project is researching reimbursement tables for procedures with and without anesthesia, in both the Public and Private marketplaces.

Phase II: Exploration of fundamental elements of the model, their relationships and their effect on the output guided this phase of the literature search. Phase II is an iterative process. Each next step depends on the previous iteration of the model. Exploring whether an element is fundamental or irrelevant to a useful model, and exploring how elements should relate to each other takes one step at a time.

Strategic Agendas Related to the Problem / Stakeholder Analysis

In the best-selling book *Getting to Yes*, the reader learns that in a negotiation, the degree to which one understands the needs and aspirations of the others is the degree to which that particular entity may be successful (Fischer et al., 2011). The term "others" is used in the statement for good reason. One should not consider other parties to a negotiation to be adversaries, opponents, or competitors. Negotiations are not necessarily zero-sum games. Arguably, the most successful, sustainable negotiations are those in which each party walks away as winners; viewing their own positions as improved because of the negotiation. Therefore, to develop strategies for this project, we necessarily examine the needs, resources, weaknesses, strengths, goals, and aspirations of the "others" … the stakeholders of this project.

GI Physician Owners/Partners of GI Surgical Centers

Although this project may benefit multiple stakeholder groups (especially CRNAs and other "non-GI surgical center owners), the stakeholder group known as "GI Physician Owners/Partners of GI Surgical Centers" stands to profit the most. Profiting over $1,000,000 per CRNA hired is one of the most simple, direct, low-cost, low-risk, high-reward actions available to GI Surgical Centers. The story is clear and concise. It is a medical solution to a medically focused audience. Specific, proven legal agreements exist to make "trials" and/or transitions into hiring CRNAs cheap, easy, and virtually risk- free. Virtually every physician, or more generally, most humans… want to "make more money while working the same/less." GI Surgical Centers already have most, if not all, of the overhead, facilities, and staff in place to facilitate hiring CRNAs. This project's solution(s) will offer extremely high payout for an extremely low investment. Therefore, GI physicians are highly motivated adopters of this project's solution.

GI Surgical Center Business Management and Administrative Staff

Ideally, the goals of business managers and administrators will be aligned with their physician

owner/partners. However, the reality of business management does not support the sustained, consistent achievement of such alignment. Just because physician owners would like to make more money, with less time working… does not mean that their staff is incentivized, empowered or able to achieve this goal. If staff perceive they are overworked, or underpaid, or if they would simply receive no direct benefit from discovering or pursuing additional projects, then their ambitions may be counter to the adoption of this project's results. For these reasons and more, this project will strategize direct-to-physician marketing and advertising. Once the physician owners are onboard, they may task their staff with engaging the results of this project.

GI Patients

Patients have much to gain with the hiring of each additional CRNA. Patient surveys indicate higher satisfaction rates regarding endoscopy procedures conducted with CRNA-provided anesthesia compared to physician-provided sedation (Johnson et al., 2017; Mariotti et al., 2023; Padmanabhan et al., 2017). Additionally, it makes sense that with all else equal, having a CRNA… an additional specialist focused on the patient… an expert in airway management and respiration… a nurse with years of intensive care unit experience… is in the best interest of the patient. Yet, as much as patients may benefit by having a CRNA involved with their GI procedures, patients do not drive this type of decision making at GI Surgical Centers. Perhaps patient education could make a difference, but targeting GI patients, educating, and inspiring them sufficiently and then motivating them to request CRNA involvement from their GI physicians is a an expensive, time- consuming, and long-term challenge that… for these reasons and more… will not guide the roll-out strategy for this project's tool(s).

CRNAs

Individually and collectively, CRNAs stand to gain in significant ways the degree to which GSCs (and all ASCs) are fully staffed by CRNAs. Any CRNA who works for or considers working for GSCs (or anywhere else), could benefit by a sophisticated understanding of their value to employers. The valuation tool targeted by this project may help CRNAs negotiate higher salaries and/or better benefits. It may help them to become more effective leaders in business and nursing. It may help them to collaborate,

form groups, negotiate more favorable contracts and to reduce their own personal and professional risks. Yet, CRNAs will also NOT be the most immediate targeted audience for this project. For one thing, employers of CRNAs still have more power to exert over individual CRNAs than CRNAs have over them. Take for example a scenario wherein a GI Surgical Center is in the process of hiring a CRNA. The GI SC may stand to make $1.6 Million per by hiring a CRNA, but a CRNA may stand to make significantly less. The tool this project seeks to build may empower a CRNA to negotiate for tens of thousands of dollars more… each time they move to a new job, while it empowers a Surgical Center to consistently make millions of dollars per year and to fine-tune operations to make hundreds of thousands more. Quite simply, each single proposed valuation tool is worth more to Surgical Centers. That is the short-term reality. In the longer term, a simpler, cheaper version of the proposed tool may be strategically marketed to CRNAs.

Anesthesia Physicians

Anesthesia physicians charge more than CRNAs. (AANA, 2023; Coomer et al., 2019; Hogan et al., 2010; Medscape, 2023). In the GI Surgical setting, there is little to no need to pay the high rates that physicians demand. For this reason, GI Surgical Centers are typically not served by physician anesthesiologists. This is good news for CRNAs, because it means that GI Surgical Centers and other small non-GI Surgical Centers do not represent outstanding opportunities for them, like these settings do for CRNAs. For these same reasons, the targeting of GI SCs by CRNAs does not pose a direct threat to their physician counterparts. This too is important to this project because if this project were viewed to threaten physician anesthesiologists, then these physicians may be incentivized to expend resources to defeat, discredit or otherwise compete with the results of this project. Because physician anesthesiologists make far more than CRNAs as a profession, the physicians have more wealthy/powerful associations, legal efforts, lobbying and other resources to block competition to gain power and influence over the Anesthesia profession. The physicians are considered in this section because they are a powerful force, capable of threatening any efforts that may empower the profession of Nurse-Delivered Anesthesia.

Insurance Companies

When strategizing any effort within the healthcare industry, it would be a mistake to ignore the power and influence of Insurance Companies. If Insurance Companies discover that the valuation tool is worth millions of dollars to them, by helping them lower their costs, then they may be interested in purchasing it outright, or they may become a competitor. They may be able to launch barriers to entry that could keep a project like this from growing, or they may shut a small company down by virtue of bogus lawsuits. Overall, the degree to which CRNAs are proliferated at the expense of their more expensive counterparts (physician anesthesiologists), and the more that CRNA engagement in GI SCs lowers risks and improves outcomes for patients… the more attractive the results of this project may become to insurance companies. Even though they may eventually become a power ally or advocate for this project, insurance companies will not be the initial target for development or application.

Hospitals

It is important to recognize hospitals and to consider how long-term goals of this project may include them. It is also important to consider whether this project threatens hospitals to any extent that may incentivize them to oppose it. At this time, no marketing strategies, no defensive strategies, nor any other of strategies of this project will include hospitals directly.

Policies Related to the Problem

In the case of ambulatory surgical centers hiring CRNAs, there are no policies that stand in the way. GI centers may hire as many CRNAs as they wish. Yet, when examining "policies" and how they relate to the problem at hand, it is important to recognize that policies do not necessarily have to be grounded in fact, nor grounded in law, nor grounded in science… to be considered "related to the problem." In fact, policies can come in many forms. Some are institutional, others governmental. Some policies are unenforced guidelines, while others become enforceable laws, regulations, or statutes. In the case of Ambulatory Surgical Centers, there are not any policies that stand in the way of hiring CRNAs. Yet, some policies may threaten the practice down the road.

For example, in Nevada and other states, powerful political forces are aligned to concentrate control

of anesthesia services into the hands of groups of anesthesia physicians. These physician groups want to make more money, while working less (Lewin Group, 2016; Hoyen et al., 2019). This is understandable. Yet, their legislation agendas (Champeau, 2023; Hoyen et al., 2019; Madera, 2023; Mills et al., 2020) makes it clear that they will sacrifice patient care to do so. Among other efforts contrary to patient health, they want to hire and oversee up to four Anesthesiology Assistants (AAs) per physician in each group. It is obvious to even the lay person, that AAs' educational and experience requirements are far less/inferior to the requirements for nurses to study and become CRNAs (AANA, 2015; ASA, 2022). Why would the physician groups push so hard to pass legislation allowing them to hire Anesthesiology Assistants while fighting against independence for CRNAs (AMA, 2023)? All one must do to answer this question is to look at other states where AA legislation has passed. In states like New Mexico (ASA, 2023), legislation was enacted to increase the number of AAs that each physician would be legally allowed to oversee. This legislation concentrates money and power in the hands of the physicians. Meanwhile, their contention that one physician may effectively supervise four AAs at a time is factually impossible (Epstein & Dexter, 2012). When one AA requires assistance from the managing physician, then what happens if one of the other three AAs under the watch of that physician needs help? The physicians are clear to legislators that AAs cannot provide the same level of care as physicians. If they are correct, then they are also necessarily insisting that the overall quality of patient care will decline under their proposed plan to proliferate AAs. Yet, even as the quality-of-care declines; physician groups are insistent that the cost of Anesthesia billing and reimbursement must not decline. This equates to providing lower quality services for the same exact cost. These policies are about power and greed. Interestingly, independent anesthesia physicians do not agree with their colleagues in Groups. Independent anesthesia physicians agree; under the group's plan, patient care will decrease while costs remain the same. Integral to their proposed and existing legislation is employing AAs who would never be able to work independently of physicians. This aspect is all about power and control. Rather than support the proliferation of CRNAs (proven over more than ½ century to provide the same level of care as Anesthesia physicians), this lobby of anesthesia physicians wants to create and proliferate a new designation of anesthesia providers (AAs) who are entirely beholden to their

physician supervisors.

Efforts like these to exert power and influence over another designation of healthcare provider, in this case physician groups over all CRNAs, threaten to undermine patient care, and keep healthcare costs high… and even raise them higher. This effort underlines the fact that healthcare policies can pose significant threats to changes and stakeholder empowerment like those suggested by this project.

This issue illustrates that healthcare costs and patient outcomes may be swayed by politics and monied interests for purposes of maintaining power, gaining power, making financial profits and/or eliminating competition. Even if such anti-competitive special interests are successful, this DNP project will be useful, and easily adapted to other states.

Clinical Guidelines Related to the Problem

The challenge at hand is that a framework should be created to empower ASCs… in particular, gastrointestinal physician owners of GI ASCs… to understand the costs and benefits of adding CRNAs. This project does not seek to introduce a new medical procedure, nor a new medicine, nor a new medical tool to the modern medical marketplace. What this project seeks is a business framework, not a medical one. There are simply no clinical guidelines regulating or controlling financial business tools for clinics. So, because this project remains outside the clinical practice of treating patients, it does not conflict with any clinical guidelines. Therefore, the truly relevant question of "What clinical guidelines are related to the problem at hand?" is answered quite simply… "none."

Impact on Patients, Families and & Communities

All else equal, every patient will benefit. By having a CRNA on their care team, the patient may benefit from the added service of one more highly skilled healthcare provider focusing on their immediate care. Patient satisfaction surveys report that patients are much more satisfied with GI procedures where CRNAs deliver anesthesia, compared to GI physician-delivered sedation (Mariotti et al., 2023; Padmanabham et al., 2017).

CRNAs are also available, in well-managed facilities, to participate in the full scope of perioperative care, contributing to higher throughput, lessening the burden on other medical team

members, and promoting an overall positive culture within their teams. CRNAs are capable of doing far more for a team than the delivery of anesthesia alone. They can be powerful components of high-performance teams.

Happy, healthy patients may contribute to happier, healthier families and communities. So, the employment of CRNAs within GI Centers may have secondary and tertiary impacts on Patients, Families, and the Community overall. Additionally, GI Centers may use the net profits related directly to CRNAs, to have additional positive effects on patients, families, and community. The Centers may hire more staff, purchase more and/or newer equipment, and/or upgrade their facility to make it more enjoyable for patients and their families to visit for procedures. The opportunities to apply their net profits to the comfort and care of their patients are innumerable.

Impact on Healthcare Systems and Organizations

According to American Hospital Association data cited in a Stanford University study (Crawford, 2023), public control of hospitals declined by 42 percent from 1983 to 2019 as hospitals either closed or were taken over by private interests. As of 2020, roughly 80 percent of the approximately 4,500 general acute care hospitals in the United States are controlled by private organizations. Further, approximately eight hundred of the remaining nine hundred public hospitals serve veterans of the armed services. Among the trends in the U.S. healthcare throughout the past several decades are: 1) per-capita healthcare costs in this country have risen above most other countries, without a corresponding rise in lifespan, or positive healthcare outcomes, 2) healthcare access for the underserved has decreased even further, and 3) private ownership of organizations within this industry has increasingly consolidated into fewer companies operating with more and more concentrated power and control.

Nurses in general, and CRNAs specifically, spend more time face-to-face with patients, compared with physicians. Nurses care for patients from the time patients enter the building, until the patients are discharged. The more nurses are hired and empowered to do their jobs; the more efficient hospitals may become. This scenario plays out nearly every time a hospital requests bids for anesthesia services. Increasingly, bids are won based on higher ratios of CRNAs to physician anesthesia providers. The

economics are straightforward: CRNAs cost a fraction of what physician anesthesiologists demand. All-physician anesthesia groups cannot compete financially with anesthesia groups containing higher ratios of CNRAs to physicians. By their very nature, CRNAs have a downward influence on healthcare costs while maintaining or improving patient outcomes (Helmers et al., 2017; Hogan et al., 2010; Johnson et al., 2017; Mariotti et al., 2023; Padmanabhan et al., 2017).

Therefore, CRNAs offer an opportunity for the entire healthcare system to benefit. From small Surgical Centers to multi-state hospital systems, this project's successful conclusion may have a long term, significant, positive impact on the healthcare system.

Chapter II

Literature Review: Evidence

The literature search revealed thousands of results. Appendix 1 is a Search Table illustrating how combining key word searches reduced a pool of thousands of publications to a mere fifty-five targets. Culling the results even further to identify Keeper Studies involved skimming and/or reading; first titles, then summaries, and finally full text, to reject/accept each of the fifty-five items of literature.

Appendix 2 is an Evidence Table. This table illustrates how publication characteristics were captured and analyzed to determine their relevance and application to the PICOT question. Such characteristics include Research Design/Method, Sample/Setting, Data Analysis, Study Findings, and Worth to Practice, Level of Evidence, Strength/Weaknesses, Feasibility, Conclusion, Recommendation, and other comments.

After the Evidence Table was complete, the Synthesis Table was created. The Synthesis Table may be found in Appendix 3. This table illustrates how the following characteristics of each of the Keeper Studies were used to synthesize the literature: Study Design, Number, Findings, Intervention, Characteristics and Findings Pertinent to the PICOT Question, Type (Content, Method, or Concept), and Discussion.

Each of the "Keeper Studies" was kept, based on information they present, falling into three important categories: Content, Method, and Concept. It is important for researchers to recognize value in each category. In a perfect world, content (a.k.a. answers) would be found to every question. Instead, gaps in content may often be filled by pursuing proven methods or concepts.

Often, and certainly the result of research toward this PICOT question, the content, methods, and concepts may each be "wrong" (applying to a different subject) or incomplete, or even entirely absent, but that does not necessarily mean that the studies are without value. Even as important as "validity," and "bias," may be… are the unintended lessons of existing studies that a researcher may extract in the pursuit of answers to new or different questions. "Reading between the lines" is an art form well applied to science.

Content is the words, numbers, figures, and diagrams of any study. It is what the study says and shows. Regarding content, some research may result in solutions (answers to questions). A single study, for example, may report the entire answer that is sought. On the other hand, a single study may reveal just one puzzle-piece of content while another provides three more… in a thousand-piece puzzle. The search for completed studies may therefore continue until all the pieces are found and the puzzle is complete. However, often the answers are not all found in existing studies. This is why it is also prudent to "mind the gaps."

The gaps in content… the missing pieces… may become significant as well. Sometimes the gaps illuminate critical areas of study that must be explored before the question may be answered. Also likely, some gaps are too small, too insignificant to be of help with the question being asked, that there is simply no pressing need to fill in those gaps. When content is missing, proven methods and/or concepts may help fill the gaps.

In fact, content was directly valuable in only eleven "Keeper Studies" in pursuit of this PICOT question. In less than half (just six) of the "Keepers," content alone is critical to this PICOT question. These are Studies #1, 3, 4, 5, 7 and 8. Yet, to stop at content alone would be a mistake. There are critical lessons pertaining to this PICOT question via method and concept (with and without content) in 9 of the 15 "Keeper Studies," namely, Studies #2, 6, 9, 10, 11, 12, 13, 14 and 15. Where there are gaps of content needed to answer the PICOT question; methods and concepts may end up supplying the missing pieces.

And so, methods become more important, the bigger the gaps in content. Often, research may be uncovered that focuses on an entirely different subject (different content) than the question at hand. In this case, the content may be useless, but the method (equations, approach to the problem, questions asked of the subject, the presentation of results, or the recommendations/conclusions) of the study may be particularly instructive or inspiring toward answering the present question. Methods such as these have presented themselves in pursuit of this PICOT question. To learn from the lessons of "method" even when the content itself has little merit, is important. Among the "Keeper Studies," four contain valuable insights regarding methods, namely: Study # 2, 9, 13 & 14. In three of these (2, 13, & 14) method alone is

pertinent to this PICOT question.

And finally, there is the subject of "concepts" to consider, independent of content and method. Concepts differ from content and method in that they involve ideas or perspectives that apply to the PICOT question, independent of the corresponding benefit of either content or method. Eight of the fifteen "Keepers" contain valuable concepts toward answering this PICOT question (Study # 5, 6, 7, 9, 10, 11, 12 & 15).

In the absence of content, methods and concepts should help fill in the gaps. For these reasons, in the research of this PICOT question; content, method and concept were each identified in the "15 Keeper Studies." Here you will find brief descriptions of each, as they pertain to each study. This is precisely how the PICOT question is answered by each Keeper Study.

Study #1: CONTENT

Cost comparison of CRNA to anesthesiologists by Helmers et al., (2017) should be included in any paper discussion and/or financial models. Multiple benefits of CRNAs, in addition to direct profit should be applied to answer this PICOT question.

Study #2: METHOD

Use the methods herein (Dexter et al., 2000) to help with a guide for CRNA hiring. Analyze their equations for use in this PICOT study. Apply sensitivity analysis for both education of physicians and customization per facility. This study's content does not apply, but its method for communicating numerical data quickly and concisely applies to how conclusions may be presented to ASC leaders. Graphical models may be considered for relaying return on investment (ROI) of specific investments.

Study #3: CONTENT

Refer to Anwar et al., (2021) study's checklist when developing cost models to answer the PICOT question. This study demonstrates the lack of financial analysis tools available to ASCs. Specific strategies from this study may be considered within an ROI framework for addition of CRNAs to ASCs.

Study #4: CONTENT

Mills et al., (2020) applies to the PICOT question because it teaches that education of ASC leaders

regarding the comparative skillsets and outcomes of CRNAs versus physician anesthesiologists may be critical to managing change within the ASC. Specific laws/regulations should be cited regarding CRNA V. anesthesiologists. CRNAs V. Non- anesthesia physicians, for education/empowerment of ACS leadership regarding adding incremental CRNAs.

Study #5: CONCEPT

O'Sullivan et al., (2007) does not present value to this PICOT question in terms of content nor method, but it does teach conceptually that Anesthesia Information Management Systems (AIMS) may be cost-effective for larger organizations and society, but to a lesser degree for small practices. To assist with answering this PICOT question, a search should be conducted for cheaper, more simplified AIMS that may better serve small ASCs. AIMS ROI may best apply if the ASC has, 1) multiple partial-day shifts for 3+ CRNAs, and/ or, 2) multiple anesthesia drugs used per facility, and/or, 3) high drug cost/waste scenarios.

Study #6: CONTENT & CONCEPT

Navidi & Kiai (2019) has content that directly applies to this PICOT question. It teaches that scheduling and grouping could be critical to achieving throughput to maximize ROI of CRNA staffing & incremental CRNA additions to staffing. Concepts within Study #6 include ROI impacts of patient satisfaction. Could satisfaction be monetized and/or included within financial/budgeting model(s)? If so, they should be incorporated into the answer(s) for this PICOT question.

Study #7: CONCEPT

Boyd (2017) illustrates that corporate culture may have a significant impact on ROI, but it does not suggest a method for including corporate culture within financial models. Corporate Culture (leadership, teamwork, and identity) needs to be explored more as a concept to apply to ASC budgeting/planning and financial analysis. Financial models should apply "soft" cultural attributes/goals when they can, to organization budgets and planning for efficiency and sustainability.

Study #8: CONTENT

The content of this study by Hogan et al., (2010) may be communicated as necessary to

understanding/adoption of CRNA staffing and incremental CRNA addition. The abilities of CRNAs are equivalent to physician anesthesiologists overall, but CRNAs cost far less than physicians. This study shows that a high ratio of CRNAs to physicians is recommended for cost—effectiveness. Correlating economics with legal/regulatory issues are critical for education/empowerment of non-anesthesia physicians and administrators.

Study #9: METHOD & CONCEPT

Risk identification may improve ASC safety & outcomes as illustrated by Seligson et al., (2019). This study connects directly with Study #7 (Boyd, 2017). Methods for monitoring safety and outcomes are monetizable and should be added to planning and budget models. Monitoring may be dove-tailed with CRNA duties for empowering CRNAs and improving their value to ASCs. The concepts of idiosyncrasies, in some cases may be added to financial modeling especially if utilizing "sensitivity" ranges within the models. In this way, ASC leaders may better understand the risks/rewards of incremental addition of CRNAs. Exploring these concepts may lead to more questions, advice, or acknowledgment of needs/lack research.

Study #10: CONTENT & CONCEPT

Josh & Vetter (2021) recommends implementing continuous quality improvement (CQI). CQI could be spearheaded by CRNAs within ASCs to add value. Study #10 does not outline criteria for CQI, but it does introduce the content of specific biases to be considered and passed along via education through paper/presentation/financial models. This study does offer pertinent concepts and a foundation for CQI and the importance thereof including understanding the types of delays that may affect profitability, and common solutions for addressing them.

Study #11: CONCEPT

Sidhu et al., (2019) reaffirms CRNA demand in the US. will not decrease in the near future. The rest of the first world has been reaching/confirming US standards of care, including growing demand for CRNAs. Confirming global standards of care and trends in anesthesia, especially as they pertain to endoscopic ASCs, directly affirms the necessity of research to determine ROIs for CRNAs in ASCs, and

their incremental addition to individual facilities.

Study #12: CONTENT & CONCEPT

Saleh et al., (2009) illustrates multiple throughput strategies that directly pertain to the PICOT question. CRNAs are necessary to engage many strategies within ASCs. Additionally, some concepts of direct, concerted, customized application of strategies are also outlined herein. This study indicates that much more research is needed regarding understanding efficiencies/profitability within operating rooms, and they will require complex, fully customized analyses. This study should be referred to for lists of potential strategies such as: standardize, group, schedule, plan, etc.

Study #13: METHOD

Study #13 (Abdelmalak et al., 2021) does not offer useful content nor concepts, but its method is powerful. Planning for the addition of CRNAs to ASCs will require CRNAs to add value to the team(s). Knowing how to engage multidisciplinary communication toward common team goals is a powerful leadership attribute. Multi- disciplinary processes and approaches may be used to develop this PICOT's solution(s); perhaps by influencing new planning models, or new education approaches of the ultimate PICOT answers.

Study #14: METHOD

While neither content nor concepts within this study are particularly relevant, the method of Activity Based Cost accounting (ABC) for planning and profit is powerfully persuasive. Activity Based Cost accounting methods should be explored to answer this PICOT question and Study #14 (French et al., 2016) will serve as a guide.

Study #15: CONTENT & CONCEPT

Study #15 (Wax, 2006) includes content regarding laws/guidance pertaining to CRNAs. It also develops the concept that differences in governance between CRNAs and anesthesiologists are widely misunderstood. With only a few laws, guidance and/or standards governing anesthesia delivery of CRNAs versus anesthesiologists; CRNAs and their cohorts should be able to educate stakeholders for three distinct reasons: (a) eliminating misconception within the professional workplace can promote

CRNA job growth, (b) teaching patients the truth can build confidence in the healthcare system, and (c) understanding the potential impacts of a changing legal framework can help an ASC anticipate and reduce risks. The PICOT question study report should include laws and guidance pertaining to focused sector(s).

Literature Review: Synthesis

Together, the Keeper Studies suggest that to achieve more efficient, cost-effective healthcare will require a higher ratio of CRNAs to anesthesiologists. They also similarly suggest that achieving higher profitability/greater efficiencies is entirely possible in almost every ambulatory surgical setting. The similar keys to success among the studies include applying a highly customized approach to managing each facility, considering multi-disciplinary design and ongoing quality monitoring, fostering positive corporate culture, and eliminating as much waste (time and resources) as possible. Therefore, the 15 Keeper Studies cumulatively/similarly suggest that this PICOT question has been successfully answered in other medical settings, and that the question is worth asking (financially and for society).

The Keeper Studies also demonstrates dissimilarities and inconsistencies in so much as they suggest different methods for achieving greater efficiency/profitability and they do not agree on which method may be the "best" or the most efficient/profitable. One suggests that promoting pro-CRNA legislation may bring the greatest gains, while other studies suggest approaches ranging from Anesthesia Information Management Systems to multi-disciplinary teams planning and re-planning, to organizing and scheduling, to Activity Based Cost accounting. Each method presents proven successes and failures alike. Each new and different approach seems to suggest that there is not a "handful of ills" that beset ambulatory surgical centers in such a way that one or two remedies are available to address the ills. Instead, their dissimilarities suggest that there are many, many things that can "imbalance the wellness" of ASCs, for which a holistic, ongoing "wellness program" is best suited to keep ASCs healthy, sustainable, and productive throughout the course of the business lifetime of each.

The similarities/dissimilarities and consistencies/inconsistencies among these Keeper Studies suggest holistic wellness may be far more effective than a targeted treatment of predicted illnesses. The financial wellness of each ASC should be monitored, tested, adjusted as needed throughout time, and

approached with lessons learned from the body of businesses across the industry, as well as treated as the unique individual organism that each is based on the individuals within it, their resources, and the communities they serve.

In attempt to answer the PICOT question, the synthesis of information from the Evidence Table concludes: (a) no current content exists to answer the PICOT question using previous studies, (b) this PICOT question is valuable and has been asked of many other medical business scenarios, and (c) answers may be achieved using proven methods of analysis. The search and synthesis of the 15 Keeper Studies may remind one of a medical metaphor wherein the PICOT question is a search for treatments of a particular ailment, and the synthesis is that there is no current treatment for such an ailment. Rather, ailments with similarities have been treated successfully, and certain concepts and methods may guide one to such treatments in the future.

Therefore, the "answer" to the PICOT question is that a customized, multi-disciplinary, long-term approach to design and sustain small medical practices will likely include tools such as comprehensive financial planning, cost/profit models, and sensitivity analyses with the outcome of a business tool(s) that will empower leaders to determine the patient throughput that provides a cost benefit for the incremental addition of anesthesia providers to the medical team. The answer, so far, is not a simple one. There is no single pill nor concoction that each ASC may take. There exists no succinct process. There is no specific tool to indicate exactly when a CRNA should be added or extracted from a team. Despite the missing content, there are methods and concepts to guide the next steps toward empowering businesses to answer that question. Specifically, the next steps should include:

- specifying a single specific type of "small medical practice" for which to apply specific methods,
- creating departmental budgets,
- creating Activity Based Costing Models,
- creating revenue models including patient throughput and payment rates,

- analyzing the models for sensitivities,
- creating engagement plans for introduction of the tools to the ASCs,
- creating implementation guidelines for applying the tools within idiosyncratic ASCs,
- creating methods for measuring success,
- creating guidelines for implementation of the tools as part of an ongoing quality/profitability assessment and improvement program for the ASCs.

Needs Assessment and Description of the Project

Population Identification

The "population" targeted by this project is "Gastroenterology Surgical Centers." GI Centers may comprise a single gastroenterologist, or many. Currently there is a U.S. population of over 15,000 gastroenterologists (AAMC, 2021). Because physicians typically operate under the umbrella of a "legal entity" then, this project may be best visualized as targeting the population of the *businesses*… rather than the population of the *individuals*… the gastroenterologists… who form them.

Project Sponsors and Key Stakeholders

Hiring CRNAs is one of the most simple, direct, low-cost, low-risk, high- reward actions available to GI Surgical Centers. The story is clear and concise. It is a medical solution to a medically focused audience. Specific, proven legal agreements exist to make "trials" and/or transitions into hiring CRNAs more financially feasible, easy, and virtually risk-free.

Organizational Assessment

In one site studied, a Gastroenterology and Endoscopy Center is owned and operated by a single Gastroenterologist. The physician performs endoscopies approximately two days per week, 3 weeks per month. The in-office staff consists of an office manager, three nurses, three clerical support staff, and the gastroenterologist. Each staff member is tasked with a full daily schedule. They report having little to no additional time in which they may take on additional tasks such as financial and business development research to analyze the costs/benefits associated with the addition of CRNAS to their staff. At the same

time, they often employ CRNAs on an ad-hoc, inconsistent basis to administer anesthesia for some procedures.

On one hand, they recognize that CRNAs may contribute to improved patient experiences and improved patient outcomes. They frequently offer their patients the option to include CRNA-delivered anesthesia during their procedures, with the requirement that those patients pay the CRNA directly, in cash, prior to their procedure. Throughout the past decade, the scheduling of temporary, contracted CRNAs has been a challenge to the clinic. Often, though the years, this ASC has performed procedures in the absence of CRNAs, even though the patients would have benefited. Further, because this ASC requires their patients to pay any/all CRNAs directly and in cash, they potentially miss multiple opportunities for CRNAs to contribute to their business operations, their teams, and their profitability.

The owner/operator of this single-physician-owned facility recognizes that there may be opportunities for his practice to become more efficient, build brand, improve patient outcomes, and improve profitability related to hiring a CRNA. For all these reasons, this facility agreed to supply this project with the information needed to develop a tool that may assist them in decision making regarding CRNA employment.

As far as drawbacks or challenges regarding their involvement, this project has anticipated and subsequently identified one clear and present challenge to their effective/efficient involvement with this project. Namely, their office administrators have commented multiple times that they perceive themselves as “overworked” and/or “overly engaged” by other tasks such that they “may not have the time” to engage with this project to the degree required of them. Their comments/concerns are understandable. As identified earlier in this report, administrative staff of ASCs may not have their own priorities, incentives or resources aligned precisely with those of the owner(s) of the ASC.

This project strategy to overcome such challenges includes respectful communication expressing gratitude and appreciation, limiting the frequency of requests, and making those requests as clear, concise, and contained as possible. Further, anywhere we find their otherwise precise data lacking, we may substitute otherwise informed estimates and/or statistically significant ranges. In fact, how this ASC

responds to requests for data may inform how the project tool should be built to accommodate ASCs as the key stakeholder and target of this tool. In other words, if this ASC finds it too challenging to provide, for example, specific payor types per each procedure performed historically, then this project's tool may be adapted to accommodate pre-ordained ranges for these inputs so that the owners of the ASCs may "play" or experiment with the tool using pre-set ranges to attract their further engagement to fine tune the outputs of the tool for their own profit and learning.

The tool itself must accommodate ease of use and quick results. The first time an ASC owner uses the tool, it is less important that they receive highly accurate results customized to their exact practice, then it is for the ASC owner to arrive at an immediate understanding that their investment in inputting precise data will result in attractive returns on the investment of that time.

In summary, the single-physician-owned facility is organizationally prepared (as much as the project requires them) to contribute to and to engage a tool that will help them analyze the costs and profits associated with adding CRNAs to their team.

Assessment of Available Resources

This project requires little in the way of resources that the team must procure beyond databases, tools, knowledge, and strategies that may be obtained through the internet and those readily available to academic university studies. Additionally, no assessment of resources is complete without recognizing the potential risks that the selected resources may underperform. When underperformance has the power to doom the entire project, then more care should be applied to the selection of resources and all the factors that may play into the success of those resources being utilized effectively. For this reason, it is important to note that even if the organizational resources for this project fail entirely; this project may still proceed to a successful conclusion. This project has the fortunate advantage that it may benefit from the dedicated participation of the partner organizations, and conversely, the project may not suffer disastrously (or at all) if the partner organizations fail or fall short in their adopted roles.

The partner organizations have agreed to supply non-identifying patient and practice data in the form of throughput by procedure type broken down by month and year for the past several years,

including payor type, procedure costs and reimbursement rates, limited business overhead data including fixed and variable costs, employee compensation and associated costs, etc. Their data will be used as inputs for a financial model that will inform tipping points and strategies for hiring, application and scheduling of CRNAs.

Among the most directly impacted "other" stakeholders are patients, owners of gastrointestinal facilities, and the broader categories of owners of ASCs. Yet, again, it is enough for this project to utilize existing, searchable publications to source this data, without requiring the direct involvement of the "other" stakeholders.

Team Selection and Formation

The most vital team members for this project are the DNP student (a.k.a. Team Leader) and the collegiate Advisory Team of educators at the University of Nevada, Las Vegas. The Team Leader is conducting the research and developing the financial tool. The Advisory Team is guiding the Team Leader through a process that is new, challenging, and demanding. Unlike the role of the partner organizations which may have minor impact on the success of this project, the Advisory Team is critical. They are setting the standards, timeline, and analysis rubrics necessary for achievement of a Doctor of Nursing Practice degree. Without the Advisory Team, there would be no DNP. Should the Advisory Team quit, there would be no DNP. Therefore, the role of the Advisory Team is in stark contrast to that of the "partner organizations."

Additionally, there is also a concrete role for a statistician to play within this project. Standard statistical skills will be required; meaning that the demands for statistical analysis required by this project will require statistical expertise that is generally held in the field. This project will not require any cutting-edge or degree of expertise that may be a challenge or risk for obtaining. As. for other types of expertise that may be helpful, the downloading of external electronic databases map pose a challenge to the Team Leader. Additionally, some aspects of utility within Excel Spreadsheet design may be helpful once the data is gathered and relationships/algorithms are developed.

Project Economic Analysis

This project will culminate in two measurable objectives: 1) a rudimentary business framework that may be used to test the financial viability of engaging incremental CRNAs at GI ASCs, and 2) the associated analysis of which may inform what factors may be important for GI ASCs to consider before and during engagement of incremental CRNAs.

Economic analysis of the isolated project is defined by its scope. In this case, "What is the anticipated Internal Rate of Return for a gastrointestinal center that may invest time and money in the financial tool imagined by this project?" Simply put, investing a few hours to learn and engage the imagined tool, a gastrointestinal center could generate millions of dollars of additional net revenue per year. A gastrointestinal surgical center operating multiple procedure rooms, already staffed with full-time CRNAs could use the imagined tool to generate hundreds of thousands of dollars of additional net revenue. Investment in the imagined tool represents significant returns, exceeding hundreds… even thousands of times the investment. As discussed comprehensively in early sections of this paper, the potential financial returns are highly attractive for gastrointestinal facilities, and the tool may be customized to help CRNAs negotiate their salaries or customized differently to empower an array of Ambulatory Surgical Centers to generate millions of dollars per center in additional net profits.

Scope of the Project

The parameters of this DNP project consist of researching, designing and internally testing an algorithm contained within excel spreadsheets that will accept limited idiosyncratic user inputs in return for limited outputs that may help gastrointestinal centers make decisions regarding the employment of CRNAs. Not intended to be visible to the end user, this algorithm will contain data including potential reimbursement rates for specific procedures, as well as some fixed and variable costs related to the employment of CRNAs. It may also contain some other direct and indirect economic benefits that gastrointestinal centers may enjoy, related to the engagement of CRNAs. These "other direct and indirect economic benefits" may include (but not necessarily), financial profit related to customer retention, customer attraction, improved liability insurance rates, improved negotiated payer rates, additional

services provided by CRNAs, additional profit centers created by CRNAs, etc.

This DNP project is well advised NOT to produce a polished, commercial consumer product. Rather, this DNP project is a feasibility study into the potential development of an algorithm or set of algorithms that may, in the future, be developed into a commercially viable financial tool for gastrointestinal facilities. This DNP project will advance and expand an understanding of the feasibility of creating a tool that may educate and empower owners of a gastrointestinal center to build financial profit.

Mission Statement

The Mission of this DNP project is to research and create the infrastructure of a financial instrument that may empower a gastrointestinal center to make more informed decisions regarding the finances associated with engaging CRNAs. At its essence, this DNP project is a feasibility study regarding the potential for developing a financial tool that specific surgical centers may use to enhance their decision-making regarding the engagement of CRNAs.

The Quintuple Aim

As illustrated by Appendix 7.1, CRNAs in GI Ambulatory Surgical Centers are at the nexus of the Quintuple Aim. The most cost- effective anesthesia delivery model is a CRNA working as an independent anesthesia provider. They are proven to provide healthcare outcomes equivalent to their anesthesiologist counterparts, yet at a fraction of the cost. Therefore, when CRNAs perform at the full scope of their education and licensure, then associated healthcare costs are lowered. Similarly, when burdensome healthcare requirements on CRNAs are lifted, healthcare access expands. Studies show that there is no difference between the quality of care provided by CRNAs, compared to anesthesiologists, so when CRNAs are employed by GI ASC, all stakeholders benefit.

The Quintuple Aim is a thought-provoking method for analyzing the perspectives of three of the most significant stakeholder groups involved in healthcare: Patients, Populations and Providers. Utilizing CRNAs as the anesthesia provider for ASCs will have positive impacts on nursing, patients, and communities, as well as on policy and economics.

Optimizing the employment of CRNAs within GI Ambulatory Surgical Centers benefits the

patients. Patient satisfaction surveys reveal that patients are much happier when they receive anesthesia, compared to physician-delivered sedation. In addition, CRNAs may contribute to the full scope of perioperative care, offering one more layer of highly trained care to each patient's experience. Making GI ASCs more profitable can encourage their proliferation targeting underserved populations. This DNP project suggests business frameworks to empower ASCs… in particular, gastrointestinal physician owners of GI SCs… to understand the costs and benefits of adding CRNAs.

CRNAs may contribute to lower costs by reducing unnecessary spending because their services cost a fraction of those of their physician counterparts. And secondly, CRNAs lower costs by improving efficiency. CRNAs increase throughput and contribute to peri-operative services that would otherwise be required of the GI physicians or other nurses or staff.

CRNAs may improve the well-being of the entire GI staff. Properly engaged CRNAs reduce the workload of the other staff of the clinic, contributing to teamwork, cohesion, and leadership. Effectively engaged CRNAs may improve the atmosphere and workflow of the team.

CRNAs may improve the patient experience. They are yet another highly skilled practitioner paying attention to the patient. When a patient has more time to engage their healthcare providers, their outcomes are improved and so too the patients' experience of their own healthcare improves.

CRNAs may contribute significantly to improved population health. By employing CRNAs at the top of their licenses, they may improve access, throughput, and triage. CRNAs are experts at determining which patients are safe candidates for ASCs and which patients would be better served in hospital settings.

CRNAs improve health equity by serving lower income communities, rural communities and or culturally specific microcosms of communities big or small. The more that the use of CRNAs is optimized throughout the pre, inter and post-operative phases of procedures, the more that throughput may be increased; further improving access and equity. The greater the flow of patients through GI procedures, the more patients may be treated in less time. With shorter waiting times for scheduling their procedures, patients are empowered to access healthcare more easily/readily. It is not uncommon for patients to be

scheduled 3-6 months in advance. So, achievable increases in throughput could lead to cutting weeks and months off patient waiting periods. This could in turn contribute significantly to patient satisfaction, population health, health equity and even the clinician's wellbeing.

Appendix 7.2 introduces the same Quintuple Aim, but from the perspective of the three phases of care: pre-operative, inter-operative and post-operative care. In other words, this diagram does not introduce added information… but it re-examines the quintuple aim through the lens of the three phases of acute healthcare. One lesson this diagram teaches is that… unlike other GI Staff members… CRNAs may contribute significantly at all three levels. In this way, CRNAs are uniquely positioned to add value to the GI practice in much broader ways than may be implied by simply delivering anesthesia during an operation. This is the type of value-added employment that can be achieved with little to no additional cost… while resulting in a host of benefits, from financial profit of the center to health outcomes of patients and then even more broadly to benefits bestowed on entire communities and the society at large.

Quintuple Aim Collectively Relates to The Problem of Interest

This project can contribute significant profit to GI centers. That profit may be used in a variety of ways, including lowering patient costs for certain categories of patients, purchase of supplies and equipment that may lead to better patient care, raising salaries of any/all the GI staff, etc.

Additionally, the information in each category above is all interrelated. Healthcare costs are related to Patient Satisfaction, which is related to population health and the provider experience is directly affected by the hiring of CRNAs, which drives profit, reduces risk, and promotes patient satisfaction… and so on.

Takeaway 1. The Quintuple Aim is a thought-provoking method for analyzing the perspectives of three of the most significant stakeholder groups involved in healthcare: Patients, Population and Providers. Economics… "cost…" is how the healthcare services are transacted.

Takeaway 2. Examining the stakeholder group of "Patients" in the singular (patient) and in the plural (population) can provide two distinctly different perspectives. These different perspectives promote consideration of timescale as well as economies of scale. Further, meeting the needs of the singular or the

plural may require separating goals into short and long terms, and applying resources in phases to match the time scales.

Value

Effectively engaged, CRNAs may benefit GI ASCs holistically, sustainably and across multiple business segments.

Financial

CRNAs represent an entirely separate and unique profit center for GI ASCs. Anesthesia delivery is reimbursable by public and private payers at much higher rates than the delivery of sedation by GI physicians during procedures. As to business frameworks that may guide employment structure of CRNA engagement; with the wide scale adoption of "contractors" as to "employees" in the U.S., GI ASCs could hire CRNAs in a per-patient, or per unit-of-time capacity (daily or one-half day, for example). Hiring a CRNA on a "per-day" basis or a "per-patient" basis further eliminates the risk and expense that would otherwise occur if GI ASCs had to hire CRNAs as "employees". As contractors, CRNAs are responsible for their own liability insurance, health insurance, occupational/worker's compensation insurance, etc. Therefore, GI ASCs have available a wide array of business frameworks to employ CRNAs to maximize GI profits and reduce risks.

In many business frameworks, the Break-Even Analysis for the Daily Employment of a CRNA within a GI ASC (Appendix 10.2) is achieved by the second or third of sixteen or more procedures that a GI physician may conduct in an 8-hour day. Break even at 2.5/16ths of procedures can be perceived from multiple perspectives. Imagine a business framework in which a GI ASC operates 5 days per week for 45 weeks per year (closed seven weeks per year). This business framework assumes CRNA compensation of $250,000/year, and anesthesia delivery compensation of $408/procedure:

Break-even of CRNA expenses/revenues = occurs during the third of 16 procedures per day.

Break-even of CRNA expenses/revenues = 2.5/16 = 0.1562 = 15.6% of gross anesthesia revenue.

Break-even of CRNA expenses/revenues = occurs 1.25 hours into each 8-hour workday.

Break-even of CRNA expenses/revenues = occurs 7 weeks into each 45-week year.

Break-even of CRNA expenses/revenues = occurs in month #2 of annual operation.

"Break-even" analysis is a popular and well understood concept. It represents the point at which an investment tips from Expenses to NET Profit. The language of "break-even analysis" is readily grasped by physicians, regardless of their experience with formal business training. The implication of breaking even at 15% of gross profits is very, very compelling. It is rare in business to have investments that break-even so quickly, especially with such minimal risk and low total investment.

Emotional

Effectively engaged CRNAs can promote emotional wellbeing of physicians and the entire staff of a GI ASC, in significant ways. CRNAs are highly trained healthcare professionals who are focused on keeping each patient alive and improving the patient's experience of their GI procedure. Patients report a higher rate of satisfaction within the GI procedure setting when they receive the additional pre-operative, operative and post-operative attention of the medical experts that are CRNAs. When patients are happy with their procedures, it lowers the stress and reduces the time that the GI physician must spend on each patient.

Further, CRNAs may effectively contribute to increasing throughput of the GI physician, while lowering the risk of adverse patient experiences. In these ways, CRNAs can contribute significantly to the emotional wellbeing of the physicians as well as the rest of the procedure staff. CRNAs are nurses who are also trained to be able to complete or complement the tasks of other nurses and/or technicians within the GI operating room setting. CRNAs are trained to complement GI ASCs by managing healthcare teams and performing an array of peri-operative nursing and administrative duties. Effectively applied to GI operations, CRNAs can dramatically enhance the emotional wellbeing of all members of the team.

Life-Changing

The effective engagement of CRNAs could profit GI ASCs while reducing the workload of the GI physicians and simultaneously reducing the risks and improving the healthcare outcomes of patients of GI physicians who, in their absence, would be delivering sedation… If a GI ASC were to effectively engage CRNAs, they could profit by over a million dollars, while reducing the workload of the GI physicians and

simultaneously reducing the risks and improving the healthcare outcomes of patients of GI physicians who, in their absence, would be delivering sedation… not anesthesia. Earning more, working less, and risking less… these are truly life-changing opportunities for GI Physicians.

Social Impact

If a Physician owner of a GI ASC were to truly pursue the incremental addition of CRNAs to their teams, they could redefine their practice to maximize net profit for their business as well as net profit for their patients and the community at large. Imagine a business framework in which a GI ASC learned that the engagement of one CRNA per operating theater could improve throughput by 15%. The first lesson may be that they could add an average of two more procedures to each 8-hour day. That represents a secondary opportunity to profit even more from CRNAs. Additionally, this opportunity for physicians represents an opportunity for patients as well. More patients could receive healthcare in a shorter amount of time. This means that improvements to access and equity could result.

Another even more profitable business framework could result from efficiency lessons related to CRNAs. Imagine a business framework in which there are more CRNAs engaged than physicians in a GI ASC. Could a brand-new style of business framework be innovated to maximize patient throughput wherein each CRNA manages the pre-operative, operative and post-operative care of each patient flowing through one operating room per CRNA? Of course, it could. Meanwhile, a single GI physician could move from one OR to the next, conducting procedures while minimizing the downtime of each physician, in favor of employing each CRNA to the maximum of their training and ability. Activity-based-cost-accounting analyses of patient throughput may likely result in dramatically raising patient throughput while maintaining high patient satisfaction, improved patient outcomes and lower risk.

Effective utilization of CRNAs could result in significant positive Social Impact. Patients typically schedule GI procedures months in advance. What would it mean for Social Impact, if wait times were cut by weeks or months? What would the social impacts be if each GI ASC boosted their throughput by 20% or more? How could raising throughput positively effect patient satisfaction, access to care and equity of care? The results could be considerable, and they could be achieved because of hiring CRNAs in the GI

setting. Proven business frameworks exist to inform GI ASCs how to maximize throughput.

Among the many business frameworks that may be applied to GI ASCs, Bercaw (2021) *Taking Improvement from the Assembly Line to Healthcare*, instructs step-by-step guidance on how to implement lean methods to achieve world-class improvement with the healthcare industry. Bercaw is far from alone. Throughput improvement has been the subject of countless business frameworks for over a hundred years. Business frameworks, thoughtfully applied to GI ASCs could yield significant positive social impacts.

High Reliability Organizations

The five principles of high reliability organizations are satisfied by fundamental aspects of employing Certified Registered Nurse Anesthetists within Gastroenterological Ambulatory Surgical Centers.

Sensitivity to Operations

Some of the greatest threats to performance of GI ASC teams begin with the most minute details. The CRNA is uniquely trained and experienced to recognize many of the most minute details of a patient's experience. During GI procedures, CRNAs focus on monitoring the slightest changes in the cardiac and pulmonary health of the patient. The CRNA pays acute attention to the critical vital statistics of the patient. She is there to keep the patient alive. Secondarily, she is there to improve the physical and cognitive experience of the patient. The central objectives of the CRNA include monitoring the most elemental and minute details of a patient's health throughout the procedure. This makes the CRNA a team member critical to building and sustaining "Sensitivity to Operations" for High Reliability Organizations.

In "Safe Surgery Saves Lives," the World Health Organization drives home lessons supporting how teams hone Sensitivity to Operations (A.P.S.F., 2024). Because the CRNA, particularly adept at monitoring the vital statistics of each patient in real-time, she may play a key role in maintaining High Reliability teams within GI ASCs.

Reluctance to Simplify

Introducing CRNAs to the GI ASC team provides a new leader, a new expert in the realm of

oversight to the pre-operative, operative and post-operative phases of interaction with the patient. The GI physician is typically not continuously involved with each patient throughout these three procedural phases. So, the addition of an advanced-practice nurse such as the CRNA creates opportunities for observation, learning, team training and guidance, as well as patient interaction and intervention that are otherwise not typically found within GI teams. These opportunities can contribute to a Reluctance to Simplify because these practitioners are experts across the perioperative array of treatment. The CRNA is uniquely positioned to explore and develop system-wide (non-simple), holistic solutions to potential failures or even enhanced treatment protocols that could improve a patient's outcomes and/or perception of the care they receive. First by witnessing and managing all the phases of the patient's care, and then by engaging and practicing portions of that care through the phases, CRNAs are perfect candidates to contribute to improve the entire procedural system. Further, while a single physician does not typically witness nor participate in procedures of their fellow physicians, it is common for a single CRNA to work with all physicians throughout a facility. Even further, it is common for CRNAs, much more so than GI physicians, to work in many different settings. CRNAs not only commonly experience operating rooms in several hospitals and ASCs, but they commonly work in a variety of operations of many different medical specialties. While it is not common for GI physicians to spend time participating in other GI physicians' procedures, it is even less common for GI physicians to experience the procedures of cardiologists, podiatrists, plastic surgeons, general surgeons, etc. If CRNAs are inspired, educated, and empowered to participate toward the goal of building a High Reliability Organization, then they may bring to the GI ASC lessons learned from a wider range of operating theaters than perhaps any other practitioner on the GI procedure team.

Preoccupation with Failure

Introducing the CRNA to the GI ASC procedure team adds a highly trained practitioner with expertise that no one else on the team possesses. This new expert brings new opportunities to identify potential failures and to overcome those failures. The CRNA's job is to "make the patient comfortable" by managing their perception and memory of the experience. The CRNA brings unique, specialized

equipment to the room, with the ability to monitor respiration, heart rate, pain indicators and more. She has expertise in monitoring, analyzing, assessing, and combating challenges unlike any other member of the team, making her invaluable in the principle and pursuit of "Preoccupation with Failure." If a team is imbued with a culture of preoccupation with failure, it can lead to anticipating failures before they occur and then avoiding them altogether, or helping the team overcome those failures when they do occur.

As Helmers et al., (2017), in "Overall cost comparison of gastrointestinal endoscopic procedures with endoscopist-or anesthesia-supported sedation by activity-based costing techniques" point out, CRNAs present a significant profit center to GI ASCs, that cannot be accessed without employing CRNAs. The opportunity to achieve net profits in excess of $1Million, makes possible a cascading host of other opportunities as portions of CRNA-generated revenues may be invested training, equipment, etc., to avoid and overcome potential failures.

Deference to Expertise

Deference to Expertise is essential to High Reliability Organizations. When something goes awry while a patient is under the care of a GI team, the root cause may be found in the procedure itself, or it may be entirely unrelated to the procedure. By example, a physician may accidentally perforate the esophagus with a scope while conducting the procedure. On the other hand, a patient may suffer a heart attack while in the parking lot or the waiting room, prior to beginning their procedure, or they may suffer kidney failure or a ruptured gallbladder during a procedure entirely unrelated to the procedure itself. In any of these examples, if the organization is operating with "deference to expertise" then even if the GI physician, or the CEO of the ASC is present, they may step aside and defer to any team member who has more expertise and/or experience, to address the challenging at hand. As an expert in pulmonary systems, airways, and life-saving interventions, the CRNA may be called upon to lead life-saving measures, or other care team obligations or opportunities at any time.

Further lessons regarding Deference to Expertise are instructed by the landmark business publication, Getting to YES by Fisher, Ury, & Patton (2011). Adapting the authors lessons to the GI procedural team, this best-selling book instructs how understanding the different roles and responsibilities

of each member of the team can accommodate "Deference to Expertise." The CRNA is particularly educated to understand the roles/expertise of other nurses and the GI physician on the team.

Practicing Resilience

Humans are fallible. This does not mean that we *may* fail. It means that we *must*. Accepting this is not to shame, but to prepare one for anticipating, overcoming, and moving on from failures, when they occur. This concert is the cornerstone of practicing resilience. Setting expectations for the members of the team most often falls on the leaders. In operating rooms, the pervading understanding is that the Surgeon or physician conducting the procedure is the leader. To build and maintain high reliability teams requires fostering teamwork as well as leadership. Each team member must be encouraged to perform their own duties while also being encouraged to ask questions, introduce observations, and challenge the status quo without fear of negative ramifications. Practicing resilience requires introducing a form of emotional intelligence to teams, in which innovation is prized, rather than seen as an admission that they were doing something wrong up until change was engaged.

Again, introducing CRNAs to a GI ASC team can be substantial step toward achieving the status of a High Reliability Organization. The cross-functionality of the CRNA, their ability to participate in pre-operative, operative and post-operative phases of the patient's experience afford them the perspective and position to serve as a teacher, a leader, and an organizer of iterative, practice of responses both emergency and routine for the entire array of GI procedural team members. CRNAs could be tasked, trained, and empowered to serve in the role iteratively developing, testing, and innovating response plans as well as leading their team-wide practice and improvement.

In the article, by Selah et al., (2009) "Operating-room throughput: strategies for improvement," the authors teach how GI ASCs may conduct more procedures in less time. Once again, CRNAs may play a significant role in increasing throughput within High Reliability GI procedure settings. Further, engagement of CRNAs could be expanded beyond a simple 1:1 ratio with GI physicians. CRNAs are trained to manage the pre- and post-operative phases of treatment in such a way that a physician could move from one room to the next, minimizing their down-time and relying on CRNAs to manage all

phases of treatment.

Goals

This project proposes an array of business frameworks for understanding the costs and benefits, tipping points, sensitivities, and service requirements of gastrointestinal centers within the United States and then empowering those GI ASCs to employ CRNAs in the most effective manner.

Table 2. Measurable Objectives

Deadline	Objective
Fall 2022	Source Gathering and Process Development
April 26, 2023	Complete DNP Proposal
April 1, 2023	Anesthesia Revenue, Scheduling and Break-Even Analysis; Appendix 10.1, 10.2, 10.3
June 1, 2023	Anesthesia FTE Hours & Pay/Leave Scenarios developed; Appendix 10.4, 10.5
June-July, 2023	Develop & Test business frameworks for hospital and anesthesia service stakeholders
September 1, 2023	Triple Bottom Line graphics and analysis
December 15, 2023	DNP Committee review & analysis
January, 2024	HRO analysis
March 8, 2024	Submit final version of DNP project
March 26, 2024	Oral defense of DNP project
April 20, 2024	Western Institute of Nursing Conference, Poster Presentation

Chapter III

Theoretical Framework: Change Theory

The transtheoretical model, developed by Prochaska and DiClemente in the 1980s is one of the leading models for behavioral change. They describe the transtheoretical model as having six stages for changes to behavior: Precontemplation, Contemplation, Preparation, Action, Maintenance and Termination. This is the Change Theory selected to implement the answers to this PICOT question.

Whether individual or organizational, "change" is about modifying behavior. As taught by Davis, et. al. (2015), the lion's share of research regarding health-related behaviors indicates that minor changes, thoughtfully selected, may lead to massive payouts in terms of human health and life expectancy. The same is true for organizations. Small, thoughtfully selected investments in behavioral change may result in substantial financial profit as well as sustainability of the business organization. Yet even the perceived simplest of changes… the hiring of a single CRNA, for example… are challenged by an array of elements of basic human psychology. Humans, the most vital component of any organization, bring a diverse array of challenges to the objective of "change." Change often seems daunting, if not entirely unlikely or impossible. Yet, psychologists and researchers have studied the obstacles and motivators to change for decades. Patterns emerge, and these patterns may be referred to as models or theories. Models tend to suggest steps or phases and then they match the identified phases with corresponding methods for producing (or at least in improving the odds of) behavioral change. Appendix 8 shows the transtheoretical model for behavioral change when adding incremental CRNAs to gastrointestinal ambulatory surgical centers.

As the body of evidence suggests, great gains may be possible for small medical facilities with the small behavioral change of "adding incremental anesthesia providers." Because research further indicates that CRNAs may provide an equally high level of service to their higher-paid counterparts (physician anesthesia providers), CRNAs will provide the greatest bang for the buck within small medical practices. Simple math supports market-wide trends that hiring CRNAs can be highly profitable. And because

money is a powerful motivator for behavioral change, the profit of CRNAs will be highlighted to inspire, educate, and empower ASCs to change their behavior… by understanding when to add CRNAs to their practices and how to optimize their benefits.

Gross profits related to the addition of a single anesthesia provider can annually reach a million dollars or more at an efficient endoscopy center. This fact will be central to implementing change. The following "Implementation Plan" includes a rationale for how the transtheoretical model will be integrated into the implementation plan.

Implementation Plan

The transtheoretical model (Appendix 8) was integrated into the implementation plan, addressing each step of behavioral change. In Precontemplation, implementation is already aided by the ASC's leadership being exposed for years (if not lifetimes) by media, cultural and individual fears about the lack of and motivations toward making more MONEY. Making more money, while working less, is the mantra of many Americans. Therefore, Precontemplation for the leaders of ASCs is reasonably guaranteed. In this phase, the leadership of ASCs are conditioned with the underlying motivations of profitability and sustainability, as well as by the fears of personal and/or professional failure. Yet, they may lack the cognition of "employing incremental anesthesia providers" to those overarching goals. Or, they may have tried to attract and optimize anesthesia providers, yet they somehow failed to do so. After such failures, they correspondingly failed to understand the losses/opportunity costs that they suffered because of not engaging in that change. Failure to implement change often leads to failure to continue efforts to change.

To incentivize ASC leaders to pass through Precontemplation to the next phase, direct advertising will be coupled with the other influences on which they are already exposed through media, society, families, and friends. They will be directly targeted to recognize the financial opportunities inherent in adding incremental CRNAs. This will be accomplished with direct phone calls, emails, a website, and physical mailers.

In the next phase, namely Contemplation, the ASC leadership plans/wants to change (to hire

anesthesia providers) within the next six months. They can identify some advantages (profit, increased throughput, improved patient satisfaction, etc.), and they can identify some disadvantages (high perceived income of a subset of nurses compared to physicians, recruiting challenges, higher indirect costs related to incremental staff growth, etc.). Their path to change is not obvious to them, yet they want to initiate change within the next six months. They do not have the experience of this change, so they lack the confidence to act decisively toward this change.

To influence their transition through this phase, implementation will include elevator pitches, electronic and in-person presentations, direct marketing, on-line advertising, and introductions through mutually known third parties. In this implementation phase, the ASC leadership will be introduced to snapshots of financial models to capture their attention and introduce them to the fact that this research and the model(s) produced because of answering this PICOT question can effectively guide them through a clear, easy-to-understand process for them to achieve greater financial profitability and sustainability.

This phase is characterized by achieving an urgency to act in an even shorter timeframe and an understanding of the "next steps." The materials and pitches presented to them will answer the question as to what resources it will require to achieve specific financial and other goals as they incrementally add CRNAs to their teams. They will be presented with a guide for understanding how to optimize their benefits while minimizing their costs and risks. They will also be provided options for engaging professionals who can lead this project to fruition as third-party consultant to their teams.

In Preparation, the third of six phases of behavioral change, the organization has engaged the services offered, with a plan for roll-out within the following 30 days. They are either following the guidance created by this project with leadership from within their company, or, they have engaged this project's consulting team to lead their implementation. Either way, an interdisciplinary team will be created within the organization, consisting of administrators, physicians, nurses and even patients within the practice. The team will be taught the potential benefits and risks of the opportunity to hire anesthesia providers; and schedules for goals and measurable objectives will be established.

In the fourth phase of behavioral change, namely Action, objectives are carried out to attract and

retain CRNAs. Rates of pay, performance standards, corporate culture and job descriptions are defined and communicated to the marketplace via a variety of employment outlets. Interviewing and hiring culminate in placement of CRNAs within the teams. Their individual performance, as well as the overall team performance is evaluated consistently through extended periods of time.

Maintenance is the fifth phase of behavioral change, wherein the benefits of employing incremental CRNAs are enjoyed and analyzed. Costs are evaluated and short- and long-term goals and objectives for adding more, or different, CRNAs are established and scheduled. In this phase, the behavior change of the organization is continued, monitored, and evaluated. Maintenance reinforces the new behavior. In the Maintenance stage, less time and effort are focused on implementation of "adding incremental CRNAs," but this is also a time when behavior (individual or organizational) often relapses.

Relapses may occur, for example, if the individual CRNAs hired turn out to not be a good fit for the culture or technical requirements of the organization. If the new CRNA's personality does not synchronize well nor enhance the team, if they fail to adequately provide the services for which they were hired, or if external forces change their motivations (death or illness of a family member, divorce, etc.), then the organization may reach a tipping point regarding the CRNA's employment. The organization must practice the plans offered to them by the guidance resulting from this PICOT question pursuit, to make sure that they do not slide back into an earlier phase of behavioral change. As research points out, relapses typically bring the individual/organization back to the phases of Contemplation or Preparation. Maintenance is not where behavioral change ends successfully. The engagement of attracting and retaining CRNAs must advance from Maintenance, to step 6: Termination.

In Termination, behavioral change is complete. The tools for understanding how and when to hire incremental CRNAs has been effectively utilized and with it, has come the monitoring, evaluation, and modifications necessary to optimize the team, optimize profits, reduce risks, and maximize all the potential benefits that high-performing CRNAs may offer. Termination does not imply "quitting." Quite the opposite, Termination is achieved when the desired change has been so successfully implemented that it becomes an integral part of the individual/organization. At Termination, the sought-after change has

become routine behavior.

Policy

As suggested heretofore, the Transtheoretical Model for Behavioral Change may be directly applied to modifying the behavior of individual Gastrointestinal physicians and the other owners and managers of their GI ASCs. This argument contends that the behavior of small private organizations that are GI ASCs may be changed by the same forces and methods effective at changing individual owners of GI ASCs. Yet, it is critical to note that "small private businesses" and "the owners of small private businesses," may behave entirely differently than public entities. With private individuals and entities, financial gain (profit) is openly discussed as the key driver of change. Yet, with in the arena of public policy, to point out that a single stakeholder or isolated private organization is to be the sole recipient of a million-dollar (or more) result of policy change… is an entirely different story. Within the realm of Public Policy, politics reign supreme. Yes, money plays a significant role, but it rarely brought to the foreground of a debate regarding public policy. Power is the currency of public policy.

Effecting public policy requires resources. Fortunes are frequently won or lost with the passing, amending, or repealing of public policy. And, so it is that the domain of public policy must be navigated… influenced… carefully when dealing with anything that is, or could be, as profitable as CRNAs being employed within ASCs.

It is not enough that the application of CRNAs to GI ASCs may improve the quality of healthcare for any or even all stakeholders. If, as this study suggests, the introduction of a sustainable business framework could profit thousands of small businesses nationwide, and could bestow a multitude of net-beneficial effects across all stakeholder groups… what could possibly stand in the way? The sheer magnitude of potential financial profits in excess of $1 Million per CRNA employed at GI ASCs is enough incentive on its own to stimulate power struggles among any who might seek to pocket a percentage of that profit.

Public Policy is about laws and regulations. At its core, public policy is about power. Who has it?

For how long? How is that power wielded? Taking another look at the stakeholders, are there Public Policies that could shift the profit of "$1 million per CRNA employed at a GI ASC"?

CRNAs

In most states, CRNAs are empowered by public policy (including laws, rules, and regulations) to perform independently at the full extent of their education and at the full extent of their licensing. What would happen if the legal definition of "CRNA" were changed via public policy? What would happen if the drugs they administered were re-classified into different categories… categories that CRNAs were not allowed (by public policy) to administer? What would happen if the public policies that currently define how a CRNA can legally practice were changed?

What would happen if a governor were to sign into law, a new public policy that made the practice of independently delivering anesthesia, just as they have done for over two hundred years… illegal? Is such a change of policy possible? Is it likely? If so, would the potential of control of "$1Million dollars per CRNA employed…" be ample incentive for someone… anyone… to launch such a public policy effort?

In fact, such a law was passed in June of 2023, in the state of Nevada, S.B. 336 (2023). A single public policy made independent delivery of anesthesia by a CRNA… illegal. A new law transformed the behavior of CRNAs in that state into felonies, punishable by fines and even imprisonment. And because the loss of a medical license in one state may be grounds for losing it in others; the ramifications of performing the duties of a CRNA in Nevada could lead a CRNA to lose the ability to practice their specialty throughout the entire country. This law represents no reprimand, but the risk of a complete revocation of one's ability to pursue their profession, untold fines and/or incarceration.

Anesthesia in America is costly. The delivery of anesthesia is limited by the number of suppliers (CRNAs and Anesthesiologists) and there is a shortage of suppliers. Anesthesia is absolutely critical to healthcare. Anesthesia may therefore be highly profitable. Like other profits, this one too is subject to those who may wield power over it through public policy.

Therefore, a sustainable business framework for employing incremental CRNAs in GI ASCs must

consider how to reduce risks from potential changes to public policies: laws, regulations, statutes, guidelines, definitions, and more. An integral part of reducing such risks is involvement and association with stakeholder groups. Contributing to community-wide Non-Government Organizations (NGOs), for example, can keep private organizations and individuals abreast of potential changes to public policy. Effective NGOs may have networks of people tracking policy changes, with teams/protocols ready to respond to threats to their stakeholders.

Stakeholder Burden of Change

With any change come costs, challenges and/or risks. This change, "optimizing the potential benefits of adding incremental anesthesia providers" has five significant, specific stakeholder groups: physicians, CRNAs, procedure-room teams, administrators, and the patients they serve.

Physicians are faced with the burden of learning to share their space, and to work productively with another type of expert (CRNAs). The same burden falls on the rest of the team, both within the procedure room and within the company at-large. Adding new professionals to a team creates opportunities for synergies and conflicts alike. Physicians are most often the leaders of procedure/operating rooms. As such, the burden to adapt to leading a larger, more diverse team falls on physicians and other leaders of the organization. The financial partners of the organization may have significant profits to gain. Fostering positive working conditions, teamwork, individual fulfillment, and happiness among each teammate is essential. While studies have difficulty estimating the financial returns related to positive corporate cultures and high-performing teams, most studies indicate that corporate culture and the basic human psychology within the workplace has a direct and profound effect on financial health and sustainability of organizations.

The administrators of ASCs share the burdens of change described above for physicians and procedure-room teams. They will also bear the additional burden of participating in data collection and analysis. Additionally, they will often bear the burden of education. They will need to be educated as to the abilities, risks, and rewards of CRNAs.

Patients, of course, are the reason the organization exists, and CRNAs are of immediate and great

benefit to them. The burden of change on the stakeholder group "patients" is relatively low. CRNAs reduce stress on patients, improve recovery times and generally improve patients' overall experience of healthcare procedures.

Feasibility of Change

Ambulatory Surgical Centers may be in business to improve the health of their patients, but they could not remain in business without sustainable revenues. The more revenue generated, the more the employees may be paid and the more may be invested in the organization. For these reasons, along with basic human psychology and the factors influencing it, changing ASCs by empowering them to optimize the benefits of hiring incremental CRNAs is highly feasible; both operationally and economically. CRNAs are already a powerful asset to healthcare organizations, including ASCs, across the U.S. and abroad. CRNAs are a proven asset. That is not the question. Economic feasibility is high. What remains in question is how small ASCs, like endoscopy clinics, may be empowered to optimize CRNAs. These small organizations lack the expertise and experience to understand how and when to hire CRNAs. They can benefit from guidance. That guidance will come in the form of financial models, plans and procedures for small ASCs to engage and optimize the benefits of hiring CRNAs. This study will empower them to do just that.

Evaluation of Implementation

When evaluating the implementation of change, it is important to first identify and understand the risks inherent to evaluation. By understanding the risks, or potential errors of evaluation; the evaluation measures themselves may be modified and fine-tuned to reduce and eliminate some errors. Understanding risks can empower the reduction of those risks.

Evaluation Risks

When evaluating change, it is not enough to simply measure the objectives achieved. The numbers can be deceiving. Financial profitability, throughput of patients served, costs of care, quality of care, costs of implementation; these measures do not tell a complete and necessarily accurate story. Take for example, a highly simplified model in which a single physician who has been conducting a single (or

two) type(s) of procedure(s); (endoscopies, for example) in a small, static community wherein her staff has remained happy and static (no new staff and no loss of staff) for a decade. If that single practitioner were to be engaged with the empowerment framework that is the natural conclusion of this DNP project and that practitioner were to employ it to successfully add CRNAs; and, if the only discernible changes to her practice were: (a) greater profits, (b) higher patient throughput, (c) greater patient satisfaction, and (d) improved medical outcomes; then, the logical evaluation would be a successful implementation of the results of this DNP project.

However, rarely are organizations so static and so simple as this imaginary example. It is entirely possible and often the case that a single change to a highly fluid, extraordinarily complex organization such as ambulatory surgical centers, has results that are difficult to measure, and almost impossible to attribute wholly and solely to one of many changes that effect such organizations over time. By example, the results of a single and successful change to an ASC achieved in the early months of 2020 may be entirely obfuscated by the otherwise negative effects of COVID-19. The numbers alone do not necessarily tell the whole story. The converse may also be true; that a sudden upswing in profitability from an entirely different source may make any single organizational change appear to have a more positive effect than it had on the ASC. For these reasons, an accurate evaluation of implementation may necessarily include provisions for: (a) time, (b) idiosyncrasies of the ASC, and (c) systemic variables affecting the ASC.

Further risking the accuracy of Evaluation of Implementation, is the perspective of the managers/ owners of the ASC who are responsible for implementation of "the change" in question. Within the consulting community, perhaps especially within the Change Management field, it is well known that no matter how powerful or positive the effect of the change may be; the greatest risk to implementation… and indeed the evaluation of its implementation… is reluctance of the leadership to change. Even after change is successfully implemented, the benefits/costs of the change may be amplified and/or discounted, due purely to the basic human psychology of those in the chain of command as well as all staff involved inside and outside the direct effects of the change. The degree to which the team members affected by the

change embrace or resent/resist the change; effects whether or not the change will be successful. The perspectives of individuals within the organization may distort the Evaluation of Implementation. The personal, professional and/or political reasons of those who resisted the change and those who promoted the change may likely also influence the evaluation of said change. Conflicting perspectives regarding the evaluation of implementation, should be expected. Those conflicting perspectives may be both objective and subjective in nature.

Evaluation Methodology

Having acknowledged the risks to accurate "Evaluation of Implementation," the evaluation itself will take multiple forms; including data gathered from distinct ranges in time: (a) thirty-six to zero (36-0) months prior to implementation,(b) twelve to zero (36-0) months prior to implementation, (c) zero to six months post implementation, (d) zero to twelve (0-12) months post implementation, and, (e) zero to thirty-six (0-36) months post implementation. Evaluation will include

- patient throughput (with and without anesthesia providers), (per physician-active-hour, and per procedure room-active-hour). An "active hour" is defined herein as any hour or piece of an hour wherein procedures are being conducted. Analysis using active hours may help to reduce errors related to half-days, shiftwork, no-show patients/physicians, and/or other interruptions to full schedules wherein a facility may be open for business, but delays occur that are not related to "incremental addition of anesthesia providers." Active hours help to eliminate many types/sources of risk/error,
- gross revenue per patient; (with and without anesthesia provider) separated into payment types (insurance, private/cash or other),
- net revenue per patient; (with and without anesthesia provider) separated into payment types (insurance, private/cash or other),
- number of anesthesia providers employed: per patient treated, per physician active-hour, and per procedure room active hour,

- insurance claims against facilities (#, damages sought, damages won), separated into patient payment types (insurance, private/cash or other),
- outcomes (vary by type of procedures conducted) (by example in endoscopy: # polyps identified, # cancers diagnosed, # accidental perforations or other procedural errors, #s of patients declined/rejected during preoperative evaluation, etc.),
- patient satisfaction surveys,
- physician satisfaction surveys,
- non-physician and administration staff satisfaction surveys,
- anesthesia provider satisfaction surveys,
- anesthesia costs per patient (with anesthesia), and
- anesthesia cost per patient as a percentage of gross direct cost per patient.

Integral to each "satisfaction survey" will be questions related to the personal, professional, and social emotional experience of each participant. The surveys will be designed to identify both idiosyncratic and systemic influences on satisfaction with the goal of distinguishing satisfaction/dissatisfaction related directly to the implemented change. Additionally, the evaluation of implementation will include a sensitivity analysis of staffing levels/changes, patient satisfaction surveys (minimum of fifteen patients from each of a simple majority of physicians conducting procedures within the final month under analysis). The proposed evaluation will include quantitative, subjective, and objective aspects related to this change.

Chapter IV

Outline of the Specific and Scientific Format

As a study of the business practices of GI ASCs, this DNP project addresses healthcare, but it does not involve biomedical research. In some instances, such as the question of whether an IRB is appropriate, the distinction between biomedical and business research instructs that facets of study critical to biomedical research are not warranted for this business-related research (see Appendix 9). Given that transparency and reproducibility are critical components of this DNP, the specific and scientific formats of this research are illustrated throughout this chapter. In the end, a reader should be equipped to duplicate the methods and achieve the same relative findings of this DNP, even across a range of business settings, including other ASCs and many others of a wide array of businesses.

Setting & Sample

This DNP focuses on a type of organization known as Gastrointestinal Ambulatory Surgical Centers. As instructed by the decade-plus of experience of the DNP student, the vast majority (over 95%) of services provided by these healthcare businesses are generally referred to as endoscopies. More specifically the services are described as colonoscopies and esophagogastroduodenoscopies (EGDs). Their target customers (patients) are those who do not exceed a threshold for risk that would otherwise suggest that they should receive such service in a hospital setting. Ambulatory Surgical Centers (ASCs) as practiced, screen out patients who are deemed to be subject to risks that these facilities are not equipped (by personnel, device, or chemical intervention) to safely address. With a narrow focus of services and rigorous screening processes, ASCs can be well suited to address many facts of healthcare; contributing to lower costs, higher throughputs, expanded access and equity, better satisfaction of clinicians and patients alike, and more. For these reasons, ASCs are a ubiquitous aspect of healthcare across the U.S. Again, this DNP project focuses on the distinct subset of the ASC population known as GI ASCs. The Chief Investigator of this DNP project has more than a decade of experience delivering anesthesia in this specific population, and her observations and expertise within such businesses are critical to this DNP

project. Further, because the services provided by this sub-set of ASCs are so limited; reproducibility, cause-effect relationships, patient satisfaction, healthcare outcomes, and more, may be clearly and succinctly correlated.

Comparison (PICOT)

"What framework may empower the modern Gastroenterology outpatient marketplace to effectively add CRNAs to the medical team?" This is the question this DNP project seeks to answer. In its simplest terms, the answer may be purely economic: A financial framework analyzing the tipping point when the net revenue associated with adding a CRNA becomes positive. Alternately stated, this is a break-even analysis wherein the chief costs of employment of a CRNA and the drugs/equipment of the anesthesia delivery process are exceeded by the profits received from billing for anesthesia services. The core of any such sustainable business framework must be a financial one. For example, the following is a rudimentary framework for comparing CRNA costs to revenues in a typical GI ASC. This may be referred to as the anesthesia profit center within a GI ASC.

Revenues - Costs = Net Profit

Where: Revenues = (# of procedures) x (weighted average reimbursement of procedures), and.

Costs = (wages/benefits of CRNA) + (fixed costs/overhead required by anesthesia) + (variable costs/drugs, disposables, admin, other personnel, etc., required by anesthesia)

Scenario #1: Typical GI Operating Room at capacity.

Revenues:	Vs.	Costs:
(4,160 Procedures/yr) x ($408/procedure)		($203,090/yr CNRA salary/benefits) + ($25/procedure)
$1,697,280	Vs.	$307,090

In this scenario, a typical single Operating Room of a GI ASC accommodates sixteen patient-procedures per eight-hour day, five days per week, for a total of 4,160 procedures per year. With an average weighted reimbursement rate for anesthesia service of $408 per procedure, the total revenue potential of that single OR, derived exclusively from anesthesia, is $1,697,280. If the cost of the CRNA to the facility is the average cost as reported by the Bureau of Labor Statistics, U.S. Department of Labor of 2022, and each

procedure contributes an additional cost of $25, then the net revenue suggested by this simple financial framework approximates $1.39 Million dollars.

This back-of-the-envelope calculation delivers a strong message; that there may be considerable enough profit in anesthesia delivery for a GI ASC to invest the resources necessary for further investigation. Obvious initial questions include:

1. What is the minimum throughput necessary to support the employment of a CRNA at a GI ASC?
2. How little could a CRNA be paid to maximize profit for the GI ASC, while still attracting/retaining said CRNA?
3. What risks do CRNAs represent to GI ASCs?
4. Are there other revenues or cost reductions that could be achieved by hiring CRNAs?
5. How could the incremental addition of CRNAs to a GI ASC be optimized to maximize profit, minimize risk, reduce costs, improve market penetration, etc?
6. And on and on.

Perhaps the most important lesson this DNP project teaches is that anesthesia delivery is potentially so highly profitable that even if not engaged optimally, adding CRNAs to a GI ASC can be an extremely profitable opportunity.

Challenging this assumption, is a scenario in which the GI ASC operates for only 26 weeks per year. It is closed for six months out of twelve. Add to that under-utilization, the decision to pay the CRNA 50% more than the national average income while only tasking the CRNA to work 6 months of the year.

Scenario #2: GI Operating Room at one-half capacity, with "Excessively paid" CRNA.

Revenues:	Vs.	Costs:
(2,080 Procedures/yr) x ($408/procedure)		($300,000/yr CNRA salary/benefits) + ($25/procedure)
$848,640	Vs.	$352,000

In this scenario, the GI ASC may realize net profits of nearly $500,000.

Measures and Instruments

As is customary with observational studies, what begins with anecdotal evidence and educated estimates become back-of-the-envelope calculations. When those calculations indicate massive potential profits requiring minimal risk and expense, then many iterations of analysis may follow. Inevitably, the simplicity of the original financial model (revenues - costs = profit), become elaborate financial analyses. With each subsequent analysis, the inputs of the financial framework are analyzed to determine to what the output of the model is most sensitive. Where exact inputs are not immediately accessible, such as "how much a CRNA must be paid in any particular geographic location," then numeric ranges are estimated, based on the best available evidence, and the extents of those ranges are tested to learn how much influence each variable of input has on the desired output (net revenue). This may be referred to as "sensitivity testing" within a financial model, or framework. It tests what the output, profitability in this case, is sensitive to.

This iterative process was integral to this DNP project. The images below illustrate how spreadsheets and algorithms were employed as the primary instrument to measure outcomes of a multitude of financial scenarios. As business frameworks were designed and tested within spreadsheets, new lessons emerged. These lessons include the benefits of creating and utilizing financial frameworks for tracking procedures by type and reimbursement rates, payor mixes and number of Operating Rooms, the scheduling of operating rooms and so on.

Appendix10.1, Anesthesia Revenue Analysis, illustrates how this DNP project utilized spreadsheets to create a financial framework for analyzing revenue scenarios for GI ASCs with multiple Operating Rooms. This image indicates how financial models may contribute to sustainable business frameworks. Here, anesthesia revenues were calculated, using nationally adopted units (Base Units & Time Units) for computing reimbursements from private insurance carriers as well as public payers such as Medicare. This unitized data was then multiplied by actual throughput by procedure type, reported by private GI centers.

The identity of the GI center is intentionally omitted to protect their proprietary information.

Further, validation of the throughput by procedure type is of little consequence. The goal of the spreadsheet was to learn if such a framework could contribute to 1) improving the decision making of GI ASCs with regard to the addition of CRNAs to their teams, and, 2) empowering GI ASCs to optimize their engagement of CRNAs. That goal was realized. Business frameworks such as these can be powerful components of GI ASC decision making. Additionally, these business frameworks teach that different procedure mixes and throughput per room can be used to track and analyze anesthesia profitability across physicians. Even a single financial framework like this one can contribute to optimizing the profitability of CRNAs within a GI ASC.

Appendix 10.2 is a screenshot of a Break-Even Analysis spreadsheet that was used to test and measure the effects of scheduling within multiple-operating room GI ASCs, on Net Profits related to anesthesia delivery. This spreadsheet was a natural extension of and was taught by the lessons of the previous spreadsheet that examined profitability per Operating Room.

Analytic Plan

This DNP project pursued an analytical plan that involved developing and testing business frameworks to learn if they could contribute significantly to the decision making of GI ASCs concerning when to add incremental CRNAs to their team(s).

Tasks: Timeline, Monitoring & Evaluation

Quarter 4 of 2022

This quarter could be characterized as "Source Gathering and Process Development." In this phase, goals included framing of a PICOT question and determining what research already existed to support answering the PICOT question. Also in this phase, the researcher was learning the necessary components of legitimate, academic research and reporting. Identifying the requirements of peer-accepted research and reporting are critical to establishing timelines and short/long term goals and objectives for authoring a DNP project. A third significant aspect of these three months was the contact and relationship-building of the researcher with proposed subjects of study; individual gastrointestinal physicians, insurance experts, software coders and designers, CRNAs, owners of anesthesia service companies, and more. Individual

relationships can be critical to any endeavor wherein the goals rely on input/involvement of players within a range/variety of fields of expertise. Relationships required for professional success with a DNP project can be costly in terms of time and finances. In this case, the DNP researcher courted physicians within GI ASCs with whom she had previous professional relationships. At least one of which was over 1,000 miles from this researcher's home address. Relationships with other professionals, such as professional software coders and designers, owners of anesthesia service companies, etc., required in-person or phone/email communication spanning more than a year before those relationships produced successful results or ended unsuccessfully, in terms of the goals of this DNP project.

Analyzing existing research from medical, healthcare, legal, business resources, and more became the main thrust of the final month of 2022. With the acquisition of the knowledge imparted from the 100+ resources that this researcher engaged, came a wide array of new questions and new avenues of potential study, each of which presented varying degrees of importance to this DNP project. A primary challenge faced in the 92-day period from October 1 through December 31 was to read, analyze, prioritize and then re-visit and dig deeper into some subjects while designating others as un-critical to the specific PICOT question. Science, business, sustainability, and human psychology each play vital roles in this DNP project. One of the greatest challenges of this quarter was to maintain focus on collecting information focused purely on the core of this PICOT question, without missing any lessons that would otherwise render the PICOT question itself, irrelevant or insufficiently answered.

Quarter 1 of 2023

Developing a successful DNP project requires avoiding pedantic responses to pervasive challenges. Instead, recognizing where the greatest gains may be made and empowering the target audience (in this case GI ASCs) to achieve results quickly and with minimal effort and expense. Therefore, reducing the myriad sources of factual, instructive information to succinct lessons and then re-packaging those lessons in such a way that the target audience is inspired and then compelled by self-interest alone, to consume and utilize those lessons… this became the key challenge of Quarter 1 of 2023.

Consuming, analyzing, and distilling the information that the researcher uncovered throughout the previous six months presented a challenge combining academics increasingly with the human psychology inherent to introduction and adoption of new behaviors.

In this 90-day period, individual GI ASCs withdrew their collaboration. Mired by bureaucracy and fear; some individual physician partners of their ASCs were unsuccessful at currying support of their groups who feared incorrectly that they would have to either open their financial books to the researcher, or to subject themselves to spending the time necessary to learn and engage the results of this study. It was determined that to garner their collaboration would require far more time and resources of the researcher than their collaboration would benefit the DNP project. In fact, the researcher learned that the individual GI ASCs do not have propriety data to benefit this DNP project that could not be sufficiently collected from public resources. Although the participation of GI ASCs was, at first, considered indispensable, amply research of other sources instructed this researcher that participation of GI ASCs was ultimately unnecessary. Further, in the second quarter of 2023, the researcher found other settings in which to test the rudimentary framework at the very core of this PICOT question.

In tandem with the development of relationships and the acquisition of their resources, the researcher designed and tested dozens of iterations of financial frameworks for analyzing the original core focus of answering the original core PICOT question, “What throughput supports the incremental addition of CRNAs to a gastrointestinal ASC?” At the most rudimentary level, the price that the market pays for anesthesia services makes the incremental addition of CRNAs to GI ASC teams incredibly profitable. Even when a wide array of errors is made by their employers, adding CRNAs may remain so lucrative that the greatest losses occur simply by delaying the employment of incremental CRNAs. Even if an ASC pays a CRNA 50%-100% above market averages, and fails to employ their CRNA in such a way as to reduce non-anesthesia pre and post-operative services, and fails to engage defensive employment contract options, and fails to engage any/all other options for optimizing the employment of their CRNAs… even under these circumstances, a GI ASC may realize net profits of more than one

million dollars per year for each CRNA they engage. As Appendix 10.2 indicates, the break-even for employing a CRNA can be achieved with just the first two (2) procedures of each day a CRNA is employed. In an atmosphere where a single GI physician can easily conduct sixteen procedures within an 8-hour workday, that baseline example represents a potential return of eight (8) times the investment.

Therefore, Quarter 1 of 2023 was highlighted by the development, testing and refinement of frameworks for the incremental employment of CRNAs within GI ASCs. The secondary lesson born from the primary one of the extreme profit potentials of investment in CRNAs, is that there are many ways to explore and express the associated net revenues. A multitude of additional frameworks and iterations thereof were explored in this quarter. Correspondingly, those iterations were introduced and tested anecdotally and with a range of stakeholders including individual CRNAs, nursing associations, state legislators, anesthesia service companies, hospital executives, GI physicians, administrators of ASCs, and so on.

Quarter 2 of 2023

In the spring of 2023, the relationships developed by this researcher paid off in the form of a real-life, real-time test of one of the financial frameworks designed for this DNP project. A controversy was coming to a head between the administration of a hospital and the anesthesia company contracted to supply that hospital with anesthesia services. Neither side had a framework to analyze or explain employing anesthesia providers. Negotiations were deteriorating, as neither a unifying language nor a succinct business framework was being proposed by either party. The parties were at an impasse. This researcher adapted one of the business frameworks developed for GI ASCs, to the hospital in question. The framework was presented to both parties. It became a focal point for understanding the value of anesthesia positions. The framework presented options for both parties to understand the same situation (employment of CRNAs) from different perspectives. The framework introduced options for analyzing scheduling, attraction/retention, Per Diem and full-time CRNAs, and more. The researcher offered that precise business framework, in the form of spreadsheets, corresponding instructions for its use,

assumptions and risks to the two parties involved in that negotiation. So, the actual business framework used for that purpose will not be elaborated upon here, to maintain what either of those organizations may consider as their own proprietary information. The details are irrelevant to the central result that the question was answered quite practically that, "Business frameworks may be developed to empower the modern Gastroenterology outpatient marketplace to effectively add CRNAs to the medical team?" The resounding answer is… YES.

Further, while a holistic, comprehensive, customizable, timeless, business framework may be developed to promote the employment of CRNAs within GI ASCs, such a completely comprehensive business framework is not required. It might not even be advisable. Smaller, less-comprehensive, less-customizable business frameworks (such as the one tested by the researcher in the previous case study) may be ample. As the tested example proved, such business frameworks have value and can produce results.

Throughout this quarter, new options for the business framework were introduced, analyzed, and tested. One of the greatest lessons may not be that business frameworks could indeed facilitate decision-making for incremental addition of CRNAs to ASCs. Rather, it may be that the greatest lesson that simple, focused business frameworks designed to answer specific questions… one at a time… as they arise within GI (or other) ASCs. Basic human psychology and change theories instruct that small, distinct changes, backed by sufficient targeted inspiration, motivation and education may be more effective than a holistic tool/framework.

Quarter 3 of 2023

One of the greatest challenges of this quarter involves how to process, incapsulate and express the lessons learned throughout pursuit of answers to the PICOT question. DNP projects are not intended solely for the benefit of a single student nor a cohort. DNP projects are intended to advance knowledge for the benefit of the masses. Therefore, how the DNP project is expressed can be just as… or, even more… important as any innovation, advancement, or idea within them. During this 92-day period, the

report was written, refined and re-written, even as models were simplified and expanded and started anew. How to express and disseminate the lessons learned throughout this DNP project were central during this time.

This period was also characterized by a deeper exploration into the study of law, private policy and public policy associated with the employment of CRNAs. Could law and policy add risk to the very foundation of any business framework to employ CRNAs within GI ASCs? In fact, 2023 witnessed multiple changes that affected the way anesthesia may be delivered across that state. Multiple public agencies, private organizations, non-governmental organizations, private individuals… virtually every stakeholder germane to this DNP project were engaged and/or effected by new state legislation. That legislation sent shockwaves throughout the state, effecting change, and coming in conflict with policies of ASCs statewide, including GI ASCs. The legislation in question was signed into law by the Nevada Governor in the early days of the third quarter of 2023, turning anesthesia delivery in that state upside down.

In the wake of such transformational legislation, the risks associated with public and private policy took center stage with this DNP project. How should "policy" be addressed? Does it affect the PICOT question? If so, to what degree? And how should policy be integrated into sustainable business frameworks? These became central challenges of the third quarter of 2023.

Quarter 4 of 2023

Quarter four is about authoring and refining the expression of the DNP project, its report for publication. Rather than attempt to describe the many iterations of the financial modeling that was the foundation of the early months of this study, it is more important to illustrate the lessons learned by the overall process, in a manner that will provide the most impact via dissemination. For these reasons, this quarter focused on authoring the DNP report. What figures or illustrations will help to convey the lessons learned? Are there specific lessons that may be conveyed visually through graphics? What charts, tables and spreadsheets encapsulate and convey the lessons so that others may reproduce and innovate them

further? Communication and dissemination were the leading objectives of this quarter.

Resources and Support

Three resources played critical roles in project: 1) online peer-reviewed literature databases, and web sites of professional and scientific expertise, 2) direct personal relationships of the chief investigator, and 3) the experience and expertise of the chief investigator of this DNP project.

Online peer-reviewed publications and professional and scientific websites supplied the backbone of the medical science, business processes and analytical frameworks, and human psychology involved with this study. While there exists a limited amount of literature directly addressing GI ASCs specifically, there is a plethora of business literature instructing best practices for analyzing any/all types of businesses. Literature instructing financial analysis, spreadsheet and algorithm development, software design, sustainable business modeling, marketing, and distribution strategizing, change management and more… exist by the thousands. Factually, basic financial analysis is ubiquitous and readily available to the extent that the mere mention of "break-even analysis" evokes a myriad of methods for understanding its elements and representing it graphically. Concepts like "profitability," "return on investment," and "break-even" are widely accepted and understood. Methods of financial analysis… "the numbers" … work no matter what business or transaction is being analyzed, so once the basic concepts are learned, there are a myriad of ways they may be introduced to problem solving. GI ASCs are no exception. This means that financial modeling is a tool, but more importantly, it is a language that is used to explain business scenarios. If one is to tell a story about a business, it often becomes important to tell it in a way that caters to the uniqueness of the stakeholder to whom the story is being told. Therefore, quick, simple stories with big profits (exciting endings) may, at times, tell more compelling stories than complex, custom, holistic analyses accounting for many scenarios. Small and simple and quickly consumed; these lessons abound in the literature of business, healthcare, psychology and more. They were formative lessons for the chief investigator.

The direct personal relationships of the chief investigator also played a critical role in this DNP

project. The role that the DNP committee of the University of Nevada, Las Vegas played in this project cannot be overstated. The professors mentored the chief investigator at every step of the process. They provided authenticity and expertise that fostered structure as well as the elasticity and confidence of this chief investigator throughout the entire process. Regarding other relationships, early on, it was thought that participation of GI ASCs would be critical to the success of this project. Many resources were therefore applied to garnering their support. As research unfolded, however, it became clear that the numbers speak for themselves. Enough data regarding throughput, risk factors for GI centers, fixed and variable costs and revenues related to anesthesia were available through personal experience of the chief investigator, other CRNAs and collected from public sources on the internet. Participation of GI centers became irrelevant. Further, when the chief investigator sought to test the concept that business frameworks could be useful in decision making regarding the incremental employment of CRNAs; a contemporary, real-life scenario presented itself through the investigator's other professional relationships. Multiple business frameworks were tested, and their success was outstanding. The investigator introduced multiple stakeholder types to frameworks she designed and adapted to existing challenges with attracting/retaining CRNAs, scheduling CRNAs, fulfilling anesthesia contracts, and helping CRNAs to understand and negotiate their own value with employers. Business frameworks can add tremendous value to decision- making on all sides of "employing incremental CRNAs."

The experience and expertise of the chief investigator was critical to this DNP project. With more than a decade of experience working inside GI ASCs, the chief investigator had become an expert in the operations of that business. She has taken business courses specific to GI centers. Additionally, she has many years of experience in a variety of operating room settings, in multiple states. From those experiences she learned lessons in management, culture, contracts, change management and more. Further, the chief investigator served in a state association of Certified Registered Nurse Anesthetists for 10 years, where she directly worked on public policy initiatives as well as learning the legal and business challenges inherent to managing the small business that is a non-profit entity.

Risks and Threats

The most significant threats to this project fall within two categories: 1) Leadership, and 2) Public Policy. Regarding Leadership, this DNP project is the product of a CRNA's exploration of the concept that incremental addition of CRNAs to GI ASCs may result in revenues exceeding $1M per CRNA. The lessons learned include that there is a tremendous opportunity for financial profit, and further that even when that profit is concentrated in the hands of the owners of the ASCs, virtually all other stakeholders will enjoy a net benefit to greater or lesser degrees. However, one of the greatest challenges related to discovery, or creation; even in the category of lessons learned from the DNP process, is that the knowledge, discovery, or creation on its own is of little to no value unless it is applied. There is a tremendous body of new knowledge in the sciences and business and often, there is an accompanying lag between innovative knowledge and that which is applied. Then again, there is another common lag between that which is applied and that which prevails, achieving complete and successful introduction throughout any/all potential application. Saturation, diminishing returns, application until obsolescence or replacement are, even for the potentially "best" or "most profitable" lessons, an entirely more challenging objective than the attainment of the lesson itself. As knowledge becomes increasingly specialized, it becomes less likely to be applied and less likely yet to be applied sustainably. Why? Because often the masters of the lesson are ill equipped to take the lesson from each step to the next on a pathway to commercialization. Sometimes, as is the case with this DNP project, lessons are learned that would take the student, an anesthesia professional herself, on an entirely different career path if she were to pursue the lessons, she has earned in the DNP project. This is one of the greatest challenges to DNP projects and it is the same with this DNP project.

The second greatest threat to the promulgation of the lessons learned through this DNP project is Public Policy. Powerful, monied interests are aligned throughout the United States to change public policy to favor those who invest in influencing laws.

Dissemination Plan

- submit for publication to medical and health-focused journals (print and online)

- create 30-second and 3-minute informational video
- deliver to Nevada Association of Nurse Anesthetists (NVANA)
- deliver copies to multiple state associations of CRNAs
- deliver copies to National Association of CRNAs
- create concept-focused website
- create and distribute to CRNA associations, and GI associations 1-pagers and pamphlets illustrating key concepts and noting sources for more information

Financial Plan

The meager budget for this DNP project was achieved. Initial estimates indicated "Maximum Total Expenses" of $9,250, as outlined in Chapter 2, section title "Project Economic Analysis." In total, less than $9,000 was spent on this project. A laptop and software were purchased below the budgeted amount. Expert Consultation totaled less than $3,500. Travel to/from out-of-state and local Gastrointestinal Ambulatory Surgical Centers was accomplished for less than $2,000. Assorted fees, expenses and costs will come in less than $1,000; even once final printing of this project is complete.

IRB Exempt

US Food and Drug administration (2019) states that "under FDA regulations, an Institutional Review Board is group that has been formally designated to review and monitor biomedical research involving human subjects."

This DNP project does not involve any biomedical research involving human subjects; none whatsoever. Neither is there any collection, analysis or research involving personal or identifiable protected information of human subjects. This DNP embodies an investigation of the employment of a specific type of professional within a particular business setting. This is an exercise in business management. Therefore, this DNP project is exempt from Institutional Review Board review and monitoring, as supported by 45 CFR 46.104 (see Appendix 9 for notice of IRB exclusion).

Chapter V

Project Summary

Results

Business is the healthcare of economies. This lesson is synthesized by literature. As healthcare may take myriad forms of treatment and wellness regimens, so too may myriad business frameworks be applied to economies both micro and macro. As dictated by sustainable business frameworks, this project focuses on the micro-economic environment of GI ASCs, while also accounting for the micro and macro bottom lines of social and environmental profit and loss. Sustainable business frameworks are inextricably linked to social sciences like demography, political science, and psychology. Appendix 12 illustrates a business framework instructed by the literature of this DNP project. Inspiration, Education, Empowerment and Action encompass the business frameworks suggested by this project; to promote the incremental employment of CRNAs to GI ASCs. These four titles suggest the core concepts of the phases of the greater framework.

In the first phase, the objective of "Inspiration" is to inspire the target audience to invest their most precious commodity… time… in learning more about a particular opportunity. Physicians have many ventures competing for their time and attention. Even opportunities that they may welcome may be lost in the deluge of information flooding every channel available to communicate with them. The challenges inherent to "Inspiration" may be overcome by discrete messages, packaged attractively, that differentiate themselves from the competition by targeting the greatest wants, needs, fears, etc., of this audience. This cohort shares the timeless common human goals of wanting to profit more, while working less, and risking less. Yet, the physician cohort is generally aware that if they act purely as healthcare providers; to earn more they must work more. Doing so continues or grows their own risk factors. The services for which they bill as physicians are typically their highest revenue earning opportunities.

Therefore, they often turn to business frameworks like capturing ancillary service benefits, creating hierarchical groups, pooling resources, etc., to achieve marginal revenue gains. Few opportunities exist for them to capture revenues in excess of $1 Million per year, while simultaneously lowering their risks,

reducing their hours worked, and lowering their costs. For these reasons, the Break-Even Analysis is a powerful tool toward Inspiring this target audience to… learn more. Regardless of one's background, experience or education, most professional adults understand the concept of "break-even." Moreover, a "Daily Break-Even Analysis," a version of which is illustrated by Appendix 10.2, can deliver multiple messages in a short amount of time, including total required investment and potential return on investment. GI physicians understand their income. Their healthcare services are rarely rewarded with profits exceeding $1Million dollars per year. Break-Even analyses may therefore be powerful business frameworks for inspiring GI Physicians.

"Education" is the phase that follows inspiration. With ample inspiration, one may dedicate the time or other resources necessary to learn more about an opportunity. The objective of education is to convert enough information to convince the target that the potential rewards are worth their investment.

Anesthesia Revenue frameworks, as illustrated in Appendix 10.1 may empower the owners of GI ASCs. Also known as cost-benefit analyses, these business frameworks elaborate on the fundamental information conveyed by Break-Even Analyses. How deep should this revenue framework dive? How complex should the framework be? Literally, how many columns, rows and categories of numbers should be represented and how interactive the financial models should be depending on the idiosyncratic characteristics of the target/individual physician or ASC owner. Just as the individual healthcare practitioner must assess their patient to determine the best course of action for treatment/wellness, so too must one assess the individual target of the Anesthesia Revenue framework to be applied to "Educating" the ASC owner. They key is to apply just enough education to get the target to move to the next phase, "Empowerment."

In the "Empowerment" phase, the objective becomes conveying the tools the ASC owner needs to act… to engage CRNAs… either beginning their employment or optimizing their employment within the GI ASC team. In "Empowerment" the engagement of CRNAs may be optimized; again, depending on the characteristics of the ASC and their owner(s). The "Empowerment" phase may be promoted by business frameworks such as the Anesthesia Scheduling Analysis depicted in Appendix 10.3, the framework in

Appendix 10.4 titled “Anesthesia Full-Time-Equivalent Hours Required by Hospital Contract,” or the framework depicted in Appendix 10.5, titled, “Pay & Leave Scenarios for CRNAs Employed by Anesthesia Services Company.”

“Anesthesia Full-Time Equivalent Hours Required by Hospital Contract” (Appendix 10.4) is a screenshot of an actual business framework created by the principal investigator of this study. This framework has been redacted to protect the identity of the hospital in question. The principal investigator used this exact business framework to empower a hospital to act, related to their real-life, contemporary challenges of optimizing their engagement of CRNAs. The objectives of hospital administrators included learning how to schedule CRNAs to optimize the utilization of their operating rooms, learning how many CRNAs may be required to service their operating rooms, and learning how to communicate their objectives with anesthesia contract holders. These objectives were accomplished by the application of this business framework.

The framework depicted in Appendix 10.5, titled, “Pay & Leave Scenarios for CRNAs Employed by Anesthesia Services Company,” is another example of a business framework that was tested in a real-life scenario. It prevailed as an effective method for empowering the optimization of the engagement of CRNAs. This business framework was presented to a business that holds anesthesia contracts for hospitals and ASCs across the country. Among their objectives, was to attract and retain CRNAs for a specific contract. Again, identifying text was redacted from this business framework. This business framework contributed to empowering the company to achieve the objective of hiring and retaining CRNAs.

This collection of frameworks is not presented here as necessary components of this phase, but as examples of business frameworks that may empower the target audience to optimize their engagement of CRNAs. Some empowering frameworks will necessarily be subjective, where quantitative analysis is not readily available. The business of anesthesia is quantifiable on primitive levels but attempts to complete bottom lines for contributions to social good, or emotional wellbeing of providers for example, may be obfuscated. Precise dollar amounts may not be readily calculated but such revenues may often be reduced

to subjective units of “net positive” or “net negative” for specific stakeholders.

The result of this DNP project is an understanding that business frameworks may effectively Inspire, Educate and Empower the owners of GI ASCs to Act… employing and optimizing the employment of CRNAs within their teams.

Sample Description

Gastroenterological Ambulatory Surgical Centers (GI ASCs) are the sample set of this project. This sample is not arbitrary. For scientific discovery, samples are chosen purposefully to test theories. GI ASCs were chosen specifically due to the simplicity of their operations and the fact that direct relationships (causality) may be easily identified and isolated from the holistic system. As discussed earlier, only two procedures make up the vast majority (over 95%) of services conducted therein. Further, GI ASCs may be observed with and without CRNAs. The costs and revenues of CRNAs within GI ASCs are easily isolated. The billing for anesthesia delivery is clearly defined and articulated by public and private reimbursement sources (insurance rates). Without CRNAs, GI physicians perform the same gastroenterological procedures, with the exception of delivering sedation drugs, rather than anesthesia. The addition of anesthesia services into this environment requires a very discrete, limited number and type of anesthesia-specific providers, drugs, and equipment. These ASCs offer both control groups and experimental groups regarding the introduction of CRNAs as the isolated variable added to the equation.

Further, unlike any other ASC stakeholder group, the owners of GI ASCs experience a highly concentrated, measurable, often easily quantifiable, difference in benefits, risks, and opportunities. This specific sample, the owners of GI ASCs, may profit by over $1 Million dollars per year, per CRNA employed, while simultaneously lowering their costs, lowering their risks, raising their patient satisfaction, serving more patients, and more; all while reducing the workload of the GI physicians therein. Individuals rarely have opportunities like this. These facts make their motivation high, increasing the probability that this project will result in raising the demand and opportunity for CRNAs nationwide. The same could not be said for CRNAs, if this project focused on individual CRNAs as the sample

population. Unlike GI physician owners of ASCs, CRNAs do not stand to generate revenues of $1.6 Million per year, per CRNA hired in those ASCs. CRNAs cannot take advantage of the lower costs, lower risks, higher patient satisfaction, etc., like the individual owners of GI ASCs can. No other stakeholder can capture the benefits of hiring CRNAs like the owners of GI ASCs can.

Once the lessons regarding the benefits of hiring CRNAs are understood and taken advantage of by GI ASCs; other ASCs… all venues where anesthesia may play a positive role… may discover the advantages that CRNAs offer to their businesses. Collectively, the characteristics of GI ASCs make them an ideal sample for this type of academic pursuit.

Results of Analysis

The results of the analysis are that Business Frameworks can instruct the addition of incremental CRNAs to GI ASCs. Business Frameworks are as numerous as medications in your local pharmacy. So, which Business Frameworks are best? How much and when should they be prescribed? Like the best healthcare, Business Frameworks should be applied Pro Re Nata (PRN); or, As the Situation Demands. Quite simply, they should be applied "as needed" by professionals who understand their efficacy and application.

Economic Evaluation

At a micro level, this project was conducted under-budget, thousands of dollars under original estimates, largely due to the initial assumption that interstate travel would be required for stakeholder engagement. In fact, communications with out-of-state stakeholders were conveniently conduction via phone, email, and videoconference. Additionally, funds initially estimated for software creation and coding of financial models were learned to be unnecessary. The science and research engaged by the chief investigator instructed that such a comprehensive, holistic, interactive, software-based financial model was not only well beyond the scope and practical objectives of this DNP project, but such application would likely cost more than a quarter-million dollars. Further, research led the chief investigator to an understanding that smaller, simpler customized business frameworks may be a far more cost-effective

approach to empowering GI ASC decision-making involving the incremental addition of CRNAs to their teams.

Evaluation of DNP

At the inception of this DNP project, the Chief Investigator envisioned the creation of a complex, holistic financial model that would accept minimal inputs from its user(s) (GI ASC owners) and, using multiple comprehensive algorithms invisible to the user, would draw from real-time, continuously updated sets of payor data, active insurance-specific data, and other data sets to create immediate feedback of advice including: interactive suggestions for competitive reimbursement rates for CRNAs, schedule-building for operating rooms, vetted legal advice for CRNA contracts, and more. That vision was unachievable due to constraints of resources such as time, money, and human capital. It is a noble pursuit, but 9 months of research and analysis influenced a more enlightened vision. Resulting from the synthesis of existing literature, anecdotal evidence from experts in a rage of associated fields, analysis of actual financial data, and real- world testing including direct engagement with a national anesthesia services company and one of their hospital clients… and more… had the effect of crafting an improved, more informed vision. The evolved vision is reflected in four key lessons learned.

Lesson 1. The employment of CRNAs represents a very profitable opportunity, coupled with very low-risk, and requiring an incredibly low investment for GI ASCs. As instructed by experts in transformational change, this opportunity presents strong motivations for changing human behavior. Minimal risk, low investment of time and money, and high potential financial reward, is a trifecta for encouraging change.

Lesson 2. Basic business frameworks are enough to communicate, inspire and empower GI ASCs to employ incremental CRNAs. Conveying these high-powered motivations to the target audience may be accomplished without a complex, expensive software application.

Lesson 3. Sophisticated, holistic, sustainable business frameworks may be engaged effectively to empower GI ASCs to optimize their profit related to their employment of CRNAs. Even if such

customizable, complex models are not essential for GI ASCs to realize revenues more than one million-plus dollars per year, per CRNA engaged, a properly designed, simple-to-use software application could be worth several hundred thousand dollars per year to GI ASCs by reducing costs, lowering risks, expanding their profit margins, and enhancing the working environment within ASCs.

Lesson 4. Policy, public or private, can eliminate the revenue opportunities inherent to the incremental employment of CRNAs within GI ASCs. If such policy changes occur, there is still little to no risk to those ASCs who employ CRNAs, if the ASC is aware of the policy change(s) and adapts their practice accordingly. If such policy changes are inevitable, then the sooner that a GI ASC employs CRNAs, the more they will profit from CRNAs before policy changes destroy this opportunity. Hence, there is even a degree of urgency present with this investment opportunity. Further, if such revenue-destroying policy changes are NOT inevitable, then it would behoove GI ASCs to invest a portion of their anesthesia- related profit to combat any/all potential policies that might destroy their ability to profit over $1 Million per year per CRNA they employ.

Discussion of Project

Summary

The DNP project instructs that the incremental additional of CRNAs to a GI ASC can be so profitable that GI Center owners should move post-haste to bring CRNAs onboard. Time is of the essence. Policy and profit both introduce urgency, to the effect that there is so much profit to be made by the employment of CRNAs that it is advised to employ CRNAs as soon as possible. Even if the business does not fully understand their value or how to best employ CRNAs, there is more to lose by waiting… than by bringing on CRNAs and learning how to maximize their benefits later. Therefore, introducing simple, well-understood business frameworks in a customized manner can be highly motivational and empowering for GI ASCs to employ and later optimize the employment of CRNAs.

Interpretation and integration with the literature

In retrospect, this chief investigator came to learn the value of the *process* of developing an

academic research endeavor and subsequent report, as taught by her DNP project leaders/instructors. Following the research to determine the results, rather than researching to produce or validate a pre-conceived notion; this critical component of science and academic education was impressed upon the chief investigator. Initially, the chief investigator postulated that a comprehensive, holistic, highly customized financial model may likely be the only natural result of this DNP project. Yet, the literature teaches a different approach; one that integrates more with organizational and individual psychology of the target audience, marketing, distribution and implementation regarding the target audience, and the financial resources of required to develop the pre-conceived software application.

The literature instructs smaller steps, in simpler, cost-effective, customized business frameworks, wherein a human interpreter (consultant) may engage the target audience for discrete, incremental lessons/tools to promote the employment of CRNAs within GI ASCs. Within the setting of GI ASCs, the business frameworks are relatively simple; few inputs due to few procedures performed define clear relationships about costs and benefits of investing in the employment and optimization of CRNAs. Business and scientific literature instruct that business frameworks depicting break-even analyses, cost-benefit analyses, or scheduling may be presented to physicians and other owners of ASCs in a fashion that those parties may easily and quickly digest and leverage for decision-making. Even if easy to use, more complex, responsive business frameworks powered by software applications may be less successfully engaged/promulgated by physicians and other ASC owners who may not as readily understand the power and reliability of their output. The literature, therefore, instructs that simpler business frameworks may be more useful in inspiring and empowering the key objective of hiring incremental CRNAs within GI ASCs.

Implications for Nursing Practice

The profitability inherent to employing CRNAs instead of their M.D. anesthesia counterparts, highlights the basic notion of "getting more while paying less." CRNAs are a classic example of the same high-quality healthcare services delivered by Anesthesiologists… yet at a fraction of the cost. The degree

to which this lesson gets to the patients and other stakeholders is the degree to which the Nursing profession will be promoted and healthcare… society… will benefit. Demand for nurses could be driven dramatically, if/when GI ASCs nationwide are inspired and empowered to hire CRNAs. Further, the promulgation of CRNAs within GI Centers will promote CRNAs within all surgical settings.

Potential for Sustainability

The addition of CRNAs to GI ASCs meets the requirements for achieving sustainability. When considering the triple bottom line test for sustainability, the proliferation of CRNAs throughout GI ASCs across the nation results in Positive Net Profits across all three. There are many ways to express the triple bottom line of sustainability. Harvard Business School Online (Miller, 2020) refers to the "3-P's" as Profit, People and Planet (Appendix 11). Regardless, all credible illustrations of the triple bottom line speak to calculating the costs and benefits of the same three elements: Financial, Social and Environmental net profit. In the case of calculating the triple bottom line for proliferation of CRNAs throughout the healthcare system, all three categories may yield net profits. CRNAs promote equity and access within healthcare. They can contribute to lowering healthcare costs while simultaneously improving outcomes, patient satisfaction, and provider wellness. They are the embodiment of receiving the highest level of anesthesia care, at the lowest costs. If there is a future where the cost of anesthetized procedures are more affordable and accessible, while achieving the highest quality of service, then CRNAs promote that outcome. Further, as Appendix 12 titled "Holistic Nurse Anesthesiology" illustrates, by addressing all five dimensions of the Quintuple Aim, and adding outreach to GI ASCs, the DNP project results in a holistic anesthesia framework that empowers owners of ASCs to improve multiple facets of their business through the effective employment of CRNAs. The CRNA is a critical component of achieving a sustainable anesthesia delivery model, and of achieving sustainability within GI ASCs.

Dissemination and Utilization of Results

Dissemination and Utilization was accomplished in four steps:

1. Multiple business frameworks were customized for two different partner organizations. Customized business frameworks including, Cost-Benefit Analyses and Anesthesia

Scheduling in a 15- provider (anesthesia) surgical center were introduced to a national anesthesia services company, based in Florida and administrators of a Nevada hospital. The business frameworks presented and taught by the principal investigator of this DNP project were essential to breaking a logjam in communication among stakeholders involved in negotiations regarding the incremental employment of CRNAs within the hospital. This chief investigator served as a third-party consultant, teaching the input and output of the models to the parties, and after early rounds of negotiation, the chief investigator amended the business frameworks and reintroduced iterations to the same parties. The chief investigator was lauded for introducing frameworks that became central to the negotiations of the third parties, and with the models, a common vernacular and visualization of methods for improving the employment of CRNAs within the hospital.

2. In October 2023, an abstract of this DNP project was submitted for poster presentation at the 2024 Western Institute of Nursing Conference.
3. The completed DNP project was delivered to the Nevada Association of Nurse Anesthetists (NVANA). NVANA Board Members received a presentation from the chief investigator at a Board Meeting that was open to and attended by members-at-large of the organization. Individual and groups of CRNAs may use the lessons taught by the DNP project to propose innovative practices at ASCs and within hospitals. CRNAs may utilize lessons of the DNP project to improve their understanding of their own worth to GI ASCs and more broadly to any setting in which anesthesia is delivered.
4. The completed DNP project was delivered to the American Association of Nurse Anesthesiology (AANA) for broad dissemination throughout the U.S. The report may be applied to instructing public and private policy makers. It will be available for dissemination through the AANA to its members, the public, researchers, etc.

Appendix 1 - Search Table

Search #	S1		S2	S3	S4	S5	S6	S7	S8								Total keeper articles
	Anesthesia business plan		Outpatient anesthesia	Office-based anesthesia	Anesthesia staffing	Anesthesia information management system	Anesthesia billing	Anesthesia throughput	Cost-effective anesthesia	S3 + S4	S4 + S5	S4 + S6	S4 + S7	S4 + S8	S5 + S6	S5 + S8	
CINAHL 2000-2022, English		1	364	145	52	113	32	4	42	3	1	3	0	0	3	2	
Keeper articles										1	1	1	0	0	1	1	5
PUBMED 2000-2022, English	1996-2022.	28	4,841	579	1,373	1,526	301	256	1,232	11	2	69	9	11	34	17	
2010-2022, English		19	3,286	400	1,050	1,213	234	214	916								
Keeper articles										4	0	15	3	0	13	0	35
Cochrane 2000-2022, English		6	2015	58	23	451	18	7	655	0	3	0	0	1	3	17	
Keeper articles										0	0	0	0	0	2	1	3
SCOPUS 2000-2022, English		0	388	106	38	305	268	333	1,337	0	0	1	0	0	2	0	
Keeper articles				3	8					0	0	1	0	0	0	0	12

Appendix 2 - Evidence Table

	CITATION: Author, Date of Publication & Title	Research Design / Method	Sample / Setting	Data Analysis	Study Findings	Worth to Practice. LOE. Strengths/Weaknesses. Feasibility. Conclusion. Recommendation
Study #1	**Helmers, R. A., et al. (2017). Overall cost comparison of gastrointestinal endoscopic procedures with endoscopist-or anesthesia-supported sedation by activity-based costing techniques. Mayo Clinic Proceedings: Innovations, Quality & Outcomes, 1(3), 234-241.**	Non-Randomized Control Trial. Time-Derived Activity-Based Costing	40 patients; Mayo Clinic GI	Percent; quantitative	CRNAs = higher ROI than gastros alone	**Worth To Practice:** HIGH. **Level of Evidence:** III. **Strengths:** Mayo = high value target, same staff for both types of delivery. **Weaknesses:** doesn't account for other factors **Feasibility:** 100% **Conclusion:** CRNA costs more and yields more than gastro alone. **Recommendation:** Gastros should employ CRNAs. **Comments:** Use this study as basis. Apply multiple additional benefits.
Study #2	**Dexter, F., & Traub, R. (2000). Determining staffing requirements for a second shift of anesthetists by graphical analysis of data from operating room information systems. AANA journal, 68(1), 31-36.**	Cohort Study	62, 4-week periods; University of Iowa	Graphical; statistical	Graphical guide for visualizing potential CRNA staffing & rhythms. Equation-driven.	**Worth To Practice:** Medium. **Level of Evidence:** IV. **Strengths:** total Anesthesia hours worked per day across all rooms. **Weaknesses:** # CRNAs to hire… NOT scheduling. Apply Seasons. Throughput biased V. Profit. **Feasibility:** 100% **Conclusion:** Graphics SELL. Use mathematical analysis. **Recommendation:** Guide to CRNA hiring. Analyze their equations for use in my study. **Comments:** Apply sensitivity analysis for both education of MDs and customization per facility.
Study #3	**Anwar, A., et al. (2021). Nonoperating room anesthesia: strategies to improve performance. International Anesthesiology Clinics, 59(4), 27-36.**	Expert Opinion	Non-Operating Room Anesthesia Theaters	Descriptive	Conceptualized strategies to improve operating room anesthesia	**Worth To Practice:** Low. **Level of Evidence:** VII. **Strengths:** brainstorming thought-map of ideas to quantify . **Weaknesses:** elementary approach to business strategy. lazy/low. **Feasibility:** 50/50 **Conclusion:** Many approaches to improve performance. **Recommendation:** check their list when developing department expense sheets. **Comments:** Demonstrates lack of factual analysis tools; refer to its list(s) when developing cost sheet(s).
Study #4	**Mills, A., et al. (2020) Quality, costs, and policy: Factors influencing choice of anesthesia staffing models. Journal of Healthcare Management, 65(1), 45-60.**	Mixed-Method Approach. Telephone interviews, Claims-Based Categorization	46 facility leaders interviewed & 6,488 facilities nationwide	Percent; qualitative; descriptive	State/Federal Laws and Medical Guidelines most critical in staffing models.	**Worth To Practice:** **Level of Evidence:** III: **Strengths:** Legislations' effect on staffing models. **Weaknesses:** zero quantification/monetization. Cursory, incomplete review of obvious. **Feasibility:** 100% **Conclusion:** legislation is key to CRNA Vs. MD ratios. **Recommendation:** educate legislators, motivate stakeholders to promote pro-CRNA legislation. **Comments:** Education of MDs re: "risk" and law(s) is critical to change-management. email copy to lobbiest, post copy on CRNA website.
Study #5	**O'Sullivan, C. T., et al. (2007). Evidence-based management assessment of return on investment from anesthesia information management systems. AANA Journal-American Association of Nurse Anesthetists, 75(1), 43.**	Systematic Review	1966 - 2005. 10 articles reviewed	Descriptive	AIMs ROI is higher… the greater the organization; from small ASCs to large hospitals to healthcare systems and ultimately their greatest ROI is for society at large.	**Worth To Practice:** High. **Level of Evidence:** I. **Strengths:** statistical significance achieved. Deep dive into ROI of AIMS. **Weaknesses:** narrowly focused on AIMs alone. **Feasibility:** 100% **Conclusion:** AIMS cost-effect for larger orgs and society… not for small practices. **Recommendation:** Search for newer, cheaper, smaller AIMS focused on mom/pop ops. "Pocket-App-AIMS" $250/mo or less **Comments:** AIMS ROI may best apply: 1) multiple. partial-day shifts for 3+ CRNAs in org. 2) multiple anesthesia drugs used per facility, 3) high drug cost/waste scenarios
Study #6	**Navidi, B., & Kiai, K. (2019). Efficiency and scheduling in the nonoperating room anesthesia suite: implications from patient satisfaction to increased revenue operating room: a common (Dollars and Sense) approach. Current Opinion in Anesthesiology, 32(4), 498-503.**	Cohort Study. Standardizing scheduling & converting sedation protocols	2016: 4,185 EGD/ colonoscopies. 2017: 4,242 EGD/ colonoscopies. 2018: 4,852 EGD/ colonoscopies. GI endoscopy.	Percent; descriptive	Scheduling & Grouping may have largest effect on NORA efficiencies & at lowest investment cost. Patient satisfaction has not been measured but has significant impacts on practice.	**Worth To Practice:** Medium. **Level of Evidence:** IV. **Strengths:** Patient satisfaction major component of non-monetized value. 12,000+ procedures analyzed over 3 years. **Weaknesses:** outcome criteria = subjective/bias-ready: interviewer & subject. Variables changed as study continued. **Feasibility:** 100% **Conclusion:** scheduling/grouping = ROI w/low "I." **Recommendation:** group & standardize care for $$. **Comments::** gastros, eyes, dentists, pods… small facilities already group propofol by days/theaters when/where CRNAs scheduled.
Study #7	**Boyd, D., & Poghosyan, L. (2017). Certified Registered Nurse Anesthetist Working Conditions and Outcomes: A Review of the Literature. AANA journal, 85(4).**	Systematic Review. Synthesized Findings on Working conditions and workforce outcomes	13 studies. N=16-7,537. Single-state to National CRNA Roster.	Descriptive	Corporate culture (leadership/ teamwork) impact ROI; but budgeting/ planning for it are ill-defined.	**Worth To Practice:** High. **Level of Evidence:** I. **Strengths:** communication, collaboration, professional identity, autonomy. **Weaknesses:** limited application to budgeting/ROI for small NORA **Feasibility:** 50/50% **Conclusion:** "soft skills" may impact ROI significantly, but vague application recipe **Recommendation:** consider basic psychology impacts of staff on bottom line. Corporate culture matters. **Comments::** apply budget dimensions sensitive to communication, collaboration, professional identity, autonomy.
Study #8	**Hogan, P. F., et al. (2010). Cost effectiveness analysis of anesthesia providers. Nursing Economics, 28(3), 159.**	Mixed-Method: Evidence Review; Simulation Model	2008: 52,636 claims, 2006: 52,233 ASC visits, 2007: 40,000 anesthesiologists, 36,000 CRNAs. Literature Review, National Healthcare Claims & National Discharge Data	Descriptive	High ratio of CRNAs to MDs is safe and most cost effective.	**Worth To Practice:** High. **Level of Evidence:** I. **Strengths:** medical futurism. Decades of facts/figures re: salaries, insurance payouts, etc **Weaknesses:** not actionable where laws tip power scales: politics beats healthcare system economics; fails to monetize CRNA Vs. non-anesthesia MD sedation **Feasibility:** 100% **Conclusion:** CRNAs = MDs (overall), but CRNAs cost less **Recommendation:** high ratio CRNAs to MDs for cost effectiveness. **Comments:** Email lobbiest/post to NVANA web.
Study #9	**Seligson, E., et al. (2019). Office-based anesthesia: an update on safety and outcomes (2017–2019). Current Opinion in Anesthesiology, 32(6), 756-761.**	Systematic Review; Literature search from 2016-2019	10 studies. Office-Based Anesthesia	Descriptive	Monitoring safety and outcomes is critical to sustainable ASCs, & idiosyncratic to each ASC.	**Worth To Practice:** Medium **Level of Evidence:** I. **Strengths:** **Weaknesses:** only 5 studies assessed; only 18 cases; case results contradicted each other on 1:1 ratio; high idiosyncratic risk among 5; several referenced studies from non-anesthesia journals **Feasibility:** 50/50 **Conclusion:** risk identification may improve ASC safety & outcomes **Recommendation:** Monitoring outcomes = critical to profitability analysis **Comments:** project value targeted: risk assessment critical, highly idiosyncratic to each small ASC. This connects directly with Study #7.
Study #10	**Joshi, G. P., & Vetter, T. R. (2021). Causes of Delays in the Ambulatory Surgery Center Setting: A Keen Grasp of the Obvious?. Anesthesia & Analgesia, 133(6), 1402-1405.**	Expert Opinion	ASCs	Descriptive	Continuous Quality Improvement (CQI) is critical to identifying ASC improving profitability. Understanding biases that may effect study of delays is key.	**Worth To Practice:** High **Level of Evidence:** VII. **Strengths:** types of ASC delays and the potential biases of studying them. **Weaknesses:** Solutions for overcoming biases during study are not offered in detail. **Feasibility:** 50/50 **Conclusion:** awareness of delays by type and common solution measures **Recommendation:** Implement continuous quality improvement and account for potential bias within analyses. **Comments:** CQI could be spearheaded by CRNA w/in ASCs to add value.

Appendix 2 - Evidence Table (cont.)

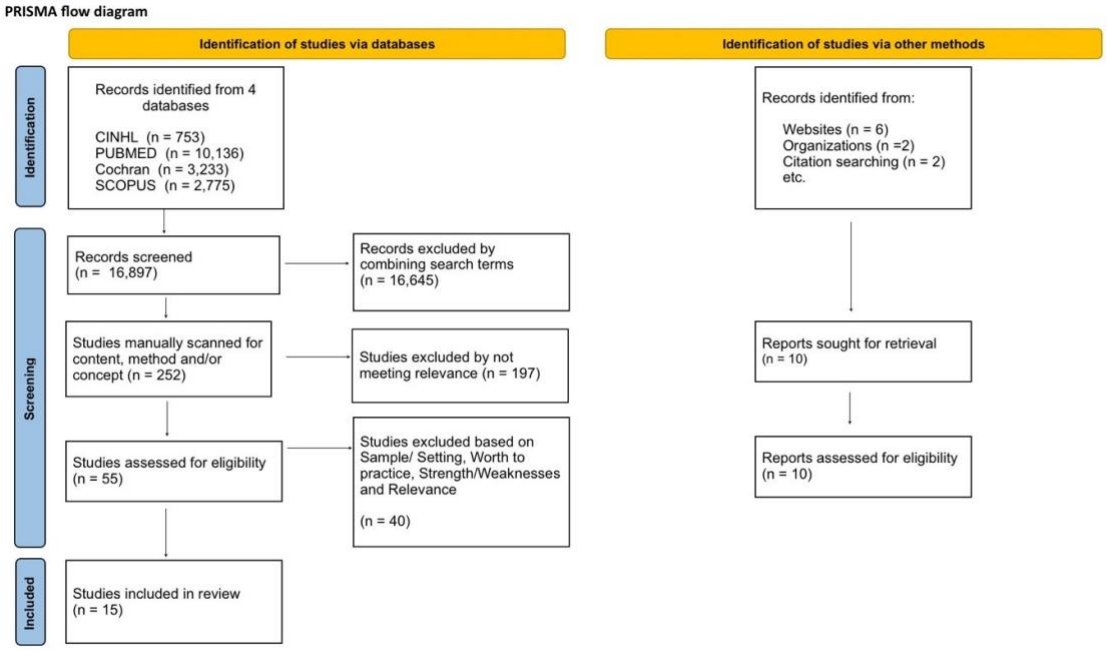
Study #11	**Sidhu, R., et al. (2019). Deep sedation and anaesthesia in complex gastrointestinal endoscopy: a joint position statement endorsed by the British Society of Gastroenterology (BSG), Joint Advisory Group (JAG) and Royal College of Anaesthetists (RCoA). Frontline gastroenterology, 10(2), 141-147.**	Expert Opinion	Complex GI endoscopy. United Kingdom	Descriptive	UK needs higher # and % of deep sedation in endo-ASCs, as well as standards/ regulations for care.	**Worth To Practice:** high **Level of Evidence: VII** **Strengths:** Studied hundreds of thousands of cases; specific to gastrointestinal procedures with sedation **Weaknesses:** primarily address UK, European… non-USA. **Feasibility:** 100% **Conclusion:** UK requires increasing # & % of deep sedation… in turn requiring anesthetist-administration. **Recommendation:** UK needs guidelines for deep sedation and more anesthetists in endo ASCs. **Comments:** reaffirms CRNA demand in US. will not change in foreseeable future. Rest of first-world reaching/confirming US standard of care.
Study #12	**Saleh, K., et al. (2009). Operating-room throughput: strategies for improvement. JBJS, 91(8), 2028-2039.**	Review of Literature. Collated and categorized into general methods for improvements and strategies	Operating Room. Perioperative, Intraoperative & Postoperative phases.	Descriptive	Operating Room throughput strategies vary wildly in type, application style & success. Customized per ASC & apply deliberately.	**Worth To Practice:** high **Level of Evidence: VII** **Strengths:** Some studies analyzed, had success w/efficiencies **Weaknesses:** limited studies assessed; no specific recommendations; admitted highly complex nature of cases/theaters made successful recommendations impossible **Feasibility:** 50/50 **Conclusion:** Efficiencies may be found, but highly complex; should be case-by-case customized **Recommendation:** Much more research needed re:efficiency of OR **Comments:** value to my project is brainstorm/list of successful strategies, and reminder: standardize, group, schedule, plan
Study #13	**Abdelmalak, B., et al. (2021). A blueprint for success: a multidisciplinary approach to clinical operations within a bronchoscopy suite. Chest, 1112-1121.**	Expert Opinion	Tertiary/quaternary Care medical center. One bronchoscopy suite.	Descriptive	Successful design/ implement of specialty ASC requires multi-disciplinary teams approach.	**Worth To Practice:** High **Level of Evidence: VII** **Strengths:** illustrates design/implement concepts for non-experts. Model may help guide/educate non-expert design/builder like MDs/nurses **Weaknesses:** Single case illustrated. No "lessons learned" or "mistakes made." No checklist to guide others **Feasibility:** 100% **Conclusion:** design/build of NORA = complex, yet frequent **Recommendation:** essential: teams, multidisciplinary approach, hands-on **Comments:** **successful** design process = successful re-design process; redesign of facility &/or layout should be considered in cost analysis of NORAs
Study #14	**French, K. E., et al. (2016). Value Based Care and Bundled Payments: Anesthesia Care Costs for Outpatient Oncology Surgery Using Time-Driven Activity-Based Costing. HHS Public Access. Healthc, 4(3), 173-180.**	Expert Opinion	11 Oncological outpatient procedures. Oncology ASCs	Percent; quantitative	Activity Based Cost Accounting (ABC) is powerful tool for admin.	**Worth To Practice:** HIGH **Level of Evidence: IV** **Strengths:** Activity Based Accounting (ABC/TDABC) = powerful analysis tool **Weaknesses:** distracted by & highly sensitive to MD:CRNA ratios **Feasibility:** 100% **Conclusion:** ABC = excellent tool **Recommendation:** Apply ABC/TDABC analysis to NORA **Comments:** appendix = excellent example for building cost analysis; use for my research: tables & discussion
Study #15	**Wax, D. (2009). Regulatory issues in office-based surgery and anesthesia. In Seminars in Anesthesia, Perioperative Medicine and Pain, 25(1), 25-31.**	Expert Opinion	Federal Law, State Law, Private Industry accreditation orgs, society guidelines. Office-Based Surgery with anesthesia	Descriptive	Discussion of Regulatory Issues in gastrointestinal ASCs.	**Worth To Practice:** High **Level of Evidence: VII** **Strengths:** history of laws/guidelines within anesthesia and OBS **Weaknesses:** non-comprehensive legal history; no particular laws suggested/highlighted as effective or not **Feasibility:** 100% **Conclusion:** Law plays critical role to safe, reliable healthcare **Recommendation:** Staying abreast of evolving healthcare laws is critical **Comments:** my report should include laws and guidance pertaining to focused sector(s)
		Legend: ABC - activity based costing; AIMS - anesthesia information managment system; ASC - ambulatory surgical center; CQI - continuous quality improvement; CRNA - certified registered nurse anesthetist; EGD - Esophagogastroduodenoscopy; GI - gastrointestinal; MD - medical doctor; NORA - nonoperating room anesthesia; NVANA - Nevada Association of Nurse Anesthetists; OBS - office based surgery; OR - operating room; ROI - return on investment; TDABC - time-driven activity-based costing; UK - United Kingdom; US - United States; USA - United States of America				

Appendix 3 - Synthesis Table

	Author	Year	Study Design	N	Finding	Intervention	Characteristics & Findings Pertinent to PICOT Question:	
							TYPE	DISCUSSION
Study #1	**Helmers, R. A., et al.**	2017	Non-Randomized Control Trial	40 patients	CRNAs = higher ROI than gastros alone	Employ high ratio of CRNAs to MDs, up to 100% CRNA	Content	Cost comparison of CRNA to MD anesthetists should be included in any paper discussion and/or financial models
Study #2	**Dexter, F., & Traub, R.**	2000	Cohort Study	62, 4-week periods	Graphical guide for visualizing potential CRNA staffing & rhythms. Equation-driven.	Engage mathematical models for anesthesia staffing	Method	Study 2's content does not apply, but method for communicating numerical data quickly/concisely applies to how conclusions may be presented. Graphical models may be considered for relaying ROI of specific investments.
Study #3	**Anwar, A., et al.**	2001	Expert Opinion	Non-Operating Room Anesthesia Theaters	Conceptualized strategies to improve operating room anesthesia	Multiple strategies for improving OR efficiency	Content	Specific strategies may be considered within ROI framework for addition of CRNAs to ASCs.
Study #4	**Mills, A., et al.**	2020	Mixed-Method	46 facility leaders interviewed & 6,488 facilities nationwide	State/Federal Laws and Medical Guidelines most critical in staffing models.	Promote laws/ guidelines to promote CRNA profession	Content	Specific laws/regulations should be cited re:CRNA V. MD anesthetists & CRNA V. Non-anesthesia MDs, for education/ empowerment of MDs/admin of ACSs, to implement recommendations
Study #5	**O'Sullivan, C. T., et al.**	2007	Systematic Review	1966 - 2005. 10 articles reviewed	AIMs ROI is higher… the greater the organization; from small ASCs to large hospitals to healthcare systems and ultimately their greatest ROI is for society at large.	Utilize AIMs whenever possible	Concept	AIMs… new, emerging, compact, customized, low-cost, should be investigated as potential value-added to CRNAs staffing and incremental CRNA additions within ASCs
Study #6	**Navidi, B., & Kiai, K.**	2019	Cohort Study	2016: 4,185 EGD/ colonoscopies. 2017: 4,242 EGD/ colonoscopies. 2018: 4,852 EGD/ colonoscopies.	Scheduling & Grouping may have largest effect on NORA efficiencies & at lowest investment cost. Patient satisfaction has not been measured but has significant impacts on practice.	Standardize procedures per suite/time-block with scheduling & grouping	Content & Concept	Study #6 has content that may directly apply: Scheduling/ grouping could be critical to achieving throughput to maximize ROI of CRNA staffing & incremental CRNA additions to staffing. Concepts w/in 6 include ROI impacts of patient satisfaction. Could satisfaction be monetized and/or included within financial/ budgeting model(s)?
Study #7	**Boyd, D., & Poghosyan, L.**	2017	Systematic Review.	13 studies. N=16-7,537. Single-state to National CRNA Roster.	Corporate culture (leadership/ teamwork) impact ROI; but budgeting/planning for it are ill-defined.	Improve corporate culture for higher ROIs	Concept	Corporate Culture: leadership & teamwork need to be explored more as a concept to apply to ASC budgeting/planning and financial analysis. Are there methods/models for applying "soft" cultural attributes/goals to organizations by way of financial/ budgetary models?
Study #8	**Hogan, P. F., et al.**	2010	Mixed-Method	2008: 52,636 claims, 2006: 52,233 ASC visits, 2007: 40,000 anesthesiologists, 36,000 CRNAs.	High ratio of CRNAs to MDs is safe and most cost effective.	Employ high ratio of CRNAs to MDs, up to 100% CRNA	Content	Correlating Economics with legal/regulatory is critical for education/empowerment of non-anesthesia MDs and administrators. The content of this study may be communicated as necessary to understanding/adoption of CRNA staffing and incremental CRNA addition.
Study #9	**Seligson, E., et al.**	2019	Systematic Review	10 studies.	Monitoring safety and outcomes is critical to sustainable ASCs, & idiosyncratic to each ASC.	Engage monitoring protocols to achieve sustainable ASCs	Method & Concept	Methods for monitoring safety and outcomes are monetizable and should be added to planning and budget models. Monitoring may be dove-tailed with CRNA duties for empowering CRNAs and adding their value to ASCs. The concepts of idiosyncrasies may, in some cases, be added to financial modeling, especially if utilizing "sensitivity" ranges within the models. In this way, admin/MDs may better understand risks/rewards. Exploring these concepts may lead to more questions, advice or acknowledgment of needs/lack research.
Study #10	**Joshi, G. P., & Vetter, T. R.**	2021	Expert Opinion	ASCs	CQI is critical to improving ASC profitability. Understanding biases that may effect study of delays is key.	Apply CQI to grow ASC profits	Content & Concept	Study #10 does not outline criteria for CQI, but it does introduce the content of specific Biases to be considered and passed along via education through paper/presentation, and it does offer concepts and foundation for CQI and the importance thereof.
Study #11	**Sidhu, R., et al.**	2019	Expert Opinion	Complex GI endoscopy.	UK needs higher # and % of deep sedation in endo-ASCs, as well as standards/regulations for care.	Employ more CRNAs in gastroenterology	Concept	Confirming global standards of care and trends in anesthesia, especially as they pertain to endo-ASCs directly affirms necessity of research to determine ROI for CRNAs in U.S. ASCs, and their incremental addition to individual facilities.
Study #12	**Saleh, K., et al.**	2009	Review of Literature	1 Operating Room.	OR throughput strategies vary wildly in type, application style & success. Customized per ASC & apply deliberately.	Customize OR throughput strategies to address specific characteristics of each ASC	Content & Concept	Study #12 illustrates multiple throughput strategies that directly pertain to the PICOT question. CRNAs are necessary to engage many strategies within ASCs. Additionally, some concepts of direct, concerted, customized application of strategies are also outlined herein.
Study #13	**Abdelmalak, B., et al.**	2021	Expert Opinion	1 bronchoscopy suite.	Successful design/implement of specialty ASC requires multi-disciplinary teams approach.	Engage multidisciplinary, structured approach to ASC designs and implementation	Method	Planning for the addition of CRNAs to ASCs will require CRNAs to add value to the team(s). Knowing how to engage multidisciplinary communication toward common team goals is a powerful leadership attribute. Multi-disciplinary processes and approaches may be used to develop this PICOT's solution(s)… perhaps by influencing new planning models, or new education approaches of the ultimate PICOT answers.
Study #14	**French, K.E., et al.**	2016	Expert Opinion	11 Oncological outpatient procedures.	Activity Based Cost Accounting (ABC) is powerful tool for admin.	Apply ABC analysis to improve profits	Method	While neither content nor concepts within this study are particularly relevant, the method of ABC accounting for planning and profit is powerfully persuasive. ABC accounting methods should be used for this PICOT and this study will serve as a guide.
Study #15	**Wax, D.**	2009	Expert Opinion	Federal Law, State Law, Private Industry accreditation orgs, society guidelines.	Discussion of Regulatory Issues in gastrointestinal ASCs.	Promote CRNA profession via laws/ standards for improved societal benefits, and educate MDs, admin and patients regarding the laws/ standard governing CRNAs	Content & Concept	Study #10 includes content regarding laws/guidance pertaining to CRNAs. It also develops the concept that differences in governance between CRNAs and MDs are widely misunderstood. With only a few laws, guidance and/or standards governing anesthesia delivery of CRNAs versus MDs… CRNAs and their cohorts should be able to educate stakeholders for two distinct reasons: 1) eliminating misconceptions within the professional workplace can promote CRNA job growth, and, 2) teaching patients the truth can grow confidence in healthcare systemwide.

Legend: ABC - activity based costing; AIMS - anesthesia information managment system; ASC - ambulatory surgical center; CQI - continuous quality improvement; CRNA - certified registered nurse anesthetist; EGD - Esophagogastroduodenoscopy; MD - medical doctor; NORA - nonoperating room anesthesia; OR - operating room; ROI - return on investment

Appendix 4 - PRISMA Diagram



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

Appendix 5 - Partner Organization Agreement

Letter of Authorization to Conduct Research at Facility

February 5, 2023

Office of Research Integrity – Secondary Analysis of Existing Data
University of Nevada, Las Vegas
4505 Maryland Parkway, Box 451047
Las Vegas, NV 89154-1047

Dear Office of Research Integrity - Secondary Analysis of Existing Data; De-identified, Non-Coded:

This letter will serve as authorization for the University of Nevada, Las Vegas ("UNLV") researcher/research team, Jennifer B. Brown to conduct the research project entitled, "Cost Benefit Analysis of Anesthesia Providers within Small Medical Practices" at Big Island Endoscopy Center, LLC ("Facility") in Kamuela, Hawaii 96743.

The Facility acknowledges that it has reviewed the protocol (Secondary Analysis of Existing Data: De-identified, Non-Coded) presented by the researcher, as well as the associated risks to the Facility, and authorizes the research project to proceed. The research project may be implemented at the Facility upon approval from the UNLV Institutional Review Board.

If we have any concerns or require additional information, we will contact the researcher and/or the UNLV Office of Research Integrity.

Sincerely,

Signature of Facility's Authorized Representative

2/14/23
Date

Ron Ashley MD
Printed Name and Title of Authorized Representative

Appendix 6 - Project Budget

New laptop computer and software: $2,500

Statistical Consultation: $0

Expert Excel Consultation:

$1,500 “Other” expert

consultation: $2,000 Travel:

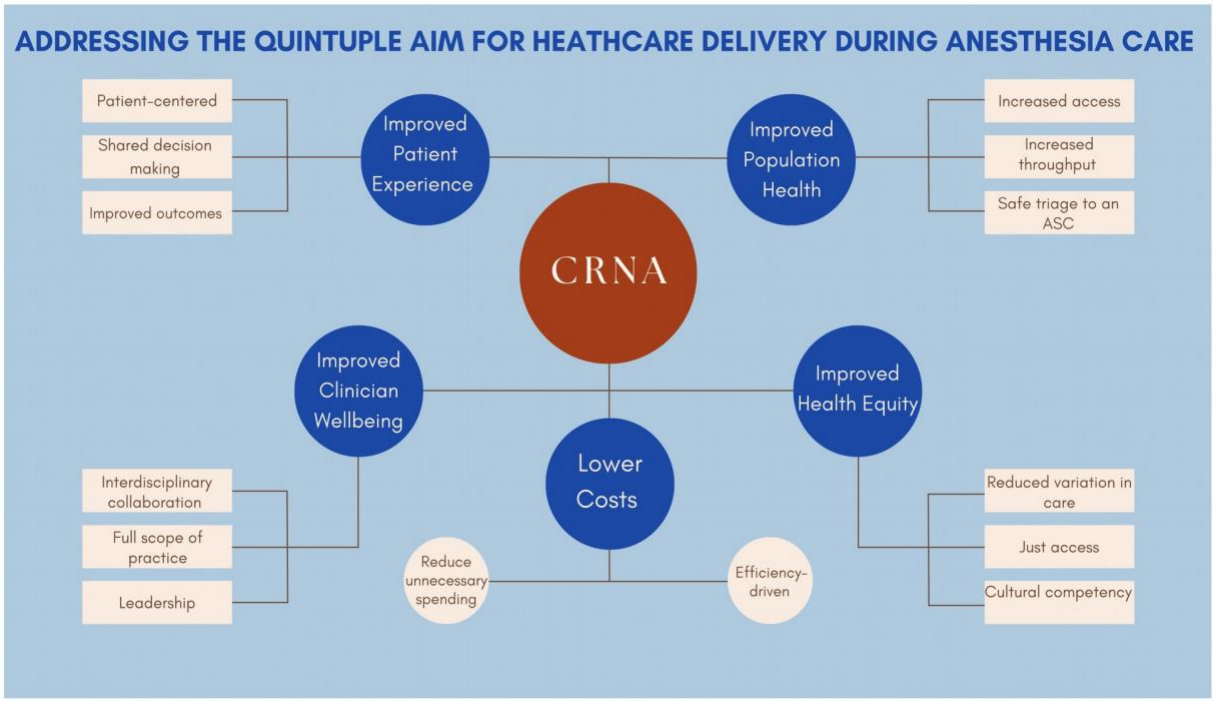
$2,000

Assorted fees, expenses, costs: $1,250

MAXIMUM TOTAL EXPENSES =

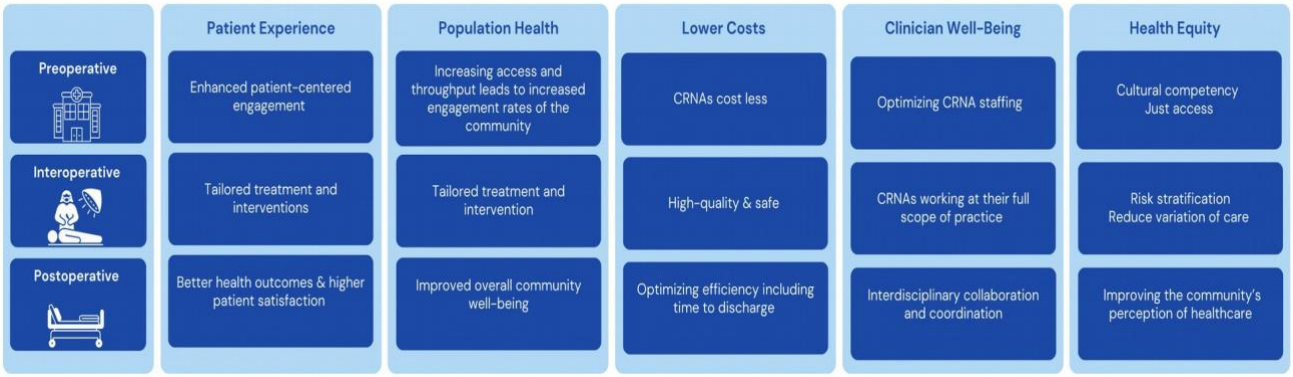
$9,250

Appendix 7.1 - Quintuple Aim



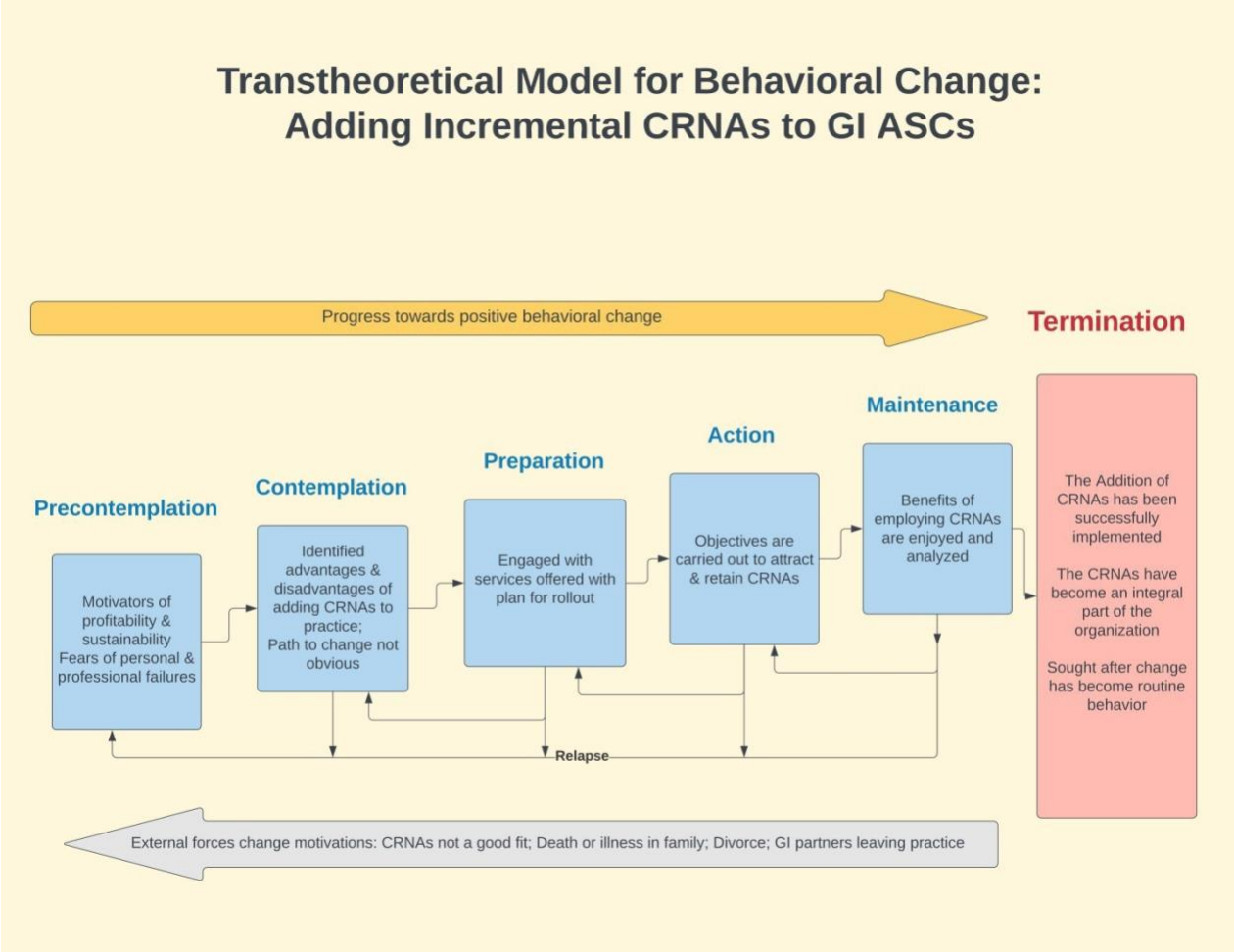
The Brown Model for Anesthesia Profitability © as it pertains to the Quintuple Aim by Jennifer Brown adapted from Zahra Art via Canva.com

Appendix 7.2 – Perioperative Quintuple Aim



The Brown Model for Anesthesia Profitability © as it pertains to the Perioperative Quintuple Aim by Jennifer Brown adapted from Amabile via Canva.com

Appendix 8 - Theoretical Framework



Note. Prochaska & DiClemente (1982) Transtheoretical model for behavioral changed was used to express The Brown Model for Anesthesia Profitability © by Jennifer Brown via Freeform.com.

Appendix 9 - DNP Project Proposal for Human Subject Protection and Safety

UNLV

School if Nursing

DNP Project Human Subject Safety and Protection Review

Notice of Excluded Activity

DATE: August 14, 2023

TO: Jennifer Brown
FROM: School of Nursing DNP Project Course Committee

PROTOCOL TITLE Cost Benefit Analysis of Anesthesia Providers within Gastroenterology Outpatient Practices
SUBMISSION TYPE: Initial

ACTION: No Human Subjects Research
REVIEW DATE: June 27, 2023
REVIEW TYPE: ADMINISTRATIVE REVIEW

Thank you for your submission of materials for this proposal. This memorandum is notification that the proposal referenced above has been reviewed as indicated in Federal regulatory statutes 45 CFR 46.

In accordance with the UNLV IRB and Human Subject Safety and Protection considerations, the review of the DNP project as a review process has been approved by the UNLV IRB. This process includes a review by Graduate Faculty in the School of Nursing and the DNP Program Director with Human Subjects Safety and Protection training prior to approval for implementation. This process is carried out as an additional review given DNP projects are typically Quality Improvement (QI) or meet the clarification of an exempt IRB status.

The School of Nursing DNP Project Review Committee has determined this request does not meet the definition of 'research with human subjects' according to federal regulations, and there is no further requirement for IRB review. As such, the School of Nursing provides a level of review and consideration for human subject safety and protection through this course associated review. As a formal IRB submission is not

required, the following guidance is applicable and must be followed to ensure ongoing transparency and oversight of the proposed project.

Any changes to this excluded activity may cause this request to require a different level of review, so please contact our office to discuss any anticipated changes.

If you have questions, please contact the DNP Program Director and your course faculty. Please include your project title in all correspondence.

Proposal Reviewed and Approved by:

Dr Kathleen Thomsen DNP
DNP Project Course Faculty

Aug. 14, 2023
Date

Leslie Lester
DNP Project Course Faculty

8/16/2023
Date

Candace W Burton
DNP Program Director

8-16-23
Date

Appendix 10.1 - Anesthesia Revenue Analysis

The Brown Model for Anesthesia Profitability ©

	A	B	C	D	E	F	G	H
5								
6		Type of	2					
7	**GI 1 (DR/Suite)**	**% of case type**	**# cases**	**Base Units - #**	**Base Units - Revenue**	**Time Units - #**	**Time Units - Revenue**	**Gross Revenue**
8								
9	EGD	**30%**	1275	**5**	$315.39	**1.25**	$78.85	$ 502,657.59
10	Colon	**50.0%**	2125.0	**4**	$252.31	**2**	$126.16	$ 804,252.15
11	EGD/ Colon	**20%**	850	**5**	$315.39	**3**	$189.24	$ 428,934.48
12		**100%**	**4250**					**$ 1,735,844.22**
13								
14		by %				by #		
15	**Unit Value - GI**		**%**	**$/Unit**	**Weighted $/**	**# of procedures**	**Weighted**	
16		Private	**74%**	**78**	$57.72	**3145**	57.72	
17		Public	**26%**	**20.61**	$5.36	**1105**	5.3586	
18								
19								
20		**Total**	**100%**		**$63.08**		**63.0786**	
21								
22								
23								
24	**GI 2 (DR/Suite)**	**% of case type**	**# cases**	**Base Units - #**	**Base Units - Revenue**	**Time Units - #**	**Time Units - Revenue**	**Gross Revenue**
25								
26	EGD	**35%**	648	**5**	$321.13	**1.5**	$96.34	$ 270,312.86
27	Colon	**55%**	1018	**4**	$256.91	**3**	$192.68	$ 457,452.53
28	EGD/ Colon	**10.0%**	185.0	**5**	$321.13	**4**	$256.91	$ 106,936.96
29		**100%**	**1850**					**$ 834,702.35**
30								
31								
32	**Unit Value - GI**		**%**	**$/Unit**	**Weighted $/**	**# of procedures**	**Weighted**	
33		Private	**76%**	78	$59.28	**1406**	59.28	
34		Public	**24.0%**	20.61	$4.95	**444**	4.9464	
35								
36								
37		**Total**	**100%**		**$64.23**		**64.2264**	
38								
39								
40								
41	**GI 3 (DR/Suite)**	**% of case type**	**# cases**	**Base Units - #**	**Base Units - Revenue**	**Time Units - #**	**Time Units - Revenue**	**Gross Revenue**
42								
43	EGD	**30.0%**	540.0	**5**	$237.92	**1.5**	$71.37	$ 167,017.38
44	Colon	**10.0%**	180.0	**4**	$190.33	**3**	$142.75	$ 59,954.96
45	EGD/ Colon	**50.0%**	900.0	**5**	$237.92	**4**	$190.33	$ 385,424.73
46	Other	**10.0%**	180.0		$0.00	**1**	$47.58	$ 8,564.99
47		**100%**	**1800**					**$ 620,962.07**
48								
49								
50	**Unit Value - GI**		**%**	**$/Unit**	**Weighted $/**	**# of procedures**	**Weighted**	
51		Private	**47%**	78	$36.66	**846**	36.66	
52		Public	**53%**	20.61	$10.92	**954**	10.9233	
53								
54								
55		**Total**	**100%**		**$47.58**		**47.5833**	
56								
57								
58	**GI 4 (DR/ Suite)**	**% of case type**	**# cases**	**Base Units - #**	**Base Units - Revenue**	**Time Units - #**	**Time Units - Revenue**	**Gross Revenue**
59								
60	Gastrointestinal	**100%**	900	**4**	$215.58	**3**	$161.69	$ 339,546.06
61			**900**					**$ 339,546.06**
62								
63								
64	**Unit Value - GI**		**%**	**$/Unit**	**Weighted $/**	**# of procedures**	**Weighted**	
65		Private	**58%**	78	$45.24	**522**	45.24	
66		Public	**42%**	20.61	$8.66	**378**	8.6562	
67								
68								
69		**Total**	**100%**		**$53.90**		**53.8962**	
70								
71								

Appendix 10.2 - Break-Even Analysis

The Brown Model for Anesthesia Profitability ©

Break-Even Analysis for the Daily Employment of a CRNA w/in a GI ASC

In this Scenario, a CRNA is paid $1,111 per day, 5 days per week for 45 weeks per year totaling $250,000/year. The GI procedures earn a weighted average revenue of $408/procedure. Variable costs per procedure represent marginal differences in material & equipment between M.D. delivered sedation & CRNA delivered anesthesia.

Daily Compensation of CRNA	$1,111
Estimated Variable Costs per Procedure	$4
Revenues = Reimbursement per Procedure	$408
Unit Increments	1
Break-Even Point	**2.8**

Units Sold	Sales	Total Costs	Profit/Loss
0	$0	$1,111	-$1,111
1	$408	$1,115	-$707
2	$816	$1,119	-$303
3	$1,224	$1,123	$101
4	$1,632	$1,127	$505
5	$2,040	$1,131	$909
6	$2,448	$1,135	$1,313
7	$2,856	$1,139	$1,717
8	$3,264	$1,143	$2,121
9	$3,672	$1,147	$2,525
10	$4,080	$1,151	$2,929
11	$4,488	$1,155	$3,333
12	$4,896	$1,159	$3,737
13	$5,304	$1,163	$4,141
14	$5,712	$1,167	$4,545
15	$6,120	$1,171	$4,949
16	$6,528	$1,175	$5,353
17	$6,936	$1,179	$5,757
18	$7,344	$1,183	$6,161

Appendix 10.3 - Anesthesia Scheduling Analysis

The Brown Model for Anesthesia Profitability ©

Time	Cases/year	Time Units/ year	Unit-Hours/ year	Hours/work-day	Time Units/work-day	Cases per work-day	Annual Work-Days required to complete annual case load	Monthly Work-Days required to complete annual case load	Weekly Work-Days required to complete annual case load
GI 1									
EGD	1275	1594	398.4375	8	32	25.60	70.83333333	5.90	1.36
Colon	2125.0	4250.0	1062.5	8	32	16.00	132.8125	11.07	2.55
EGD/ Colon	850	2550	637.5	8	32	10.67	79.6875	6.64	1.53
GI 2									
EGD	647.5	971.25	242.8125	8	32	21.33	30.3515625	2.53	0.58
Colon	1018	3053	763.125	8	32	10.67	95.39	7.94921875	**1.83**
EGD/ Colon	185	740	185	8	32	8.00	**23.13**	**1.92708333**	0.44
GI 3									
EGD	540	810	202.5	8	32	21.33	25.31	2.11	0.49
Colon	180	540	135	8	32	10.67	16.88	1.41	0.32
EGD/ Colon	900	3600.0	900	8	32	8.00	112.50	9.38	2.16
Other	180	180	45	8	32	32.00	5.63	0.47	0.11
	1800.0	**5130.0**	**1282.5**						**3.08**
GI 4	900	2700	675	10	40	13.33	67.50	5.63	1.30
GI 5	2400	7200	1800	10	40	13.33	180.00	15.00	3.5
									4.76
				Maximum GI cases/day		18			

Appendix 10.4 - Anesthesia Full-Time-Equivalent Hours Required by Hospital Contract

The Brown Model for Anesthesia Profitability ©

Hours Required

Hours Required					
Operating Rooms ONLY					
No OB Call, No 1st Call, No 2nd Call, & No OB Room at all					
Shifts	**Hours per Shift (A)**	**Surgical Suites (B)**	**Staff Hours per Day (A x B)**	**Staff Hours per WORK WEEK of 5 days / week. (A x B x 5 days)**	**Staff Hours per YEAR. (A x B x 5 x 52 weeks)**
7 am - 3 pm	8	4	32	160	8,320
7 am - 5 pm	10	3	30	150	7,800
7 am - 7 pm	12	2	24	120	6,240
		Total:	**86**	**430**	**22,360**
How many providers (with 7 weeks vacation) are required to achieve 22,360 hours per year?					
Hours/Week	**Weeks/Year**	**Hours/Year**	**# Providers**		
35	45	1,575	14.2		
40	45	1,800	12.4		
45	**45**	**2,025**	**11.0**		
50	45	2,250	9.9		
55	45	2,475	9.0		

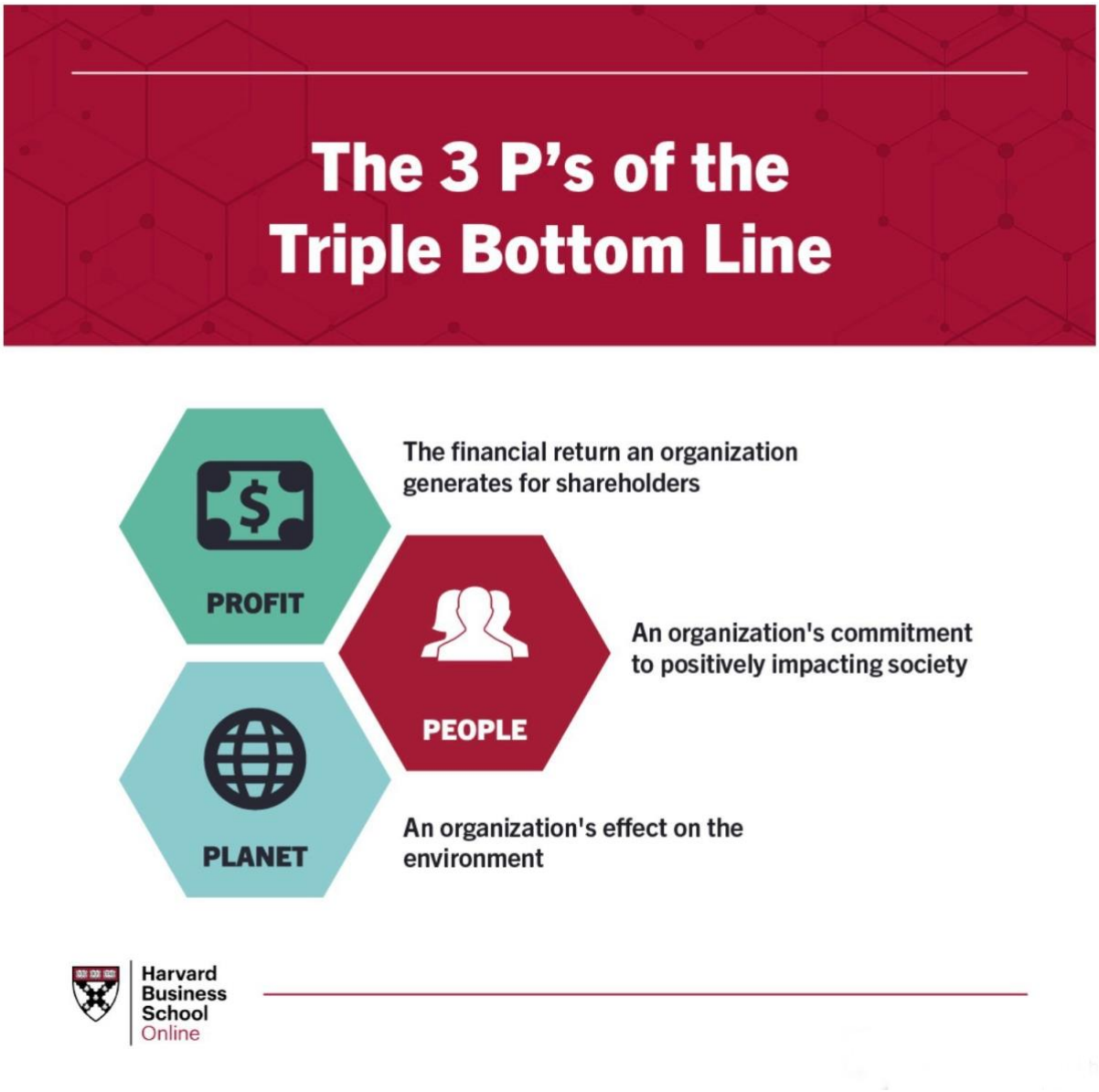
Hours Required					
OB Only					
Shifts	**Hours per Shift (A)**	**Surgical Suites (B)**	**Staff Hours per Day (A x B)**	**Staff Hours per WORK WEEK of 7 days / week. (A x B x 7 days)**	**Staff Hours per YEAR. (A x B x 5 x 52 weeks)**
7 am - 7 am	24	1	24	168	8,736
		Total:	**24**	**168**	**8,736**
How many providers (with 7 weeks vacation) are required to achieve 8,736 hours per year?					
Hours/Week	**Weeks/Year**	**Hours/Year**	**# Providers**		
24	45	1,080	8.1		
36	45	1,620	5.4		
45	**45**	**2,025**	**4.3**		
48	45	2,160	4.0		
50	45	2,250	3.9		
60	45	2,700	3.2		
65	**45**	**2,925**	**3.0**		

Appendix 10.5 - Pay & Leave Scenarios for CRNAs Employed by Anesthesia Service Company

The Brown Model for Anesthesia Profitability ©

Pay & Leave Scenarios				
Scenario 1:	**$320,000.00**	**Per year**	**7**	**Weeks Paid Leave**
	Hours/Week	**Weeks/Year**	**Hours/Year**	**$/Hour**
	45	**45**	**2,025**	**$158**
	50	45	2,250	$142
	55	45	2,475	$129
	60	45	2,700	$119
Scenario 2:	**$320,000.00**	**Per year**	**10**	**Weeks Paid Leave**
	Hours/Week	**Weeks/Year**	**Hours/Year**	**$/Hour**
	45	**42**	**1,890**	**$169**
	50	42	2,100	$152
	55	42	2,310	$139
	60	42	2,520	$127

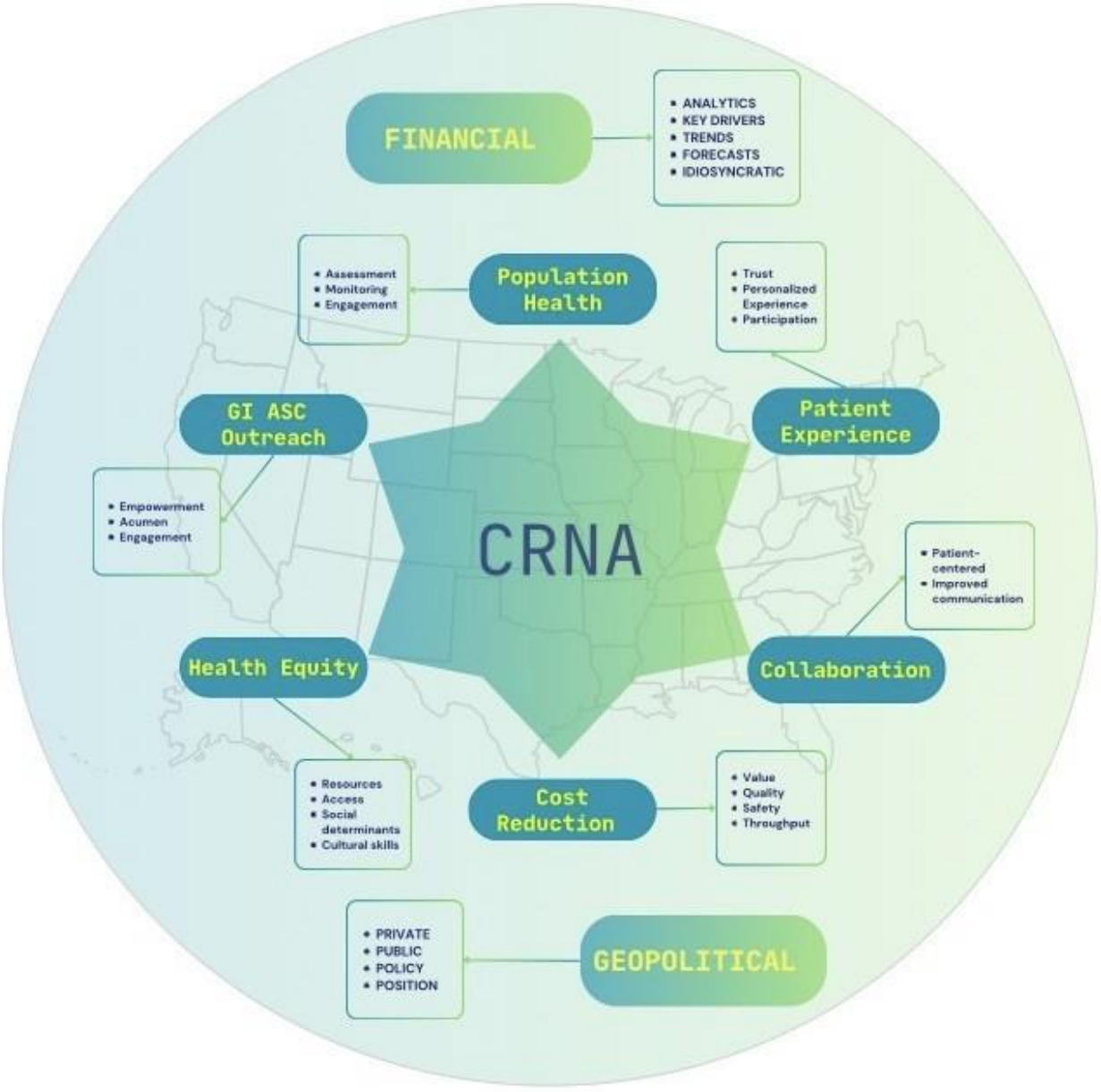
Appendix 11 - Triple Bottom Line



Miller, K. (2020). The triple bottom line: What it is & why it is important. *Harvard Business School Online*. Accessed on November 2, 2023 from https://online.hbs.edu/blog/post/what-is-the-triple-bottom- line

Appendix 12 - Holistic Nurse Anesthesiology

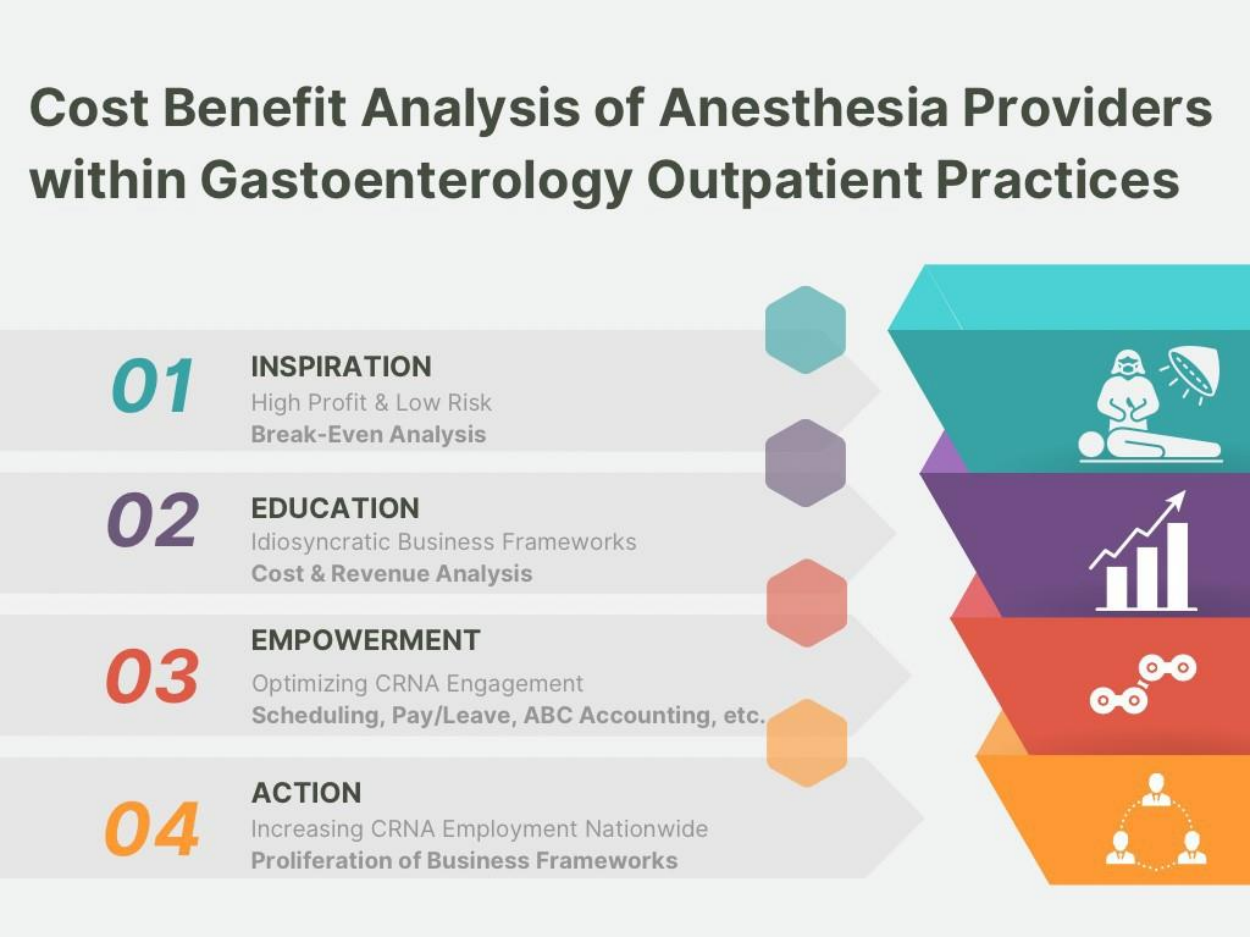
The Brown Model of Holistic Nurse Anesthesiology ©



Note. This holistic framework empowers owners of ASCs to improve multiple facets of their business through the effective employment of CRNAs. The CRNA is the core component of achieving a sustainable anesthesia delivery model. The Brown Model of Holistic Nurse Anesthesiology © by Jennifer Brown via Canva Creative Studio, Canva.co

Appendix 13 - Cost Benefit of Anesthesia Providers within Gastroenterology Outpatient Practices

The Brown Model for Behavioral Change ©



The Brown Model for Behavioral Change © by Jennifer Brown adapted from @RRGraph via Canva.com

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Curriculum Vitae

JENNIFER B. BROWN CRNA, DNP-NE
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EDUCATION

2024 **UNIVERSITY OF NEVADA, LAS VEGAS** Las Vegas, NV
Doctor of Nursing Practice – Nurse Executive

2009 **UNIVERSITY OF PENNSYLVANIA** Philadelphia, PA
Master of Science, Nurse Anesthesia

2005 **UNIVERSITY AT BUFFALO, SUNY.** Buffalo, NY
Bachelor of Science, Nursing

EXPERIENCE

9/2023 - Present **Providence Health System** Portland, OR
Certified Registered Nurse Anesthetist: Locum Tenens

- Providence Portland Medical Center 483-bed
- Providence St. Vincent Medical Center 523-bed
- Providence Willamette Falls 60-bed
- Full-service, acute care hospitals serving Northern Oregon
- ***Non-medically directed*** anesthesia care for: trauma, peripheral vascular, orthopedic, pediatric, robotic, obstetric, gynecologic, endoscopic, ultrasound ultrasound-guided nerve blocks, etc.
- 24-hour obstetric center coverage
- 24-hour 1st/2nd OR call coverage

5/2022 - 9/2023 **Carson Tahoe Regional Medical Center** Carson City, NV
Chief Nurse Anesthetist & Certified Registered Nurse Anesthetist

- 159-bed; full-service acute care hospital serving Northern Nevada
- ***Non-medically directed*** anesthesia care for: trauma, peripheral vascular, orthopedic, pediatric, robotic, obstetric, gynecologic, endoscopic, ultrasound-guided nerve blocks, etc.
- 24-hour coverage for the Obstetric Center with over 1500 deliveries/year
- 24-hour 1st/2nd OR call coverage
- Managed operations of the anesthesia department
- Reviewed, collaborated, authored and implemented policies and procedures
- Assigned and managed staff schedules, on-call arrangements, and emergency changes

02/2022 - Present **Kona Community Hospital** Kealakekua, HI
Certified Registered Nurse Anesthetist: Locum Tenens

- 94-bed, full-service acute care hospital serving West Hawaii
- ***Non-medically directed*** anesthesia care for: trauma, peripheral vascular, orthopedic, pediatric, robotic, obstetric, gynecologic, endoscopic, ultrasound ultrasound-guided nerve blocks, etc.
- 24-hour coverage for obstetric services and 24-hour O.R. coverage

03/2012 - 5/2022 **Digestive Health Center** Reno, NV
Certified Registered Nurse Anesthetist

- ***Non-medically directed*** Monitored Anesthesia Care (MAC) for ASA I-IV patients
- Provided anesthetics for over 40,000 endoscopic procedures throughout 10 years of service

12/2019 - Present **Miles Memorial Hospital** Damariscotta, ME
Certified Registered Nurse Anesthetist: Locum Tenens

- 38-bed, general, acute and specialty healthcare services
- ***Medically directed*** anesthesia care for orthopedic, pediatric, obstetric, gynecologic, out-patient, endoscopic, general surgery, etc.

07/2019 - 08/2019 **Central Peninsula Hospital** Soldotna, AK
Certified Registered Nurse Anesthetist: Locum Tenens

- 49-bed, full-service acute care hospital in the Kenai Peninsula of Alaska
- ***Non-medically directed*** anesthesia care for: orthopedic, pediatric, obstetric, gynecologic, out-patient, endoscopic and general surgery, etc.

09/2018 - 10/2018 **Alaska Native Medical Center** Anchorage, AK
Certified Registered Nurse Anesthetist: Locum Tenens

- 173-bed Medical Center including Alaska Spine Institute Surgical Center
- ***Non-medically directed*** anesthesia care for orthopedic, pediatric, robotic, obstetric, gynecologic, out-patient, endoscopic, neurosurgical, general surgery, etc.
- Preceptor for Student Nurse Anesthetists of Texas Christian University

07/2009 - 04/2012 **Hillcrest Medical Center** Tulsa, OK
Certified Registered Nurse Anesthetist

- 691-bed Medical Center including: Regional Burn Center, Spine and Orthopedic Center, Woman's Health Center, and Oklahoma's Largest dedicated Heart Hospital
- ***Non-medically directed*** anesthesia care for orthopedic, pediatric, robotic, obstetric, gynecologic, out-patient, interventional radiology, electrophysiology, endoscopic, neurosurgical, etc.
- Preceptor for Student Nurse Anesthetists of Texas Christian University and Newman University
- 24-hour, in-house coverage for High-Risk Obstetric Center with over 3,800 deliveries/year
- 24-hour 1st call coverage
- **EMR: Meditech**

CERTIFICATIONS/LICENSES

- Controlled Substance Registration; DEA #MB6574330, Exp. 7/31/2024
- Registered Professional Nurse; Nevada #70925, Exp. 3/13/2025
- Certified Registered Nurse Anesthetist; Nevada #000397, Exp. 3/13/2025
- Registered Nurse; Alaska #100166, Exp. 11/30/2024
- Certified Registered Nurse Anesthetist; Alaska #100167, Exp. 11/30/2024
- Registered Nurse; Maine #193034, Exp. 3/13/2025

- Certified Registered Nurse Anesthetist; Maine #75088, Exp. 3/13/2025
- Registered Nurse; Hawaii #94907, Exp. 6/30/2025
- Certified Registered Nurse Anesthetist; Hawaii #2776, Exp. 6/30/2025
- Registered Nurse; Oregon #10012113, Exp. 3/13/2024
- Certified Registered Nurse Anesthetist; Oregon #10012113, Exp. 3/13/2024
- AHA Advanced Cardiac Life Support (ACLS): Exp. 6/2024
- AHA Basic Life Support (BLS): Exp. 5/2025
- AHA Pediatric Advanced Life Support (PALS): Exp. 5/2025

PUBLICATIONS

- Buffum, J.M. (2009). Managing oxidative stress and G6PD deficiency. *Int Student J Nurse Anesth.* (8) 56-59

PROFESSIONAL MEMBERSHIPS & LEADERSHIP ROLES

- American Association of Nurse Anesthesiology
  2009 - Present
- Nevada Association of Nurse Anesthetists
  2014 - present
  Secretary 2014 - 2017
  President-Elect 2017 - 2019
  President 2019 - 2023
- Nevada Nurses Association
  Legislative Committee Member 2016 - 2023
- Nevada Advanced Practice Nurse Association
  2015 - Present
- Sigma Theta Tau International Honor Society for Nursing
  2024

PRESENTATIONS

10/2021 *Regulations & Barriers for Dental Practice with CRNAs in Nevada*. Nevada State Board of Dental Examiners: Anesthesia Committee

10/2023 *Legislative History of CRNAs in Nevada*. University of Nevada, Las Vegas: NURS 719