

Fall 2019

A Market Analysis of Pay Rates for New Graduate Certified Registered Nurse Anesthetists

Zachary Halliwell

Follow this and additional works at: https://aquila.usm.edu/dnp_capstone



Part of the [Anesthesiology Commons](#), [Marketing Commons](#), [Other Nursing Commons](#), and the [Perioperative, Operating Room and Surgical Nursing Commons](#)

Recommended Citation

Halliwell, Zachary, "A Market Analysis of Pay Rates for New Graduate Certified Registered Nurse Anesthetists" (2019). *Doctoral Projects*. 125.
https://aquila.usm.edu/dnp_capstone/125

This Doctoral Project is brought to you for free and open access by The Aquila Digital Community. It has been accepted for inclusion in Doctoral Projects by an authorized administrator of The Aquila Digital Community. For more information, please contact Joshua.Cromwell@usm.edu.

A MARKET ANALYSIS OF PAY RATES FOR NEW GRADUATE CERTIFIED
REGISTERED NURSE ANESTHETISTS

by

Zachary Halliwell

A Doctoral Project
Submitted to the Graduate School,
the College of Nursing and Health Professions
and the School of Leadership and Advanced Nursing Practice
at The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Nursing Practice

Approved by:

Dr. Nina McLain, Committee Chair
Dr. Mary Jane Collins, Committee Member

Dr. Nina McLain
Committee Chair

Dr. Lachel Story
Director of School

Dr. Karen S. Coats
Dean of the Graduate School

December 2019

COPYRIGHT BY

Zachary Halliwell

2019

Published by the Graduate School



ABSTRACT

The profession of Certified Registered Nurse Anesthetists (CRNA) is a thriving occupation. In their national Occupational Outlook Handbook, the Bureau of Labor Statistics (U.S. Department of Labor, 2018), reported the national market for CRNAs is predicted to continue its steady growth through 2026. The Bureau of Labor Statistics (BLS) provides numerous statistics, as previously mentioned, on their website. However, the stats available include CRNAs of varying experience levels. The Mississippi Department of Employment Security (MDES) has a few statistics, online, regarding the market for CRNAs. The data provided by MDES, while appreciated, is lacking in numerical significance, given the minuscule sample size of the data donated to them (Mississippi Department of Employment Security [MDES], 2018). The goal of this project was to establish evidence of average annual base salaries amongst newly graduated CRNAs, in Mississippi.

This project utilized a six-question survey, inquiring about the hiring of newly graduated CRNAs and the base salaries offered to them. This survey was sent to 42 CRNA employers, throughout Mississippi. Thirty of the 42 employers completed the survey, yielding a 71% response rate. The data was evaluated using descriptive statistics and simple percentages and ranges.

This project revealed that 67% of CRNA employers in Mississippi have a full-time position available for a new graduate CRNA. The project also indicated that 43% of employers in Mississippi have hired a newly graduated CRNA within the past year. The majority of new graduate CRNAs were offered between \$137,000-\$156,000 per year.

ACKNOWLEDGMENTS

I would like to express my sincere gratitude to my committee chair, Dr. Nina McLain, for your constant patience, persistence, and guidance extended to me throughout this entire process without which none of this would be possible. I would also like to acknowledge Dr. Mary Jane Collins for your support and always being available, if and when, I needed.

DEDICATION

I would like to dedicate this project to my best friend, who happens to be a long-haired dachshund, Sassy. Sassy was there for me throughout this entire process—through the good times and the bad. She never hesitated to voice her opinion, with a gentle bark or menacing growl, nor did she attempt to lift a single paw in an effort to distract me from my work. Sassy, my dear, this project is for you. Also, I would like to give a shout out to my wife, Hannah Halliwell. She was my rock throughout this process.

TABLE OF CONTENTS

ABSTRACT ii

ACKNOWLEDGMENTS iii

DEDICATION iv

LIST OF TABLES vii

LIST OF ILLUSTRATIONS viii

LIST OF ABBREVIATIONS ix

CHAPTER I – INTRODUCTION 1

 Purpose 1

 Mississippi 2

 CRNA Vacancy Estimates 5

 Anesthesia Provider Cost Efficiency 9

 Growth in Surgical Services 11

 DNP Essentials 12

 Summary 12

CHAPTER II – METHODOLOGY 14

 Context 14

 Intervention 14

 Measures 15

 Analysis 15

Ethical Considerations	16
Summary	16
CHAPTER III – RESULTS	17
Summary	20
CHAPTER IV – DISCUSSION.....	21
Summary	21
Interpretation.....	21
Limitations	21
Conclusion	22
APPENDIX A – IRB Approval Letter	23
APPENDIX B – DNP Essentials	24
REFERENCES	25

LIST OF TABLES

Table 1 Mississippi CRNAs Average Annual Salary and Hourly Wage..... 3

Table 2 Mississippi Major Metropolitan Area’s Average Annual CRNA Salaries..... 4

Table 3 Mississippi Developmental Area’s Average Annual CRNA Salaries 5

LIST OF ILLUSTRATIONS

Figure 1. Base Salaries Offered to New Graduate CRNAs in Mississippi..... 19

LIST OF ABBREVIATIONS

<i>AACN</i>	American Association of the Colleges of Nursing
<i>ASC</i>	Ambulatory Surgery Center
<i>CRNA</i>	Certified Registered Nurse Anesthetist
<i>DNP</i>	Doctor of Nursing Practice
<i>IRB</i>	Institutional Review Board
<i>MDES</i>	Mississippi Department of Employment Security
<i>MS</i>	Mississippi
<i>USM</i>	The University of Southern Mississippi

CHAPTER I – INTRODUCTION

Purpose

CRNAs have one of the most lucrative careers in the country. The national median annual wage for CRNAs is \$165,120 (U.S. Department of Labor, 2018). In their national Occupational Outlook Handbook, the Bureau of Labor Statistics (U.S. Department of Labor, 2018) reported the national market for CRNAs is predicted to continue its steady growth through 2026. They also reported in their 10-year employment outlook that the projected employment for CRNAs is predicted to increase by 16.2% nationally, with an annual average increase of 2,800 openings across the country (U.S. Department of Labor, 2018). These statistics entail CRNAs with various levels of experience, from new graduates to 20-year veterans. Nationally, these statistics indicate a bright future for CRNA job prospects, but there is not enough evidence for base salary averages amongst the varying experience levels of CRNAs. The lack of statistical evidence for base salaries, amongst the varying experience levels of CRNAs, creates a struggle for employers as they attempt to remain competitive in a constantly evolving economy and for newly graduating CRNAs as they pursue employment that does not sacrifice their value.

The goal of this project was to establish evidence of average annual base salaries amongst newly graduated CRNAs in Mississippi. These national and regional statistics, provided by the Bureau of Labor Statistics, do not separate salary averages based on experience (U.S. Department of Labor, 2018). This lack of evidence in annual base salaries amongst newly graduated CRNAs in Mississippi can be an issue for employers as they try to remain competitive in an ever-increasing demand for cost efficiency in health

care. This lack of evidence can also be an issue for the newly graduated CRNAs as they attempt to make decisions on where to begin their journey in anesthesia.

Mississippi

In a 10-year employment outlook, from 2014-2024, the Mississippi Department of Employment Security projected employment rates and calculated salary averages across Mississippi. Mississippi Department of Employment Security separated their data by the two major metropolitan areas of Jackson and Coastal area (Gulfport/ Biloxi/Pascagoula), Community College Districts, and Workforce Development areas. Also available are statewide estimates for projected employment growth, between 2014-2024, and wage estimates for 2017 (MDES, 2018). In the 10-year employment projections, the Mississippi Department of Employment Security had the 2014 employment number for CRNAs listed at 260 and projected the occupation to rise to 270 jobs by 2024. In their 2017 occupation estimates, the Mississippi Department of Employment Security listed the employment number as 320, which is well over the projected number of 270. The average annual salary in Mississippi was listed as \$155,470, with an average hourly wage of \$74.74. Unlike the Bureau of Labor Statistics, the Mississippi Department of Employment Security divided average salaries by entry-level CRNAs or experienced CRNAs. The average entry-level salary for a CRNA in Mississippi, according to Mississippi Department of Employment Security (2018), is \$114,330 a year and their average hourly income as \$54.97. Mississippi Department of Employment Security (2018) lists the average experienced CRNA salary as \$176,040, and their average hourly income at \$84.63.

Table 1

Mississippi CRNAs Average Annual Salary and Hourly Wage

Experience	Average hourly wage	Average annual salary
Entry level and experienced CRNAs	\$74.74	\$155,470
Entry level	\$54.97	\$114,330
Experienced	\$84.63	\$176,040

Note. Average annual salaries and hourly wages retrieved from the Mississippi Department of Employment Security (2018). CRNA = Certified Registered Nurse Anesthetist.

The Jackson area CRNAs average annual salary is reported as \$158,040, with entry-level CRNAs making an average of \$145,090 annually, and experienced CRNAs making an average annual salary of \$164,510 (MDES, 2018). CRNAs in the Mississippi Coastal area of Gulfport, Biloxi, and Pascagoula earn a reported average annual salary of \$183,490. Entry-level CRNAs are reported as making an average annual salary of \$169,840, and experienced CRNAs are reported as making an average salary of \$190,320 (Table 2). The Jackson and coastal areas of Gulfport, Biloxi, and Pascagoula are projected to keep the same rate of employment for CRNAs, with no predicted net growth or loss (MDES, 2018).

Table 2

Mississippi Major Metropolitan Area's Average Annual CRNA Salaries

Area	CRNA average annual salary	CRNA average annual salary	
		Entry level	Experienced
Jackson	\$158,040	\$145,090	\$164,510
Coastal ^a	\$183,490	\$169,840	\$190,320

Note. Average annual salaries of the major metropolitan areas in Mississippi retrieved from the Mississippi Department of Employment Security (2018). Gulfport, Biloxi, & Pascagoula.

The Mississippi Department of Employment Security also separated the State into four workforce developmental areas to list estimated wages and projected employment flux: Delta, Mississippi Partnership, Southcentral Mississippi Works, and Twin Districts. The Delta developmental area is in the Northwestern portion of Mississippi and encompasses 14 counties. Mississippi Department of Employment Security (2018) estimated the average annual salary for CRNAs in this area in 2018 was \$168,361. Entry-level CRNAs were estimated to make \$108,792 annually, and experienced CRNAs were estimated to make around \$198,145 per year (MDES, 2018). The MS Partnership, encompassing the Northeastern Section of Mississippi, entails 27 counties, and in this area, CRNAs averaged an annual salary of \$166,618 (MDES, 2018). Entry-level CRNAs averaged an annual salary of \$133,423, and experienced CRNAs averaged \$183,215 per year (MDES, 2018). The Southcentral area contains 17 counties and CRNAs average \$154,685 per year here (MDES, 2018). The entry-level CRNAs average an annual salary of \$137,645, while experienced CRNAs average \$163,205 per year (MDES, 2018). The last developmental area is the Twin Districts, located in Central and Southeastern

Mississippi, encompassing 24 counties. CRNAs average annual salary in this area is \$157,637. Entry-level CRNAs earn an average of \$112,244 per year, while experienced CRNAs earn \$180,333 per year (Table 3).

Table 3

Mississippi Developmental Area's Average Annual CRNA Salaries

Area	CRNA average annual salary	CRNA average annual salary	
		Entry level	Experienced
Delta	\$168,361	\$108,792	\$198,145
MS Partnership	\$166,618	\$133,423	\$183,215
Southcentral	\$154,685	\$137,645	\$163,205
Twin Districts	\$157,637	\$112,244	\$180,333

Note. Average annual salaries of CRNAs retrieved from the Mississippi Department of Employment Security (2018).

CRNA Vacancy Estimates

Merwin, Bucci, Jordan, and Stern (2009), collected survey data detailing CRNA vacancies in hospitals all over the country. The survey requested information regarding the location of the hospitals, the number of CRNAs and other anesthesia providers, practice characteristics, and impediments to increasing the number of surgeries performed. According to Merwin et al. (2009), the national estimates resulting from the survey provided vacancy rates of 0.18 per 1000 surgeries and 14.7 vacancies per 100 CRNAs. This same study indicated that as one moves from metro hospitals to rural hospitals, the vacancy rate climbs in a consistent way. Vacancy rates are lowest in metro areas and highest in rural metro-adjacent regions (Merwin et al., 2009). This study also managed to relay surveys to ambulatory surgery centers (ASC) across the country and

found regions with the highest CRNA vacancy rates are located along the Gulf Coast and the Western United States. The total CRNA vacancy number established in ASCs was 1,196. The overall estimated number of vacancies per 100 CRNAs in ASCs is 11.1 and 14.7 vacancies per 100 CRNAs in hospitals across the country. Thus, vacancy rates are significantly lower in ASCs across the country than in hospitals. The lower vacancy rates in ASCs can more than likely be attributed to better work hours, less call or overtime, less complicated patients, less complicated surgeries, and no holiday work commitments. According to the survey results, the predicted training rate for new CRNAs is estimated to increase by 0.8% per year, due to increases in surgery demands (Merwin et al., 2009).

In 2007, Daugherty, Fonseca, Kumar, and Michaud (2010) surveyed anesthesiologists, CRNAs, and hospital anesthesiology directors across the country to gather data on wages, time usage, and procedure volumes. The survey results demonstrated that there was a shortage of both anesthesiologists and CRNAs nationwide in 2007. To be specific, there was a shortage of 3,800 anesthesiologists and 1,282 CRNAs, or 9.6% and 3.8% of the anesthesia workforce, respectively (Daugherty et al., 2010). The anesthesiologist shortage was spread evenly across the country; however, the CRNA shortages were particularly concentrated in the Northeast. Some states in the Western portion of the country had surpluses of CRNAs. Daugherty's survey showed considerable variation across states, with just over half (54%) of states experiencing anesthesiologist shortages, and 60% of states demonstrating CRNAs shortages.

Daugherty's team also estimated future trends in anesthesiology labor markets, using different scenarios for supply and demand. The scenarios assumed 2007 trends would continue; however, the scenarios did not consider possible sudden changes in the

demand for or the supply of anesthesia providers. These scenarios initially showed a 1.6% annual increase in demand for both CRNAs and anesthesiologists, a 0.67% net annual increase in the supply of anesthesiologists, and a 3% annual increase in the supply of CRNAs (Daugherty et al., 2010). Taking these statistics into consideration, Daugherty et al., (2010), estimated a projected shortage of 4,479 anesthesiologists by 2020 and a surplus of 7,970 CRNAs. If other scenarios occurred, such as a higher entry rate for anesthesiologists (2.76% per year), it would lead to a surplus of anesthesia providers, and if there was an annual growth in demand for anesthesia services, exceeding 3%, this would cause a shortage of CRNAs (Daugherty et al., 2010).

Another interesting detail uncovered by Daugherty, Fonseca, Kumar, and Michaud (2010) was the average age of anesthesiologists and CRNAs in 2007 was 49 years. With advances in medical and surgical practices, 49 years of age is not as burdensome as it used to be, but people cannot work forever. Taking into consideration this survey was performed 11 years ago, one would assume this resulted in a rise in the retirement rates for current anesthesia providers. However, the anticipated rise in retirement rates of anesthesia providers can be offset by the increasing number of anesthesia training programs. In general, the demand for CRNAs will decrease, there will be fewer vacancies for CRNAs, and more surgeries will be performed at a faster rate if the ratio of CRNAs to surgeries increases. This increase in CRNAs to surgeries ratio may result in less wage growth and greater unemployment. Merwin, Bucci, Jordan, and Stern (2009), collected data on CRNA vacancy rates across the country and calculated predictions for growth in the profession. The ratio calculated in the study was the number of CRNAs per 1,000 surgeries. Merwin et al. (2009) predicted that if the 2007 training

rates for newly graduating CRNAs remained constant through 2020, the CRNA to surgery ratio would increase. Statistically speaking, Merwin et al. (2009), predicted the 2007 CRNA to Surgery ratio of 1.24 CRNAs per 1,000 surgeries, would increase to 1.50 CRNAs per 1,000 surgeries in 2020 (Merwin et al., 2009). If the number of surgeries performed in 2020 doubled the 2007 numbers, the ratio would drop to 1.33, which would still be a modest gain (Merwin et al., 2009). If this holds true, it means the profession would have an increased ratio of CRNAs to surgeries performed, nationally. These numbers, however, do not distinguish between ASCs or hospitals, which would explain the higher than expected ratios. One way to offset these increasing ratios of CRNAs to surgeries performed is if the newly trained CRNAs traveled to areas of the country with very high vacancy rates. The distribution of newly graduated CRNAs to areas in the country with higher demands for CRNAs could attenuate the CRNA oversaturation in certain regions across the country.

Wunder, Glymph, Schirle, and Valdes (2017), conducted a study on CRNA supply and demand trends in the state of Florida between 2014-2018. The survey was sent to hospitals and ASCs and projected numbers of CRNA graduates from 2014-2018 were obtained from nurse anesthesia programs in Florida. The survey projected 73 new full-time openings through 2018, representing an 18% growth rate. The Florida CRNA programs projected graduating 1,394 new CRNAs through 2018 (Wunder et al., 2017). The study estimated that 85% of these new graduates will find full-time positions, in Florida. A projected surplus of 15% (114 positions) correlates to recent national estimates. To absorb the high rate of new graduates, full-time positions would have to grow by 22%. If there is a shift in supervision or medically directed provisions there

would not be a surplus of CRNAs as predicted. Florida also has greater competition for anesthesia services, with anesthesia assistants being introduced years ago, due to market demands (Sokanu, 2018).

Ultimately, the continued demand for CRNAs is likely. The imbalance of CRNA vacancy rates in rural and urban areas offers great disparity. A more evenly distributed CRNA population throughout the United States would provide a more unified distribution of vacancies and possibly a more even provision of anesthesia services.

Anesthesia Provider Cost Efficiency

As the demand for health care continues to grow, increasing the number of CRNAs and permitting them to practice in the most efficient delivery models will be a key to containing costs while maintaining quality care. Generally, CRNAs are salaried, and their compensation usually lags anesthesiologists' while receiving no overtime pay. According to Hogan, Moore, Seifert, and Simonson (2010), CRNAs are less costly to train than anesthesiologists and have the potential for providing anesthesia care efficiently. In a study performed by Hogan et al., (2010), CRNA-only services generated the highest yearly revenue in an ideal facility caseload, while medically-directed services on a 1:1 ratio of CRNAs to anesthesiologists provided the least amount of annual revenue. The same study indicated that medically directed (1:4) anesthesia services generated the 2nd highest yearly revenues under ideal facility caseloads, and anesthesiologist-only services generated more revenue than the 1:1 medically-directed method (Hogan et al., 2010). Medically-directed anesthetic services produce the highest reimbursement for each procedure, but the cost of paying the providers, unless utilizing a 1:4 ratio with a high caseload, offsets the high volumes of reimbursement. Due to low

provider costs per procedure with moderate reimbursement per procedure, CRNA-only services on average generate the highest yearly revenues (Hogan et al., 2010).

Another study performed by Quraishi, Hoyem, and Jordan (2017) demonstrated that Medicare Part B services had an average increase of 3.1% per year from 2000 to 2014. The study gathered data on the use of anesthesia-related billing codes during the study's time frame. Medicare anesthesia services are permitted 100% of the allowed reimbursement except for the AD modifier. The function of billing modifiers is to determine whether the allowed service can be billed at the selected medical direction rate based on specific requirements. To be more specific, some modifiers are allowed 100% of the reimbursement, such as QZ and AA, while others, such as the medically-directed modifiers, are only granted 50% of the allowed reimbursement. The most common modifiers used in this study were as follow:

- AA: Anesthesia services performed personally by the anesthesiologist.
- AD: Medical supervision by a physician; more than 4 concurrent anesthesia procedures.
- QK: Medical direction of 2, 3, or 4 concurrent anesthesia procedures involving qualified individuals.
- QY: Medical direction of 1 CRNA by an anesthesiologist.
- QX: CRNA service with medical direction by a physician.
- QZ: CRNA service without medical direction by a physician.

In this 15-year study, the least used billing modifier was the AD modifier. CRNA-only services, using the QZ modifier, increased from 10.9% to 21.7% over the 15-year period (Quraishi et al., 2017). This modifier represented the highest rate of increase of all the

modifiers utilized with an average increase of 8.3% per year for allowed services and an average increase of 7.5% per year for Medicare payments. In contrast, billing for the AA modifier, or the anesthesiologist only modifier, decreased from 33.2% to 25.8% over the same time frame (Quraishi et al., 2017).

Hogan, Moore, Seifert, and Simonson (2010), also found that both direct and indirect costs of a graduate program and graduate education for CRNAs are lower than costs for anesthesiologists by a substantial margin. Anesthesia graduate education costs for CRNAs are less than one-fourth the anesthesia graduate costs of anesthesiologists. Total costs, to include both undergraduate and graduate costs, for CRNAs are around 15% of the costs of anesthesiologists (Hogan et al., 2010). The lower cost of educating CRNAs versus anesthesiologists is important because these estimates indicate that it may cost society less to increase the number of anesthesia providers by expanding CRNA education programs to offset the demand for increased surgical caseloads. In an age where the bottom line of costs and revenue reign supreme, increasing the use of CRNA services would appear to be the obvious course for the future of anesthesia delivery.

Growth in Surgical Services

The growing demand for anesthesia providers relies on several factors, rising numbers of procedures requiring anesthesia being one of them. According to Nagrebetsky, Gabriel, Dutton, and Urman (2017), the proportion of cases requiring non-operating room anesthesia increased from 28.3% in 2010 to 35.9% in 2014. The proportion of outpatient non-operating room anesthesia cases increased from 69.7% in 2010 to 73.3% in 2014 (Nagrebetsky et al., 2017). Among the cases reported in

Nagrebetsky and colleagues' study, colonoscopies were the most common procedures requiring non-operating room anesthesia.

Liu, Main, Mattke, and Waxman (2012), also performed a study on the frequency of outpatient endoscopies and colonoscopies from 2003-2009. Liu et al. (2012) found that the number of gastroenterology procedures, per million medicare enrollees, remained largely unchanged (136,718 procedures), but increased more than 50% in commercially insured patients, from 33,599 in 2003 to 50,816 in 2009. In both populations, the proportion of procedures who used anesthesia services increased from 14% in 2003 to more than 30% in 2009 (Liu et al., 2012).

DNP Essentials

The Doctor of Nursing Practice (DNP) Essentials define the competencies central to the roles for advanced practice nurses. According to the American Association of the Colleges of Nursing (AACN) (2006), there are eight essentials required to obtain a DNP degree. All of the essentials were met in some manner throughout the completion of this project. A more detailed description of how all eight of the essentials were applied are described in Appendix B.

Summary

The job market for CRNAs, as a whole, continues to be robust. The national market for CRNAs is expected to sustain its steady growth and market value (U.S. Department of Labor, 2018). The continued growth in procedures requiring the use of anesthesia has played a key role in the growing demand for anesthesia providers (Liu et al., 2012). The largest demand for anesthesia providers appears to be in more rural areas of the country (Merwin et al., 2009). The lack of significant data available concerning the

market for new graduate CRNAs in Mississippi, specifically in regard to average annual base salaries (MDES, 2018). This lack of available data reinforces the purpose of this project in establishing evidence for current market values of new graduate CRNAs in Mississippi, specifically average annual base salaries.

CHAPTER II – METHODOLOGY

Context

A survey was emailed to CRNA employers in Mississippi. The survey was sent to approximately 42 hospitals and anesthesia groups. The survey recipients were within the State of Mississippi identified as CRNA employers by previous data collected by The University of Southern Mississippi (USM) Nurse Anesthesia Program for reporting purposes. Prior to completing the survey, the anesthesia department employers were told their participation in the survey is 100% voluntary and there are no repercussions for non-participation. Communication among committee members was done in person on campus at the USM Hattiesburg, Mississippi location.

Intervention

A lack of availability in the distinction of CRNA salary averages amongst varying levels of working experience provided an opportunity for enhanced awareness, specifically pertaining to newly certified CRNAs. Resources are available that provide salary averages for CRNAs, nation and statewide, but without experience level distinction. This gap in available knowledge can create a market in which the employer and the potential employee accept unfair values as the norm. The survey included six questions, all pertaining to the employment of newly certified CRNAs, their offered base salaries, and any other benefits offered they would like to share. Creation of these questions was based on the lack of information regarding experience specific market values for CRNAs. Communication among committee members was done in person, on campus, at USM Hattiesburg, Mississippi location.

Measures

As previously mentioned, the gap in information related to experience distinct market values for CRNAs incited the pursuit of data for this issue. Initially, contact was made to committee members for input regarding the course of action in the acquisition of the needed information. The six-question survey was then developed based upon the previously addressed needs. CRNA employer information was obtained, from USM Nurse Anesthesia Program, to be recipients for the previously mentioned survey. A preliminary email was written to accompany the newly created survey. Once the preliminary survey and email were completed, feedback was sought from committee members regarding them. Institutional Review Board (IRB) approval was sought and attained (IRB-19-71) (Appendix A). Once IRB approval was attained, the survey was emailed to CRNA employers. The CRNA employers were emailed two weeks later as a follow-up in an attempt to increase the response rate. Once the responses were obtained, they were organized and evaluated.

Analysis

Once the surveys were completed by the CRNA employers and returned, they were organized and evaluated. The data was evaluated using descriptive statistics and simple percentages and ranges. When the evaluation of the data was completed, a draft was created to report the findings. Committee members were sought for feedback regarding the survey's statistical analysis. Adjustments were made to the statistical analysis and the executive summary of its findings were subsequently finalized. Upon completion, the executive summary will be presented to the Chief CRNA in person at the

clinical site of interest. Presentation of the project will occur on campus at the USM's DNP Scholarship Day.

Ethical Considerations

When researching and disseminating market values for competing entities (CRNAs and employers), there is always the possibility of unmasking unflattering values for one of the entities. When uncovering these values, the entity with the unflattering values may undergo financial growing pains in an attempt to remain competitive. Another ethical issue to consider is the possibility of one or more areas in the state not responding to the survey, resulting in an unfair portrayal of the employers who did respond to the survey.

Summary

This project sought to address the lack of available data regarding annual salary averages of CRNAs, specifically pertaining to newly certified CRNAs. Contact was made to committee members for input regarding the creation of the survey. A six-question survey was then developed based upon the previously discussed needs. CRNA employer information was obtained, from the USM Nurse Anesthesia Program, to be recipients of the survey. The survey was sent to 42 employers of CRNAs throughout Mississippi. Once the survey responses were obtained, they were organized and evaluated using descriptive statistics and simple percentages.

CHAPTER III – RESULTS

A six-question survey was sent to forty-two employers of CRNAs throughout the State of Mississippi. The survey asked employers about the current availability of full-time positions for new graduates, how many new graduate CRNAs they have hired in the previous year, base salaries offered to the new graduate CRNAs, sign-on bonuses for the new graduate CRNAs, and whether they offered any additional benefits to the new graduate CRNAs that they would like to share. Thirty out of the 42 total surveys were completed and returned for analysis, yielding a 71% response rate.

The results for a current, full-time position available for new graduate CRNAs were evaluated first. Thirty-three percent of employers do not have full-time positions available, meaning 66.67% of employers have full-time positions available for new graduate CRNAs. Amongst CRNA employers who have available full-time positions, 20% have 4 or more positions available, 23.33% have 1 position available, 13% have 2 available positions, and 10% have 3 available positions for new graduate CRNAs. The mean full-time positions available for new graduate CRNAs within Mississippi is 1.6, with a standard deviation of 1.55.

Forty-three percent of CRNA employers within Mississippi has not hired a new graduate CRNA within the past year. Twenty-three percent of employers have hired 4 or more new graduate CRNAs within the past year, 20% have hired a single new graduate CRNA, and 6.7% have hired 2 and 3 newly graduated CRNAs a piece. The mean for newly graduated CRNAs hired over the past year is 1.47, with a standard deviation of 1.66.

One of the questions within the survey inquired about the base salary offered to the newly graduated CRNAs, with multiple salary ranges to choose from. The yearly salary ranges that were listed in the question are as follows:

- \$110,000 - \$114,000
- \$115,000 - \$125,000
- \$126,000 - \$136,000
- \$137,000 - \$147,000
- \$148,000 - \$156,000
- > \$156,000

Amongst the 30 CRNA employers who responded to the survey, 23% selected that the new graduate CRNAs were offered a base salary range of \$115,000 - \$125,000 per year. 20% of employers selected \$137,000 - \$147,000 per year and \$148,000 - \$156,000 per year. 13% of employers paid new graduate CRNAs \$126,000 - \$136,000 per year, and 3% of employers paid their new graduate CRNAs more than \$156,000 per year.

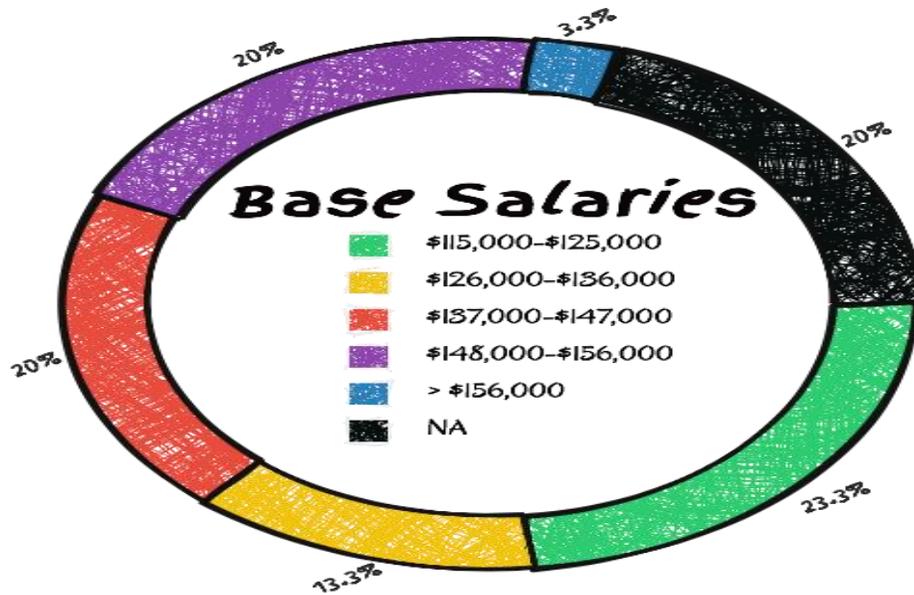


Figure 1. *Base Salaries Offered to New Graduate CRNAs in Mississippi.*

Only 16.67% of employers offered sign-on bonuses to their new graduate CRNAs. Forty percent of employers who offered sign-on bonuses offered between \$5,000 - \$10,000. Another 40% of sign-on bonuses offered to new graduate CRNAs were between \$11,000 - \$20,000. The final 20% of new graduate CRNAs who were offered sign-on bonuses were offered over \$20,000.

The final question of the survey asked employers to provide any additional benefits offered to new graduate CRNAs. The question was formatted as a discussion in an attempt to avoid limiting employer options. Twenty percent of the employers who replied to the survey provided additional input of benefits offered to the new graduates. The additional benefits listed are as follows:

- Loan forgiveness program offered through the federal government
- Retirement matching
- Disability insurance

- Health insurance
- Malpractice insurance
- CEU reimbursements and education stipends
- Pension after 30 years of service
- Paid Vacation (No specific amounts provided)
- Relocation expense stipend

Summary

This project utilized a six-question survey, inquiring about the hiring of newly graduated CRNAs and the base salaries offered to them. The survey was sent to 42 CRNA employers, throughout Mississippi. Thirty of the 42 employers completed the survey, yielding a 71% response rate. The data was evaluated using descriptive statistics and simple percentages and ranges. This project revealed that 67% of CRNA employers in Mississippi have a full-time position available for a new graduate CRNA. The survey also indicated that 43% of employers in Mississippi have hired a newly graduated CRNA within the past year. Forty percent of new graduate CRNAs were offered between \$137,000-\$156,000 per year and 36% percent of new graduate CRNAs were offered between \$115,000-\$136,000 per year.

CHAPTER IV – DISCUSSION

Summary

The lack of available data regarding the distinction between experience levels in Mississippi CRNA salary averages provided an opportunity for enhanced awareness, specifically pertaining to newly certified CRNAs. Resources are available that provide salary averages for CRNAs, nation and statewide, but without experience level distinction. This gap in available knowledge can create a market in which the employer, and the potential employee, accept unfair values as the norm. Therefore, a six-question survey was formed inquiring about the hiring of newly graduated CRNAs and the base salaries offered to them. This survey was sent to approximately 42 employers of CRNAs, throughout the State of Mississippi.

Interpretation

Thirty of the 42 employers of CRNAs within the State of Mississippi responded to the survey, yielding a response rate of 71%. The survey revealed that 67% of those 30 employers who completed the survey have a full-time position available for new graduate CRNAs and 43% have hired a new graduate within the past year. The base salary ranges offered to the newly graduated CRNAs within the past year were scattered between \$115,000 - \$156,000 per year, with the majority of new graduates offered between \$137,000 - \$156,000 per year. Only 17% of employers offered new graduates a sign-on bonus.

Limitations

Limitations for this current analysis include the inability to discern the location of each employer who responded to the survey. More insightful market analysis for new

graduate CRNAs could be provided by acquiring the knowledge of regional, specific markets within the state of Mississippi. For example, if a single city has multiple anesthesia employers, and each employer offers a base salary well below the state average, it can dilute the statistics and the market. The statistical dilution can misguide any subsequent interpretations by those who read them. Awareness of each of the CRNA employer's location can also give greater insight on the occupational outlook for new graduate CRNAs within the State of Mississippi, as a whole.

Conclusion

Project participation for this analysis was exceptional, and the 71% survey response rate reflected that. The high response rate illustrates the desire for enhanced awareness regarding the market for newly graduated CRNAs. The variability across the state in base salaries offered to new graduates also reflect the need for greater awareness. This project was limited without the knowledge of each employer's location within the state. Future research should include the employer's location within the State of Mississippi to enhance the understanding and utilization of this research.

APPENDIX A – IRB Approval Letter

Office of
Research Integrity



118 COLLEGE DRIVE #5125 • HATTIESBURG, MS | 601.266.6576 | USM.EDU/ORI

NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI via the Incident template on Cayuse IRB.
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.

PROTOCOL NUMBER: IRB-19-71

PROJECT TITLE: A Market Analysis of Pay Rates for New Graduate Certified Registered Nurse Anesthetists

SCHOOL/PROGRAM: School of LANP, Leadership & Advanced Nursing

RESEARCHER(S): Zachary Halliwell, Nina McInain

IRB COMMITTEE ACTION: Exempt

CATEGORY: Exempt

Category 2.(i). Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording).

The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

APPROVED STARTING: March 19, 2019

A handwritten signature in cursive script that reads "Donald Sacco".

Donald Sacco, Ph.D.

Institutional Review Board Chairperson

APPENDIX B – DNP Essentials

Doctor of Nursing Essential	How the Essential is Completed
Essential One: Scientific Underpinnings for Practice	This essential was met by reviewing evidence-based literature pertinent to this project.
Essential Two: Organizational and Systems Leadership for Quality Improvement and Systems Thinking	This doctoral project aimed to improve the quality of economical awareness concerning the market for new graduate CRNAs.
Essential Three: Clinical Scholarship and Analytical Methods for Evidence-Based Practice	This essential was met by researching and analyzing the most recent evidence-based literature pertinent to a market analysis of new graduate CRNAs.
Essential Four: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care	This essential was met through the utilization of electronic databases for the acquisition of evidence-based research and information.
Essential Five: Health Care Policy for Advocacy in Health Care	This essential was met through the discovery of a gap in available data regarding average base salaries for new graduate CRNAs. The results of this project can be utilized by employers of CRNAs to enhance their economic efficiency in hiring new graduate CRNAs.
Essential Six: Interprofessional Collaboration for Improving Patient and Population Health Outcomes	This doctoral project utilized interprofessional collaboration by communicating with employers of CRNAs throughout the state of Mississippi for the enhancement in knowledge regarding the statewide salary averages for new graduate CRNAs.
Essential Seven: Clinical Prevention and Population Health for Improving the Nation’s Health	The results of this project could help CRNA employers enhance their success in hiring new graduate CRNAs and improve patient care, due to a resolution of staffing issues.
Essential Eight: Advanced Nursing Practice	This essential was met by enhancing the knowledge of average annual base salaries for new graduate CRNAs in Mississippi.

REFERENCES

- American Association of Colleges of Nursing (AACN). (2006). *The essentials of doctoral education for advanced practice nursing*. Retrieved from <https://www.aacnnursing.org/Portals/42/Publications/DNPEssentials.pdf>
- Daugherty, L., Fonseca, R., Kumar, K. B., & Michaud, P. (2010). An analysis of the labor markets for anesthesiology. *Rand Health Publications*, Retrieved from https://www.rand.org/pubs/research_briefs/RB9541.html
- Health workforce projections: Certified Nurse Anesthetists. (2016, December). *Health Resources & Services Administration*. Retrieved from <https://bhw.hrsa.gov/sites/default/files/bhw/health-workforce-analysis/research/projections/crna-fact-sheet.pdf>
- Hogan, P., Moore, C., Seifert, R., & Simonson, B. (2010). Cost-effectiveness analysis of anesthesia providers. *Nursing Economics*, 28(3), 159-169. Retrieved from [https://www.aana.com/docs/default-source/research-aana.com-web-documents-\(all\)/nec_mj_10_hogan.pdf](https://www.aana.com/docs/default-source/research-aana.com-web-documents-(all)/nec_mj_10_hogan.pdf)
- Liu, H., Main, R., Mattke, S., & Waxman, D. A. (2012). Utilization of anesthesia services during outpatient endoscopies and colonoscopies and associated spending in 2003-2009. *Journal of the American Medical Association*, 307(11), 1178–1184. doi:10.1001/jama.2012.270
- MacIntyre, P., Collins, S., Hower, I., & Stevens, B. 2014). Cost of education and earning potential for non-physician anesthesia providers. *American Association of Nurse Anesthetists Journal*, 82(1), 25-31.

- Merwin, E., Bucci, M., Jordan, L., & Stern, S. (2009). New estimates for CRNA vacancies. *American Association of Nurse Anesthetists Journal*, 77 (2), 121-129. Retrieved from <https://core.ac.uk/download/pdf/6618830.pdf>
- Mississippi Department of Employment Security. (2018). Occupational employment projections: Year 2016 projected to year 2026. Retrieved from https://mdes.ms.gov/media/63514/oep_state.pdf
- Nagrebetsky, A., Dutton, R. P., Gabriel, R. A., & Urman, R. D. (2017). Growth of nonoperating room anesthesia care in the United States: A contemporary trends analysis. *Anesthesia and Analgesia*, 124(4), 1261-1267. doi: 10.1213/ANE.0000000000001734
- Quraishi, J. A., Hoyem, R., & Jordan, L. M. (2017). Anesthesia medicare trend analysis shows increased utilization of CRNA services. *American Association of Nurse Anesthetists Journal*, 85(5), 375-383. Retrieved from https://cdn.ymaws.com/www.masscrna.com/resource/resmgr/billing_and_liability/qz_article.pdf
- Rubens, A. (2016). CRNA profession at a crossroads. *Modern Healthcare*, 46(3). Retrieved from <https://www.modernhealthcare.com/article/20160116/MAGAZINE/301169995/crna-profession-at-a-crossroads>
- Sokanu. (2018). Anesthesiology Assistants. *Job Outlook*. Retrieved from <https://www.sokanu.com/careers/anesthesiologist-assistant/job-market/>.
- Sun, E. C., Baker, L. C., Dexter, F., Macario, A., & Miller, T. R. (2015). No significant association between anesthesia group concentration and private insurer payments

in the United States. *Anesthesiology*, 123(3), 507-514. doi:
10.1097/ALN.0000000000000779

U. S. Department of Labor, Bureau of Labor Statistics. (2018). Certified Registered Nurse Anesthetists. *Occupational Outlook Handbook, 2017-2018*. Retrieved from <https://www.bls.gov/ooh/healthcare/nurse-anesthetists-nurse-midwives-and-nurse-practitioners.htm>.

Wunder, L., Glymph, D., Schirle, L., & Valdes, J. (2017). Workforce initiative for current predictors of CRNA employment in the state of Florida. *American Association of Nurse Anesthetists Journal*, 85(3), 217-221. Retrieved from https://www.aana.com/docs/default-source/aana-journal-web-documents-1/workplace-initiative-0617-pp217-221.pdf?sfvrsn=1c948b1_6