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*Nurse anesthesia programs (NAPs) are the highest priced programs for graduate students compared with 7 other nursing master's degree programs. Not only are nurse anesthesia programs expensive, but also most students are encouraged by the policies within their individual programs to terminate full-time employment before matriculation.*

*The purpose of this study was to determine school-related and living expenses, as well as the income and sources of income for graduate students in the second year of their NAP. To obtain the information, a student cost survey was designed and administered to participants attending NAPs across the United States during the 2001 school year. In addition, total degree costs were analyzed using a cost model assessing 4 components: educational costs, living expenses, net income foregone, and loan costs.*

*The results showed that total degree costs incurred by graduate students in NAPs to complete their nurse anesthesia education totals \$173,007. The analysis of the sources of income showed the following sources were used by respondents: guaranteed student loans; a spouse's income; agreements with future employers; stipends from universities, hospitals, and/or the military; grants; family support; and self-income.*

*Completing a nurse anesthesia education program is expensive, although the expected return on the investment is high. Nevertheless, the expense may keep qualified graduate students from entering NAPs.*

**Key words:** Nurse anesthesia school expenses, nurse anesthesia students, student cost survey.

## SCHOOL-RELATED EXPENSES, LIVING EXPENSES, AND INCOME SOURCES FOR GRADUATE STUDENTS IN NURSE ANESTHESIA PROGRAMS

Certified Registered Nurse Anesthetists (CRNAs) have been administering anesthesia for more than 100 years. In fact, the specialty practice of nurse anesthesia has evolved over time into one of the most challenging areas of advanced practice nursing.<sup>1</sup> Today the profession has approximately 28,000 practicing CRNAs administering roughly 65% of the 26 million anesthetics delivered in the United States each year.

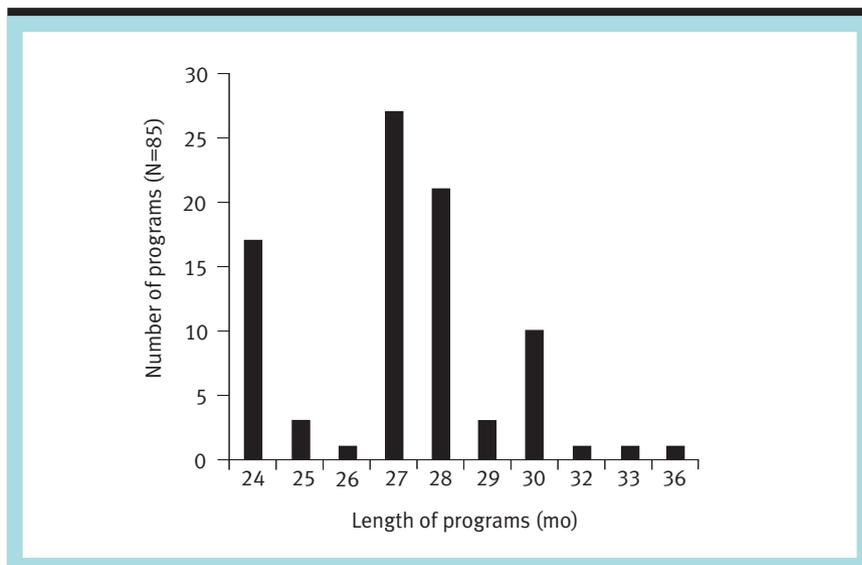
The earliest nurse anesthesia training program dates back to 1889; however, the first postgraduate courses were not established until 1909. As of December 2001, there were 85 accredited nurse anesthesia programs (NAPs) in

the United States, all of which offer a graduate degree.

Many of the 85 programs in the United States encourage their graduate students to refrain from work during the program. Program length ranged from 24 months to 36 months, during which time graduate students have no income.<sup>2</sup> Figure 1 illustrates the number of programs by program length. The median length of the programs was 27 months.

Graduate students are not only unemployed for 2 to 3 years but they also pay higher tuition. Tuition costs ranged from no tuition in military programs to more than \$20,000 per year.<sup>3</sup> Ouellette<sup>4</sup> reported that NAPs are generally more costly than other graduate programs. A few of the factors contributing to the higher cost of education are a longer program of study and a full-time enrollment requirement by graduate students. Bullough<sup>5</sup> also reported that when comparing

**Figure 1. Number of programs by program length, as of December 2001**



graduate clinical nursing programs, the highest priced program in terms of cost to the institution is nurse anesthesia.

Since many students were employed prior to anesthesia school, they did not qualify for grants available to other graduate students who did not work. Additionally the maximum amount for graduate student loans they could apply for each year was \$18,500; the tuition charged in several programs exceeded the yearly amount students were allowed to borrow. There are scholarships available; however, they are few. Redman et al<sup>6</sup> noted that students with previous nursing degrees and those with nonnursing degrees found it difficult to qualify for student aid. Merrill<sup>7</sup> noted that financial aid and traineeships are helpful, but they do not replace the loss of a full-time income.

### Materials and methods

This study was a traditional descriptive design using survey methods to describe school-related expenses, living expenses, and sources of income, as well as the income for graduate students. The data were collected during the 2001 school year from graduate students in NAPs in the United States and Puerto Rico. At the time of the survey there were 83 accredited NAPs, with approximately 2,600 students. Seven programs were excluded for 1 of 2 reasons: either it was a new program with no seniors or it was a military program. The military programs were excluded because the information obtained may not have shown an accurate representation of graduate students enrolled in NAPs across the country. The characteristics required that the senior students be enrolled in a given institution with 12 to 18 months remaining before completion of

**Table 1. Characteristics of respondents\***

	Response	Percentage
<b>Age of respondents</b> (N = 362)		
21-25	16	4
26-30	163	45
31-35	87	24
36-40	57	16
41-45	29	8
46-50	10	3
<b>Sex of respondents</b> (N = 348)		
Male	157	45
Female	191	55
<b>Marital status</b> (N = 347)		
Single	130	37
Married	186	54
Divorced	31	9
<b>Working status</b> (N = 366)		
Yes	86	23
No	274	75
No response	6	2

\* N values do not represent the total response rate, only the response to the question.

their program. Senior nurse anesthesia students were chosen because they should have the most accurate information in relation to total program expenses. The institutional review board at California State University of Fullerton approved the application for the use of human subjects.

Surveys were mailed to all directors of NAPs who distributed them to their graduate students. Consent to participate was implied with the return of the completed survey. A follow-up letter, survey, and email were sent to those programs that did not respond to the first survey.

A total of 32% (367 of 1,140) of graduate students responded to the survey after 2 mailings; 23% (261 of 1,140) of graduate stu-

dents responded to the first mailing. The 1,140 students surveyed were from the 76 schools that were included in the study. Graduate students from 55 of 76 schools responded to the survey (72%). Characteristics of the respondents are listed in Table 1.

Data were analyzed using descriptive statistics. Frequencies and means were determined for most variables. One of the goals of this study was to determine income for senior nurse anesthesia students, as well as the sources of income. The income was annualized and totaled as presented on the student cost survey. The median is presented for the many sources of income including the total annual income.

Total degree costs for graduate students also were determined. The Bednash et al<sup>8</sup> definition of total degree costs to students was used with slight modifications. There are 4 components used to determine the total degree costs for graduate nursing students: educational costs, living expenses, net income foregone, and loan costs (Table 2.)

## Results

The median income for nurse anesthesia students was \$38,400; the median yearly school-related expenses were \$9,500; the median monthly living related expenses were \$1,950. The calculated median yearly living-related expenses were \$23,400.

There are several sources of income that can be used to fund a graduate student's education. Table 3 not only shows the assortment of alternative sources but also shows the median totals given by students, as well as the percentage of graduate students who used that

resource as a means of income.

Total degree costs to graduate students include 4 components; educational costs, living expenses, net income foregone, and loan costs. The median total educational costs for graduate students were calculated from the student cost survey to be \$9,500 (\$21,375 for 27 months), and the median total living expenses were calculated to be \$23,400 (\$52,650 for 27 months). The net income foregone was calculated by subtracting the median of the actual earnings (\$8,500) from the median of the gross earnings from the previous year (\$45,000) yielding a total net income foregone of \$36,500 (\$82,125 for 27 months). The fourth component, loan costs, was defined as the sum of the interest payments over 10 years, the standard payback period, and the principal. The median response to total amount of unpaid loans for graduate students' education at graduation was taken, and a 7% interest

was applied for 10 years. The total loan costs were calculated to be \$15,732. The total degree costs incurred by graduate students were \$173,007. Figure 2 illustrates the total costs incurred by students over a period of 27 months.

## Discussion

This study determined the school-related and living expenses, as well as the income and income sources for graduate students. In the analysis of the sources of income, 73% of graduate students used student loans as a primary source of income. Forty-three percent indicated their spouse's income was an additional source of income, contributing to a median income of \$40,000. Interestingly, 54% (186 of 347) of respondents were married, although it was not a question asked in the survey. This may mean graduate students were capable of funding their education because they were married.

Surprisingly, only 15% of grad-

**Table 2. Total degree costs to nurse anesthesia students**

<b>Educational costs</b>	<b>Living expenses</b>	<b>Net income foregone</b>	<b>Loan costs</b>
Tuition	Rent/mortgage	Income foregone	Interest on loans
Review course	Food	(Current potential earnings minus actual annual earnings)	(Sum of the interest payment over 10 years and the principal)
Fees	Automobile		
Books	Transportation		
Examinations	Clothing		
Equipment	Health insurance		
Copying	Entertainment		
Tutoring	Child care		
Continuing education	Utilities		
Licensure	Phone		
Basic cardiac life support training	Other		
Seminars			
Moving expenses			
Liability insurance			
Other			

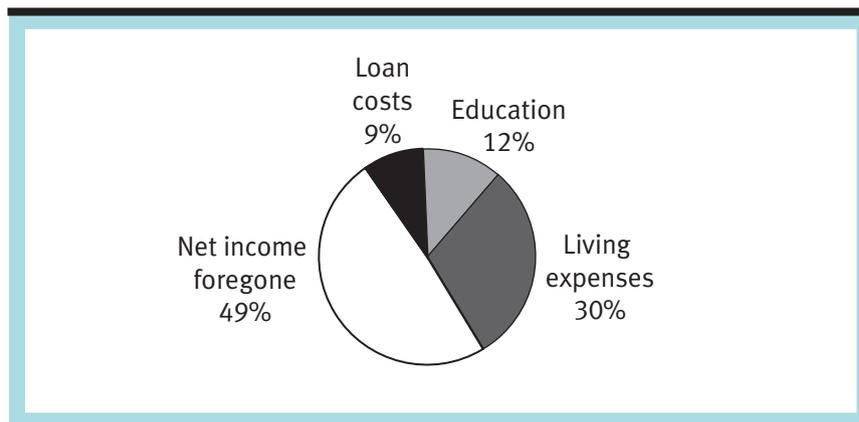
**Table 3. Sources of income (N = 366)**

Source	Median	Percentage of students*
Guaranteed student loans	\$18,000	73
Graduate/teaching assistant positions	7,000	4
Work-study program	5,450	3
Agreement with future employers	10,000	15
Government salary or stipend (military or Veterans Administration)	7,900	12
Nurse Education Act grant	1,200	17
Government loans or grants	10,000	16
Other loans or grants	6,000	18
Stipend (university or hospital)	4,000	30
Income from dividends	640	7
Spouse's income	40,000	43
Child support	4,080	3
Family support	6,000	10
Income per year (self)	8,000	23
Other	4,842	3

\* The total is greater than 100% because many nurse anesthesia students used more than one source of income.

uate students indicated they had agreements with future employers. Considering the shortage of CRNAs across the country, one would project institutions would have a greater interest in funding a future employee. Rather than offering a sign-on bonus, perhaps there should be more agreements to fund a prospective employee at the time of entry into the NAP. The reality is that graduate students have a greater monetary need during the program rather than when they secure employment.

When comparing the findings with previously published research, the results were quite similar. The Fagerlund<sup>9</sup> prototype study estimated that the total program cost per student was \$114,062. The costs were grouped into 6 categories: direct educational expenses, incremental expenses, clinical residency fees, foregone income and benefits, interest paid on education

**Figure 2. Total degree costs to nurse anesthesia students**

loans, and relocation costs.<sup>9</sup> Fagerlund calculated the estimates for a 27-month program, but did not consider everyday living expenses incurred by graduate students. If the living expenses from this study were excluded from the calculated total degree costs, the total would be \$120,357. This amount was comparable to Fagerlund's figure of \$114,062, representing a slight dif-

ference of \$6,295. The Fagerlund study was conducted in 1995, which was 6 years prior to the present study. The reason for the slight variation in the figures could be that Fagerlund's study was designed around a prototype nurse anesthesia educational program, whereas the figures from the present study were taken directly from graduate students.

Consistent with the Fagerlund study, foregone earnings do represent the greatest cost for most students.<sup>9</sup> In fact, they represent 49% of the total degree costs incurred by nurse anesthesia students during their course of study.

The greatest limitation was the low response rate. However, the implications are important because the cost of attending a NAP is significant, yet there are few data to substantiate that fact. It has been suggested that NAPs may be losing potential candidates due to financial constraints. Because the data from this study identify how costly NAPs are, they may be used by the

profession to support requests for continued or increased funding of nurse anesthesia education at the federal level.

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