
A Peek into VLDS: A Retrospective Look at Recently Graduated Registered and Licensed Practical Nurses

Healthcare Workforce Data Center

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Contents

Introduction	4
Demographics of the Sample	4
Demographics: Geographical Distribution of Public High Schools that Graduated RNs and LPNs	5
Education: Career and Technical Education (CTE) Program Enrollment	7
CTE Enrollment by Gender	9
CTE Enrollment by Race.....	9
Education: Public Versus Private College Enrollment	10
Public Versus Private College Enrollment by Gender	10
Public Versus Private College Enrollment by Race	10
Socio-Economic Status: Economically Disadvantaged Status in K-12	11
Disadvantaged Status in Childhood by Gender	11
Disadvantaged Status in Childhood by Race	11
SAT Result	12
SAT Result by Disadvantaged Status, Gender, and Race	12
Socio-economic Status: Income	13
Income by Disadvantaged Status, Gender, and Race	13
Conclusion	13

Introduction

This report examines the differences in the demographic, educational, and socioeconomic background of registered nurses (RNs) and licensed practical nurses (LPNs) in Virginia. The study seeks to understand why some students choose to be a RN over a PN, and vice versa. This study uses the Healthcare Workforce Data Center (HWDC) data in the Virginia Longitudinal Data System (VLDS). For the first time, HWDC survey data for nurses currently licensed in Virginia can be linked to educational data through the VLDS, allowing for a retrospective look at the state’s healthcare workforce. This paper examines RNs and LPNs licensed in Virginia who also attended K-12 or post-secondary institutions in Virginia.

There were 466 LPNs and 3,843 RNs in this study. The licensees completed the Registered Nurse and Licensed Practical Nurse Workforce Surveys administered by the Virginia Department of Health Professions HWDC between 2014 and 2017. The Virginia Department of Education (VDOE) provides the K-12 education data in the VLDS from 2003 forward and the State Council of Higher Education for Virginia (SCHEV) provides the post-secondary data in VLDS; the earliest SCHEV data used was from 2004. Both data sources were linked to HWDC survey data to obtain this study’s sample.

An analysis of the demographic, educational, and socio-economic background of nurses is important for developing programs and policies that continue to support nurses’ career development. It is also important information for career guidance for current high school students. Further, understanding the academic background of Virginia-educated nurses also informs the public of the rigor and academic preparation of their healthcare personnel.

Demographics of the Sample

The vast majority of both the RN and LPN populations in this study is female, over 90% are female. As expected from the data, because the VLDS data only goes back to 2003, the nurses who are in VLDS are younger, more recent graduates of Virginia’s K-12 and post-secondary institutions. In this population, over 98% were under age 30 at the time of their survey. Most would be 30-35 years old today.

Previous results from the Registered Nurse Survey and Licensed Practical Nurse Survey reveal Whites are over-represented among RNs whereas Blacks are overrepresented among LPNs; Hispanics are under represented among both RNs and LPNs. The following table presents the racial breakdown of all RNs and LPNs in the state workforce as obtained from the surveys.

	All ages			Under 40	
	RN	LPN	All	RN	LPN
White	77%	59%	61%	75%	56%
Black	11%	32%	19%	11%	31%
Asian	5%	2%	7%	6%	2%
Other Race	1%	1%	0%	1%	1%
Two or More Races	2%	2%	3%	3%	3%
Hispanic	3%	3%	10%	4%	6%

Source: VA. Healthcare Workforce Data Center

RNs are less racially/ethnically diverse than LPNs. However, the racial distribution of the LPNs in this study is more similar to the overall LPN population in the state and also to the state’s population distribution. In Virginia, Whites constitute 61%, Blacks 19%, Hispanics 10%, and Asians 7% of the population.

Summary Statistics for RNs and LPNs

	RN	LPN
% Female	93	94
% Under age 30	99	99
% White	82	66
% Black	9	24
% Asian	6	2
% Hispanic	3	7
% Other	1	1
% LVN/LPN	0	98
% Hospital RN	4	0
% At least BSN	66	0
Career technical education	25	36
% Economically disadvantaged in K-12	10	25
% Enrollment in Public College	94	91
Mean SAT (Max=1,600)	1,077	957
Median Income	\$45,000	\$35,000

Source: Virginia Longitudinal Data System (VLDS)

RNs are less racially/ethnically diverse than LPNs. However, the racial distribution of the LPNs in this study is more similar to the overall LPN population in the state and also to the state’s population distribution. In Virginia, Whites constitute 61%, Blacks 19%, Hispanics 10%, and Asians 7% of the population.

RNs were most likely to have a baccalaureate degree in nursing (BSN); 66% had a BSN. By contrast, LPNs were most likely to possess a licensed vocational nursing (LVN) or a licensed practical nursing (LPN) certificate or diploma; 98% reported possessing such. LPNs were also more likely to have taken a career and technical education class in high school; 36% were enrolled in a CTE program in high school compared to a quarter of RNs.

The Virginia Department of Education identifies a student as Economically Disadvantaged if, at any point during K-12 education, the student: 1) was eligible for Free/Reduced Meals, or 2) received Temporary Assistance for Needy Families (TANF), or 3) was eligible for Medicaid, or 4) identified as either migrant or experiencing homelessness. As seen in the table, LPNs are more likely to have been economically disadvantaged during their K-12 education; 25% were economically disadvantaged compared to 10% of RNs.

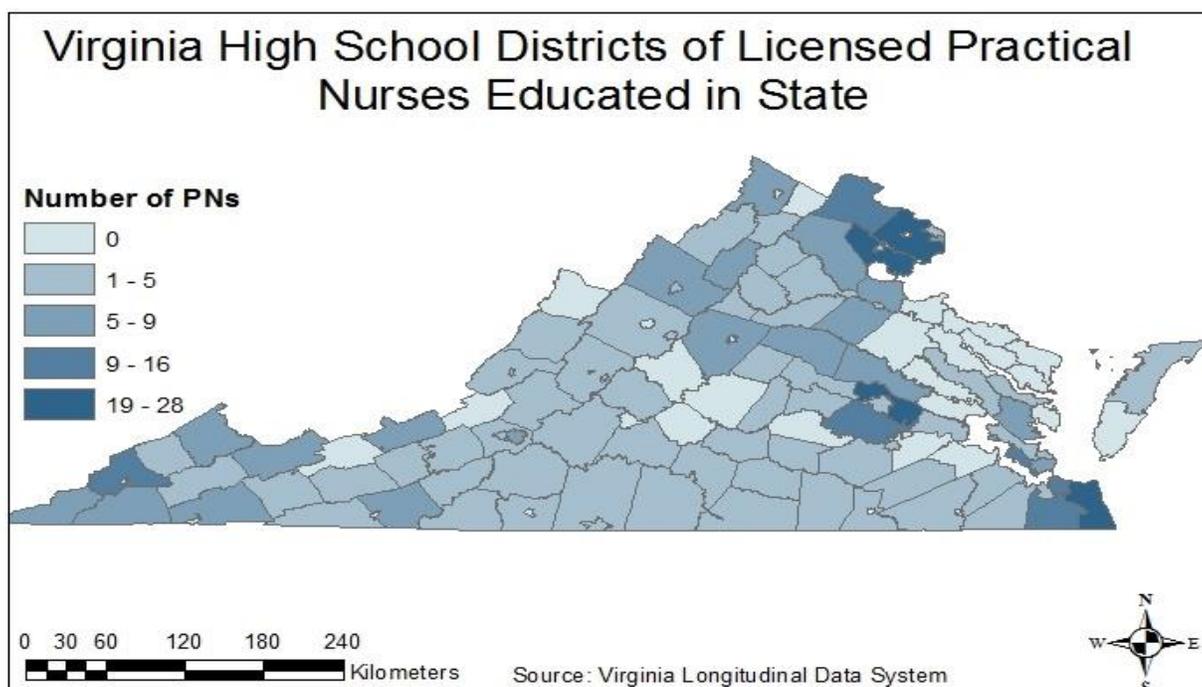
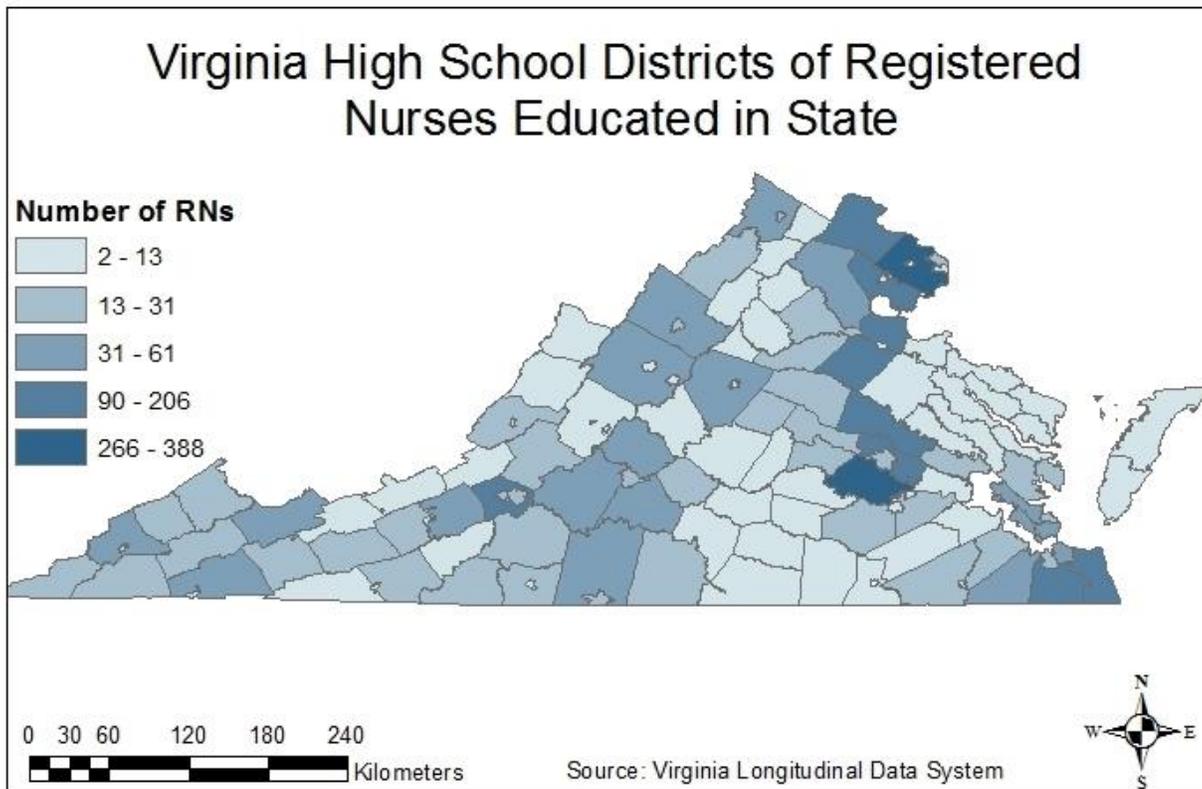
LPNs were more likely to attend private colleges; 8% attended a private college. By contrast, 94% of RNs attended a public college compared to 91% of LPNs. The mean SAT for RNs who took the SAT or ACT (converted to SAT) was 1,077 (out of 1,600) whereas the mean score for LPNs was 957. Similarly, median income was higher for RNs than for LPNs.

Demographics: Geographical Distribution of Public High Schools that Graduated RNs and LPNs

Data from the VDOE in VLDS makes it possible to see the school districts where the RNs and LPNs received their K-12 education. Nearly all Virginia school districts contributed to producing the state’s RN population in

this study. The following map shows the geographical distribution of RNs across the state. The central and northern regions educated most of the RNs in this study. Fairfax County Public Schools educated 388 of the RNs in this study whereas 266 of the RNs graduated from a Chesterfield County Public School.

Unlike RNs, the LPNs in this study come from select counties. Not every county produced LPNs in this study. Further, the counties responsible for producing the most LPNs are different from those who produced the most RNs. Virginia Beach City Public Schools produced 28 LPNs, followed by Henrico County Public Schools which produced 26 LPNs and Prince Williams County Public Schools which produced 20 LPNs. Fairfax County Public Schools produced 19 LPNs in this study and Chesterfield County Public Schools produced only 12 LPNs in this study, following after Chesapeake County Public Schools which produced 16.



Education: Career and Technical Education (CTE) Program Enrollment

Career and technical education programs help students investigate careers and design the courses they take to advance their career goals. These programs provide entry level certification to start high school students in their career field while they pursue additional education in their field. There are several health science CTE programs in Virginia high schools. For example, nursing aide and practical nursing CTE programs prepare high school students to get the certifications needed to work as a nurse aide or LPN immediately upon graduating high school. This section examines how many Virginia students who are RNs and LPNs today were in enrolled in CTE programs and specifically health science CTE programs.

Only 24% and 36% of RNs and LPNs, respectively, were enrolled in a CTE program while in high school. Further, half of the CTE programs that LPNs enrolled in were health science programs whereas only 29% of the CTE programs that RNs enrolled in were health sciences.

CTE Program	LPN	RN
Business(Regular)Occupational	16	124
Nursing Aide*	30	101
Computer Information Systems	14	90
Practical Nursing*	44	67
General Marketing	8	52
Design, Multimedia, & Web Technologies	2	45
Family Focus	13	45
Health Career Cluster	3	41
Accounting	4	39
Emergency Medical Technology*	3	28
Apparel and Accessories Marketing	2	28
Early Childhood Education & Services	3	28
Culinary Arts	2	20
Technical Design and Illustration	1	17
Sports and Recreational Marketing	0	13
Cosmetology	2	11
Medical Assistant*	0	10
Communication and Info Tech	3	10
Agricultural Business	1	9
Family and Human Services	1	8
Leadership and Citizenship Development Program	2	8
Agricultural Production	0	7
Dental Assistant*	0	7
Principles of Technology	0	7
Teacher Cadet Program	0	7
Interior Design	0	6
Teacher Preparation Program	0	6
Horticultural Science	1	5
Pharmacy Technician	3	5
Information Systems	0	4
Programming	0	4
Sports Medicine	0	4
Pre-Engineering (PLTW)	0	4
Drafting	0	4
Work and Family Management	0	4

Source: Virginia Longitudinal Data System (VLDS)

CTE Program	LPN	RN
Hospitality and Recreation Marketing	0	3
Design and Technology	0	3
Production Technology	0	3
Graphic Imaging Technology	1	3
Firefighting	1	3
Criminal Justice	0	3
Education for Employment	0	3
Natural Resources Management	0	2
Computer Network Software Operations	0	2
Veterinary Assistant*	0	2
Computer Systems Technology	0	2
Industrial Cooperative Training (ICT)	3	2
Hospitality Services	0	2
Agricultural Machinery Service	1	1
Turf Grass Management	0	1
Veterinary Science*	0	1
Equine Management*	1	1
Business (Special)	0	1
Medical Systems Administration*	0	1
Database Design and Management	0	1
Home Health Aide*	0	1
Executive Marketing	0	1
Advertising Design	0	1
Telecommunications	0	1
Commercial Photography	0	1
Robotic Workcell Technology	0	1
Television Production	1	1
Computer Networking Hardware Operations	1	1
Automotive Body Technology	0	1
Electricity	0	1
Automotive Body Repair	0	1
Diesel Equipment Technology	0	1
Fashion Design	0	1
Control Technology	1	0
Total	168	922

*Health science CTE programs

CTE Enrollment by Gender

There are clear gender differences in CTE programs enrollment. Male RNs were more likely to be enrolled in CTE programs while in high school compared to female RNs. Twenty-seven percent of male RNs were enrolled in a CTE program compared to 24% of female RNs. A higher proportion of male RNs enrolled in the CTE program were enrolled in health science CTEs; 35% were in health science CTE programs compared to 29% of female RNs who were in CTE programs.

There were fewer male LPNs and they were less likely than female LPNs to be enrolled in a CTE program; 24% of male LPNs were enrolled in a CTE program compared to 37% of female LPNs. Further, only 43% of males enrolled in a CTE program were enrolled in health sciences CTE programs compared to 50% of female LPNs enrolled in a CTE program.

	RN					LPN				
	Health Science CTE	All CTEs	% Health Science CTE	Total Students	% Took CTE	Health Science CTE	All CTEs	% Health Science CTE	Total Students	% Took CTE
Female	222	757	29%	3,111	24%	81	161	50%	437	37%
Male	34	96	35%	352	27%	3	7	43%	29	24%
Total	256	853	30%	3,463	25%	84	168	50%	466	36%

Source: Virginia Longitudinal Data System (VLDS)

CTE Enrollment by Race

There were also racial differences in CTE program enrollment for RNs and LPNs. Black RNs were most likely to have enrolled in a CTE program in high school whereas Asians and RNs of Other races were least likely. Twenty-seven percent of Black RNs compared to 18% of Asian and Other race RNs were enrolled in CTE programs. Hispanic RNs, closely followed by Black RNs, who were enrolled in a CTE program were most likely to be enrolled in a health science CTE program. Asian RNs who were enrolled in a CTE program were least likely to be enrolled in a health science CTE program.

	RN					LPN				
	Health Science CTE	All CTEs	% Health Science CTE	Total Students	% Took CTE	Health Science CTE	All CTEs	% Health Science CTE	Total Students	% Took CTE
White	222	757	29%	3,111	24%	65	127	51%	306	42%
Black	34	96	35%	352	27%	13	28	46%	112	25%
Asian	4	40	10%	227	18%	1	2	50%	11	18%
Hispanic	8	22	36%	107	21%	4	8	50%	31	26%
Other	1	7	14%	39	18%	1	3	33%	4	75%
Total	269	922	29%	3,836	24%	84	168	50%	464	36%

Source: Virginia Longitudinal Data System (VLDS)

For LPNs, the racial breakdown is slightly different. LPNs of Other races were most likely to be enrolled in a CTE program; 75% of them were. They were followed by Whites with a 42% CTE program enrollment and then Blacks with a 25% CTE program enrollment. Asian LPNs were least likely to have enrolled in a CTE program. Of those who were enrolled in a CTE program, White LPNs were most likely to be enrolled in a health science program; they were closely followed by Asian and Hispanic LPNs.

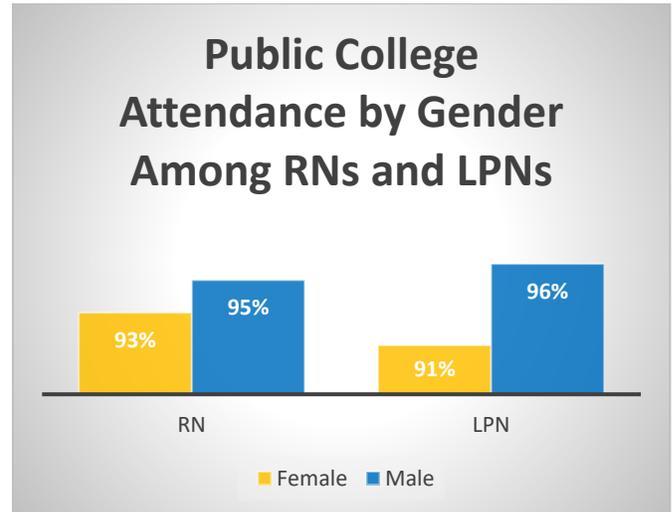
Education: Public Versus Private College Enrollment

Public Versus Private College Enrollment by Gender

As mentioned earlier, 94% of RNs and 91% of LPNs attended a public college in Virginia. It is important to examine whether there are gender differences in enrollment in public versus private college for RNs and LPNs. For both females and males, the overwhelming majority attended public college. However, a higher proportion of female RNs attended private colleges compared to males. The pattern was similar for LPNs too. Although a majority of LPNs attended public college, 9% of female LPNs attended private colleges compared to 4% of male LPNs.

		RN		LPN	
		#	%	#	%
Female	Private	225	7	32	9
	Public	3,213	93	332	91
Male	Private	12	5	1	4
	Public	225	95	23	96

Source: Virginia Longitudinal Data System (VLDS)



Source: Virginia Longitudinal Data System (VLDS)

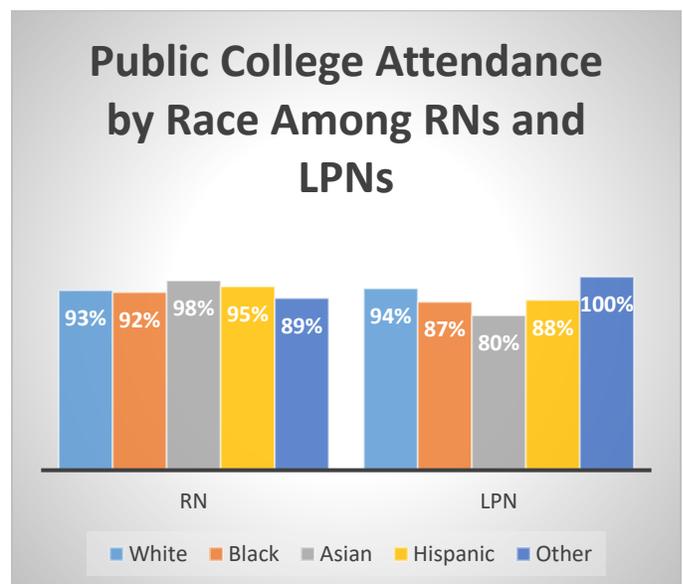
Public Versus Private College Enrollment by Race

For all races, both RNs and LPNs were more likely to attend public college. RNs of Other races were most likely to attend private college; 11% of RNs of Other races attended a private college. Next were Black RNs, among whom 8% attended private college. Asian RNs were least likely to attend private college; only 2% of them did.

By contrast, Asian LPNs were most likely to attend private college compared to LPNs of other racial groups; 20% of Asian LPNs attended a private college. Black and Hispanic LPNs were also highly likely to attend private college compared to Other races; 13% and 12% of Black and Hispanic LPNs attended private college.

		RN		LPN	
		#	%	#	%
White	Private	199	7	16	6
	Public	2,787	93	241	94
Black	Private	26	8	12	13
	Public	309	92	80	87
Asian	Private	4	2	2	20
	Public	213	98	8	80
Hispanic	Private	5	5	3	12
	Public	89	95	22	88
Other	Private	2	11	0	0
	Public	17	89	2	100

Source: Virginia Longitudinal Data System (VLDS)



Source: Virginia Longitudinal Data System (VLDS)

Socio-Economic Status: Economically Disadvantaged Status in K-12

Disadvantaged Status in Childhood by Gender

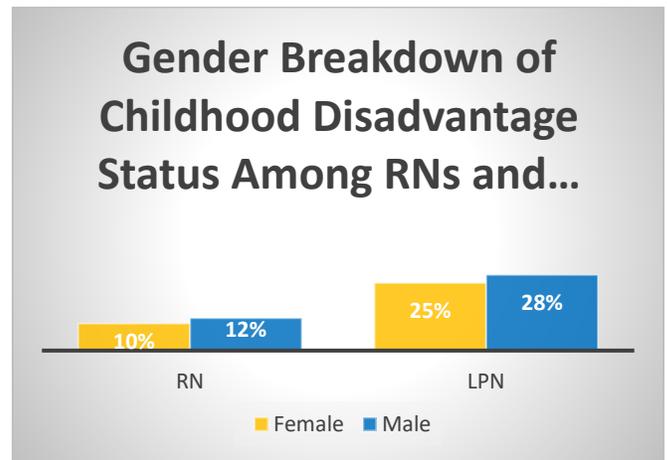
As seen previously, LPNs were more likely to have been economically disadvantaged at some point in time during their K-12 education compared to RNs. This section examines gender differences in economic disadvantage during K-12 education for both RNs and LPNs.

Males were more likely to have been economically disadvantaged during K-12 education. Among RNs, 12% of males were economically disadvantaged during their K-12 education compared to 10% of females. Among LPNs, 28% of males were economically disadvantaged during their K-12 education compared to 25% of females.

Disadvantaged Status of RNs and LPNs by Gender

	Disadvantaged	RN		LPN	
		#	%	#	%
Female	Yes	346	10%	109	25%
	No	3,237	90%	328	75%
Male	Yes	31	12%	8	28%
	No	229	88%	21	72%

Source: Virginia Longitudinal Data System (VLDS)



Source: Virginia Longitudinal Data System (VLDS)

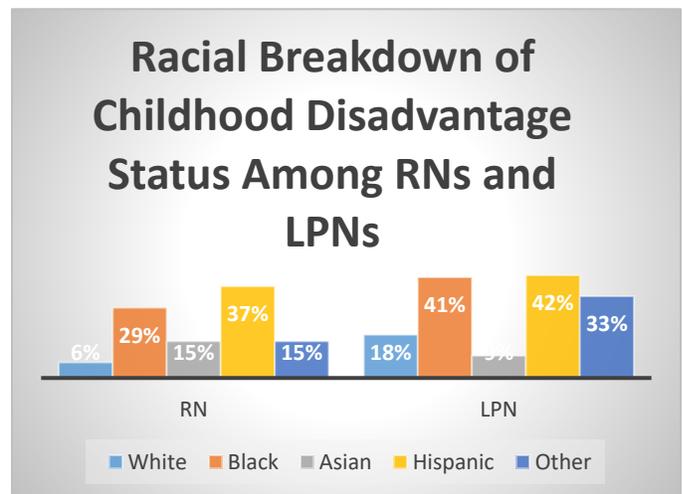
Disadvantaged Status in Childhood by Race

Among RNs, Hispanics had the highest proportion that was economically disadvantaged during K-12; 37% of Hispanic RNs were economically disadvantaged during K-12. They were followed by Blacks; 29% of Black RNs were economically disadvantaged during K-12. The two racial groups also had the highest and second highest percentage of LPNs who were economically disadvantaged during K-12. More than 40% of Hispanic and Black LPNs were economically disadvantaged during K-12 compared to 15%, 15%, and 6% of Asian, Other, and White LPNs, respectively.

Disadvantaged Status of RNs and LPNs by Race/Ethnicity

		RN		LPN	
		#	%	#	%
White	Yes	197	6	54	18
	No	2,914	94	252	82
Black	Yes	101	29	46	41
	No	251	71	66	59
Asian	Yes	34	15	1	9
	No	193	85	10	91
Hispanic	Yes	40	37	13	42
	No	67	63	18	58
Other	Yes	3	15	1	33
	No	17	85	2	67

Source: Virginia Longitudinal Data System (VLDS)



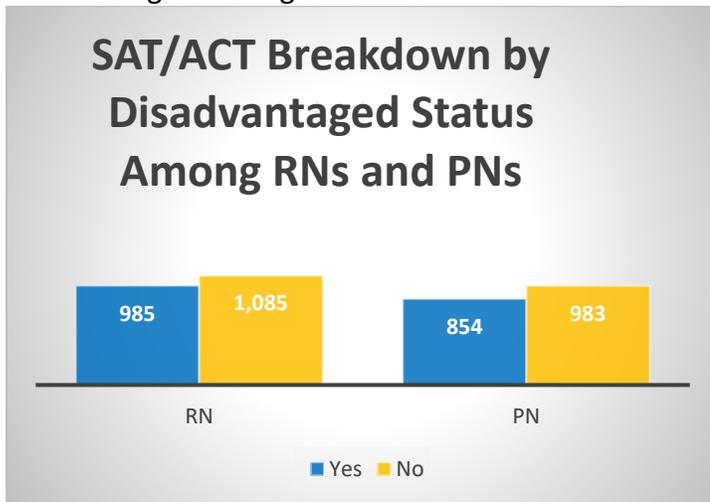
Source: Virginia Longitudinal Data System (VLDS)

SAT Result

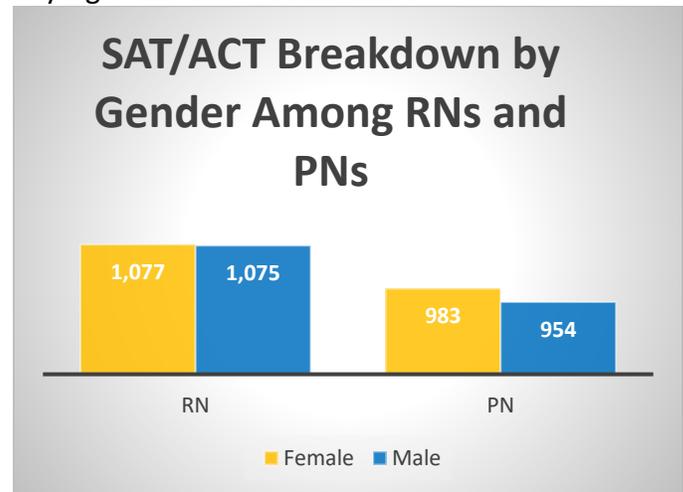
SAT Result by Disadvantaged Status, Gender, and Race

As mentioned earlier, RNs reported a higher mean SAT score than LPNs. A t-test analysis reveals that RNs' mean score is significantly higher than that of LPNs. However, not all RNs or LPNs took the SAT or ACT; 51% of RNs took one or both exams whereas only 10% of LPNs did. This finding is not surprising as post-secondary LPN programs are less likely to require the examinations compared to RN institutions, particularly for RNs pursuing a BSN.

Examining SAT results by disadvantaged status during K-12 revealed some difference. There was about a 100 point difference in mean score for both RNs and LPNs by disadvantaged status, with those economically disadvantaged scoring lower. The differences were statistically significant for both RNs and LPNs.

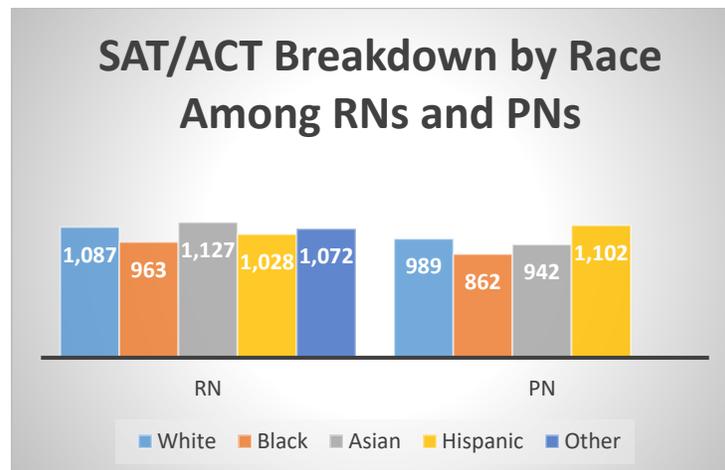


Source: Virginia Longitudinal Data System (VLDS)



Source: Virginia Longitudinal Data System (VLDS)

Males also scored lower than females among both RNs and LPNs. Among RNs, males had a mean score that was just 2 points lower than females but among LPNs, males' mean score was 29 points lower than females'. Among the different racial groups, Blacks reported the lowest SAT/ACT mean score among RNs, followed by Hispanics. However, Hispanics reported the highest SAT/ACT mean score among LPNs; Blacks still reported the lowest score. The mean score for Hispanic LPNs was actually higher than that of Hispanic RNs, suggesting that academic performance, at least as measured by SAT/ACT, may not be the main driving factor why Hispanics choose a LPN over a RN program.



Source: Virginia Longitudinal Data System (VLDS)

Socio-economic Status: Income

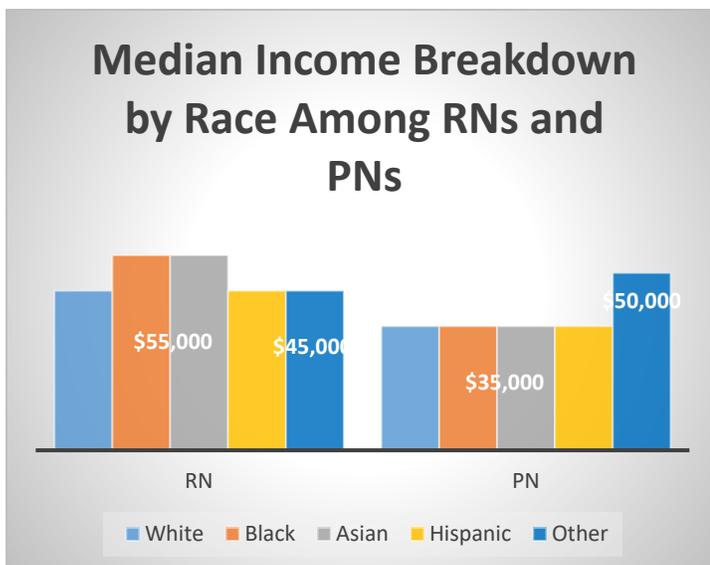
Income by Disadvantaged Status, Gender, and Race

The median income for RNs was between \$40,000 and \$50,000 whereas the median income for LPNs was between \$30,000 and \$40,000. Among RNs, 31% received between \$40,000 and \$50,000 whereas 27% reported less than \$40,000; a quarter earned between \$50,000 and \$60,000 whereas 16% reported above \$60,000. Forty-five percent of LPNs reported between \$30,000 and \$40,000 as income. About 37% earned less than \$30,000; 14% reported between \$40,000 and \$50,000 whereas 3.2% received more than \$50,000 in income.

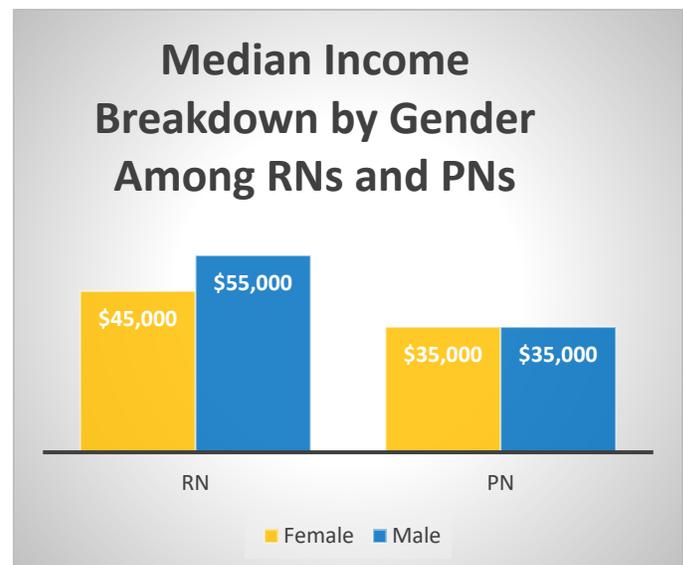
Examining income by disadvantaged status during K-12 revealed no difference; RNs regardless of disadvantaged status reported \$45,000 median income and LPN, regardless of disadvantaged status, reported \$35,000 median income. The distribution of income was more right-tailed for both RNs and LPNs; there were people reporting income above the median among RNs and LPNs who were not economically disadvantaged during K-12. In many cases, the highest income reported by RNs and LPNs who were not economically disadvantaged during K-12 were higher than those reported by those who were economically disadvantaged during K-12.

Male RNs reported median income between \$50,000 and \$60,000 whereas female RNs reported median income between \$40,000 and \$50,000. There was no gender difference in median income of LPNs.

There were some differences in the median income of RNs and LPNs by race/ethnicity. Black and Asian RNs reported a median income between \$50,000 and \$60,000 whereas all other RNs reported median income between \$40,000 and \$50,000. Among LPNs, all racial/ethnic groups reported median income of \$35,000 apart from LPNs of Other race.



Source: Virginia Longitudinal Data System (VLDS)



Source: Virginia Longitudinal Data System (VLDS)

Conclusion

This study examines retrospective data of current RNs and LPNs to better understand what differentiates the two nursing groups. In terms of age and gender, both appear similar in this study but they appeared to differ in racial composition, and in academic and socioeconomic outcomes. With the higher prevalence of CTE program enrollment among LPNs and also higher mean SAT among Hispanic LPNs compared to Hispanic RNs, it appears

that LPNs may have committed to being a LPN earlier due to the structural obstacles (such as economic disadvantage) they see in their way. Unfortunately, economic disadvantage status did not predict the likelihood of being a RN rather than a LPN in this study. Only the SAT/ACT score was significant in predicting the likelihood of being a RN rather than a LPN in a logistic regression which included gender, race, age in last year of high school, and economic disadvantage status. This analyses will be examined again using recently added 2018 and 2019 data that will soon be available in VLDS.