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Stripes and Stethoscopes: A Comparative Analysis of Nurse Corps Promotion Rates Across Army, Navy, and Air Force

March 2026

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Prepared for the Naval Postgraduate School, Monterey, CA 93943.

ACQUISITION RESEARCH PROGRAM
DEPARTMENT OF ACQUISITION, FINANCE AND MANPPOWER
NAVAL POSTGRADUATE SCHOOL

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ABSTRACT

This thesis provides the first systematic cross-service comparison of promotion outcomes among U.S. Army, Navy, and Air Force Nurse Corps officers. Although the Defense Officer Personnel Management Act (DOPMA) establishes a common statutory framework for advancement, each service retains discretion over promotion timing and vacancy management, potentially producing divergent career trajectories for similarly qualified nurses. Using longitudinal administrative data from the Defense Medical Human Resources System Intranet (DMHRSi) spanning fiscal years 2016–2024, I analyze promotion rates, time-in-grade, and promotion likelihood at the O-3 to O-4, O-4 to O-5, and O-5 to O-6 gates using cohort-based descriptive analysis, logistic regression, Kaplan–Meier survival estimation, and Cox proportional hazards models. I found that promotion timing differs across services at each gate: the Air Force leads at O-3 to O-4, while the Navy leads at both O-4 to O-5 and O-5 to O-6. Service differences narrow at senior ranks. Medical-Surgical nurses have the lowest promotion rates across all services, yet subspecialty differences alone do not explain service-wide disparities, suggesting institutional policy drives promotion timing more than workforce composition. Findings inform workforce planning and equity discussions in joint medical environments.

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LIST OF ACRONYMS AND ABBREVIATIONS

AE	Aeromedical Evacuation
AECP	Army Enlisted Commissioning Program
AES	Aeromedical Evacuation Squadron
AFNC	Air Force Nurse Corps
AFSC	Air Force Specialty Code
AMEDD	Army Medical Department
ANC	Army Nurse Corps
ANCA	Army Nurse Corps Association
ANOVA	Analysis of Variance
AOC	Area of Concentration
BSN	Bachelor of Science in Nursing
BUMED	Bureau of Medicine and Surgery
CCATT	Critical Care Air Transport Team
CONUS	Continental United States
CRNA	Certified Registered Nurse Anesthetist
CSH	Combat Support Hospital
CVN	Aircraft Carrier, Nuclear-Powered
DCC	Direct Commission Course
DEERS	Defense Enrollment Eligibility Reporting System
DHA	Defense Health Agency
DMHRSi	Defense Medical Human Resources System Intranet
DOPMA	Defense Officer Personnel Management Act
DUINS	Duty Under Instruction
EMF	Expeditionary Medical Facility
FMF	Fleet Marine Force
FY	Fiscal Year
HR	Hazard Ratio
HPSP	Health Professions Scholarship Program
ICU	Intensive Care Unit
IRR	Individual Ready Reserve

JBSN	Joint Base San Antonio News
LHA	Amphibious Assault Ship, General Purpose
LHD	Amphibious Assault Ship, Multi-Purpose
LPD	Amphibious Transport Dock
LPN	Licensed Practical Nurse
LR	Likelihood Ratio
MANMED	Manual of the Medical Department
MDG	Medical Group
MECP	Medical Enlisted Commissioning Program
MEDCOM	Army Medical Command
MHS	Military Health System
MSC	Medical Service Corps
MTF	Medical Treatment Facility
NCLEX	National Council Licensure Examination
NEC	Navy Enlisted Classification
NHHC	Naval History and Heritage Command
NNC	Navy Nurse Corps
NP	Nurse Practitioner
NPS	Naval Postgraduate School
NROTC	Naval Reserve Officers' Training Corps
OB/GYN	Obstetrics and Gynecology
OCONUS	Outside the Continental United States
OLS	Ordinary Least Squares
OR	Operating Room
RN	Registered Nurse
ROTC	Reserve Officers' Training Corps
SD	Standard Deviation
SSC	Subspecialty Code
SWMI	Naval Surface Warfare Medical Institute
T-AH	Hospital Ship
TIG	Time in Grade
USNS	United States Naval Ship

I. INTRODUCTION

The United States military depends on a healthy and ready force to accomplish its national security mission. Military nurses are essential to sustaining that readiness, providing clinical care in hospitals, aboard ships at sea, on aeromedical evacuation flights, and in forward-deployed combat environments. Three of the six U.S. military branches, the Army, Navy, and Air Force, maintain Nurse Corps organizations, collectively employing over 12,000 active-duty, guard, and reserve nurses who serve across a wide range of clinical and operational settings. Despite performing fundamentally similar roles, nurses in each service operate under distinct organizational structures, career development roadmaps, and promotion timelines that may produce meaningfully different career outcomes.

The promotion of military officers is governed by the Defense Officer Personnel Management Act (DOPMA) of 1980, which establishes minimum time-in-grade requirements, competitive promotion zones, and the principle of "up or out," whereby officers who fail to promote after two considerations are generally separated from the service. While DOPMA provides a common statutory framework for all branches, it affords each service secretary considerable flexibility in setting promotion zone timing, selection rates, and vacancy requirements. This flexibility means that two nurses of equal ability, performing equivalent clinical roles in the same joint medical treatment facility, could experience substantially different promotion timelines and career trajectories depending solely on which service uniform they wear.

Promotion outcomes matter for reasons that extend beyond individual career satisfaction. Zangaro (2013) identified promotion opportunity as the primary driver of job satisfaction among military nurses, and both Wrolstad (2025) and Zangaro (2013) found that some Air Force medical personnel have higher retention rates than their Army and Navy counterparts. If cross-service differences in promotion rates or timing are substantial, they may contribute to differential retention and attrition across the Nurse Corps, ultimately affecting the military's ability to maintain adequate nursing strength. As the military health system continues to consolidate into joint medical treatment facilities, where nurses from

all three branches serve side by side, any disparities in promotion patterns become increasingly visible to the workforce and increasingly relevant to leaders responsible for morale and retention.

A. PROBLEM STATEMENT

Despite the importance of promotion to nurse retention and career satisfaction, the existing literature on military nurse promotions is limited in scope. The most comprehensive studies—Simpson (1992), Ray (2012), Keme (2019), and Winston (2024)—focus exclusively on the Navy Medical Service Corps and Navy Nurse Corps. These studies have identified important predictors of promotion, including advanced degrees, clinical subspecialty, deployment experience, and adherence to career roadmaps. However, no study has systematically compared promotion outcomes for nurses across all three military services. This gap is significant because it leaves military nursing leaders, personnel planners, and policymakers without empirical evidence on whether the three services provide equitable career progression opportunities for their nurses.

The absence of cross-service research means that several important questions remain unanswered. It is unknown whether the subspecialty effects identified in Navy-specific studies extend to the Army and Air Force. It is unclear whether the three services promote nurses at similar rates or on similar timelines, and if differences exist, whether they are driven by institutional policies, workforce composition, or individual-level factors. Without answers to these questions, leaders cannot determine whether the DOPMA flexibility exercised by each service has produced equitable outcomes or whether policy adjustments are warranted.

B. PURPOSE OF THE STUDY

The purpose of this thesis is to provide the first systematic comparison of promotion patterns among Nurse Corps officers across the Army, Navy, and Air Force. Using administrative personnel data from the Defense Medical Human Resources System Intranet (DMHRSi) combined with Defense Enrollment Eligibility Reporting System (DEERS) spanning fiscal years 2016 through 2024, this study analyzes promotion rates, promotion timing, subspecialty effects, and demographic factors at three competitive promotion gates:

O-3 to O-4, O-4 to O-5, and O-5 to O-6. The study employs multiple analytical methods, descriptive cross-tabulations, logistic regression, Kaplan-Meier survival analysis, and Cox proportional hazards models, to characterize cross-service differences and identify the factors that predict promotion outcomes.

C. RESEARCH QUESTIONS

This thesis is guided by the following research questions:

1. How do promotion rates to O-4, O-5, and O-6 differ across the Army, Navy, and Air Force Nurse Corps?
2. How does promotion timing, measured as time-in-grade, vary across the three services at each promotion gate?
3. Does promotion likelihood differ by nursing subspecialty, and do such differences differ across services?

D. SCOPE AND METHODOLOGY

The study uses data from Defense Military Human Resource System-internet (DMHRSi), a web-based human resources management system that integrates personnel data across the Military Health System, combined with information from Defense Enrollment Eligibility Reporting System (DEERS). The dataset contains monthly observations of military and civilian medical personnel worldwide from January 2016 through September 2025. After restricting the sample to active-duty registered nurses holding ranks O-2 through O-6, I further limited the sample to officers whose first observed rank transition occurred between September 2016 and October 2018, corresponding to the Fiscal Year (FY) 2017 and FY 2018 promotion cohorts. Additionally, I excluded FY 2025 to ensure complete capture of Navy promotions, the full analytical sample consists of 245,276 person-month observations representing 2,973 unique officers across the Army, Navy, and Air Force. A further restricted subsample of 1,150 officers observed holding three or more ranks during the study period is used for time-in-grade analysis.

The analytical approach progresses from descriptive to inferential methods. Descriptive cross-tabulations establish promotion rates by service branch and subspecialty

at each promotion gate. Logistic regression models estimate the independent effect of subspecialty on promotion likelihood within each service. Kaplan-Meier survival curves compare the timing of promotions across services while accounting for right-censored observations. Cox proportional hazards models test whether service-level timing differences persist after controlling for entry cohort, gender, and race. This multi-method approach provides a comprehensive picture of cross-service promotion patterns from multiple analytical perspectives.

The scope of this study is limited to competitive field-grade promotions governed by DOPMA. Promotions to O-1 and O-2 are excluded because they occur automatically upon satisfactory performance and completion of required training. Promotions above O-6 are excluded because they require presidential appointment and Senate confirmation, following a distinct statutory process. The dataset does not include educational credentials, specific duty station assignments, deployment history, performance evaluation scores, or completion of professional military education. These limitations are discussed in detail in the discussion chapter.

E. SIGNIFICANCE OF THE STUDY

This study is significant for several reasons. First, it fills a gap in the military personnel research literature by providing the first cross-service comparison of nurse promotion outcomes. Prior research has focused exclusively on the Navy, and while those studies have been valuable in identifying promotion determinants, they cannot speak to whether the same patterns exist in the Army and Air Force. By extending the analysis to all three services, this study establishes a baseline for understanding how institutional context shapes career progression for military nurses.

Second, the findings are practically relevant to military nursing leaders responsible for career counseling and workforce management. If promotion rates and timing differ substantially across services, leaders in each branch need to understand those differences to set realistic expectations for their nurses and to advocate for policy adjustments where appropriate. This is especially important in joint medical treatment facilities, where nurses from different services compare career experiences directly.

Third, the study informs policymakers considering whether the flexibility afforded by DOPMA has produced equitable outcomes. If equivalent nurses in different services face meaningfully different promotion prospects, this raises questions about whether greater standardization of promotion policies across the military medical community is warranted. The quantification of cross-service differences provides the empirical evidence needed to have that conversation.

The rest of this thesis is organized as follows. Chapter II provides background on the military nurse corps, describing the organizational structures, promotion systems, and career frameworks of the Army, Navy, and Air Force Nurse Corps. Chapter II further reviews the existing literature on military officer promotion, focusing on three themes: determinants of promotion outcomes, service-specific differences in career progression, and methodological approaches used in prior studies. Chapter III describes the data and methodology, detailing the DMHRSi longitudinal dataset, the analytic sample of FY2017–2018 cohorts, and the statistical methods employed, including survival analysis, Cox proportional hazards models, and logistic regression. Chapter IV presents the results, reporting promotion rates, time-in-grade findings, and the effects of service branch, subspecialty, and demographic characteristics on promotion outcomes. Chapter V discusses the findings in the context of prior research and their implications for military nurse workforce policy. Chapter V also provides a conclusion with a summary of key findings, limitations of the study, and recommendations for future research.

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II. BACKGROUND AND LITERATURE REVIEW

A. OVERVIEW OF THE U.S. MILITARY NURSE CORPS

Three of the six U.S. military branches maintain Nurse Corps organizations—the Army, Navy, and Air Force—each with distinct organizational structures and career pathways shaped by their service-specific missions and operational requirements. These three Nurse Corps have varying histories. Congress established the United States Army Nurse Corps in 1901 (Army Nurse Corps Association [ANCA], 2025). Between 1901 and 1911, Army nurses only served in three locations: New Mexico, California, and the Philippines. When World War I started, the Army Nurse Corps consisted of 403 active-duty nurses, and they were pivotal in providing care to wounded service members through evacuations and mobile surgical hospitals both on the ground and at sea (ANCA, 2025). The United States Navy Nurse Corps was established in 1908, by President Theodore Roosevelt through the Naval Appropriations Bill (Naval History and Heritage Command [NHHC], 2025). Originally consisting of twenty nurses who were called the "Sacred Twenty" (NHHC, 2025), nurses in the Navy were sent to many hospitals within the United States and overseas. They were also sent to other countries to establish nursing schools, such as in the case of the nursing school in Guam (NHHC, 2025). Finally, in 1949, the newly independent Air Force established its Nurse Corps (MHS, 2025). These nurses were originally part of the Army Nurse Corps but were transitioned into the Air Force Nurse Corps when the Air Force was established (Vairo, 1998).

1. Army Nurse Corps

The Army Nurse Corps maintains the largest military nursing force, structured to support both fixed medical facilities and deployable combat operations. The ANC is "the oldest military nursing corps in the United States and the first women's component in the armed forces" (Joint Base San Antonio News [JBSN], 2016). Its mission is to "provide responsive, innovative and evidence-based nursing care integrated within the Army Medicine Team to enhance readiness, preserve life and function and promote health and wellness for all entrusted to their care" (U.S. Army Nurse Corps [ANC], n.d.). As a whole,

the ANC is comprised of 3096 active-duty nurses, 633 National Guard nurses, and 2705 Reserve nurses, for a total force of 6434 nurses (L. Magyar, personal communication, February 2, 2026). The ANC is led by the Chief of the Army Nurse Corps, typically a Brigadier General, who advises the Surgeon General of the Army within the Army Medical Command (MEDCOM) on all matters related to nursing (ANC, n.d.). Army nurses are frequently assigned to healthcare facilities like hospitals and clinics that are referred to as Medical Treatment Facility (MTF), Army Field Hospitals or Combat Support Hospitals (CSH), and other medical department activities, both in the Continental United States (CONUS) and Outside the Continental United States (OCONUS).

The ANC offers three routes for someone to become a nurse corps officer in the Army (Army ROTC Nursing, 2026). The first route is through direct commission, where an individual has received a Bachelor of Science degree in Nursing (BSN), passed the National Council Licensure Examination (NCLEX) for nursing, and completed the Army Medical Department (AMEDD) Direct Commission Course (DCC). The second route is to become a nurse is through an Army Reserve Officers' Training Corps (ROTC) Nursing program. An Army ROTC Nursing program is where a nursing student participates in ROTC while earning their BSN. The third route is to become an Army nurse is through Army Enlisted Commissioning Program (AECP), which allows active-duty enlisted Soldiers to complete their BSN, and commission as an officer (Army ROTC Nursing, 2026). All of these entrance pathways require the nurse to be a registered nurse (RN). A registered nurse with only a BSN is commissioned as a Second Lieutenant (O-1); and they can rise to the rank of Major General (O-8) (Army ROTC Nursing, 2026). Nurses in the Army are categorized by specialties, such as Critical Care Nurse, Emergency Nurse, Psychiatric or Mental Health Nurse, Nurse Practitioner, and Nurse Anesthetist, among others. Each category of nursing will determine the career path and deployment cycle these nurses will undergo during their time in the Army (Army ROTC Nursing, 2026). It is important to note that the Army is the only military branch that uses Licensed Practical Nurses (LPNs); however, these nurses are not commissioned officers and therefore are not part of the Army Nurse Corps (L. Magyar, personal communication, February 2, 2026).

2. Navy Nurse Corps

The Navy Nurse Corps (NNC) distinguishes itself through its unique maritime mission, operating in both land-based medical facilities and at sea aboard ships and with Marine Corps units. The NNC is considered a "Staff Corps" within the Navy and is a part of the Navy Medicine enterprise headquartered at the Bureau of Medicine and Surgery (BUMED) in Falls Church, Virginia (Bureau of Medicine and Surgery [BUMED], n.d.). The primary mission of the NNC is three-fold. First, it provides "centralized, coordinated policy development and guidance for professional nursing matters in operational and conventional settings" (Navy Medicine, 2026). Second, it develops, implements, and maintains "Nurse Corps programs which support and sustain overall Navy Medicine mission objectives and policies established by the Chief of Naval Operations and Chief, Bureau of Medicine and Surgery (BUMED)" (Navy Medicine, 2026). Finally, it provides "professional nursing care to promote, protect, and restore the health of all entrusted to our care anytime, anywhere" (Bureau of Medicine and Surgery [BUMED], United States Navy, 2009, pp. 8–3). The NNC is unique in that it not only services in land environments within the Continental United States and outside the Continental United States, but operates in maritime environments as well, lending to the idea in the mission statement of "anytime, anywhere." As of December 2025, the NNC was composed of 2,690 active-duty nurses, and 1,235 reservists (BUMED, 2026). Unlike the Army, the Navy does not maintain a National Guard force.

Similar to the Army, the NNC has multiple commissioning sources for nurses. The NNC, like the ANC, offers a direct commission for registered nurses who already hold a BSN and are licensed (Ray, 2012). Active-duty enlisted Sailors and Marines have the option to apply for the Medical Enlisted Commissioning Program (MECP) (Navy Medicine, 2026a). Upon selection, the Sailor or Marine will attend nursing school full-time, while receiving full pay and benefits, to earn a BSN (Navy Medicine, 2026a). Once completed, they will be commissioned as Nurse Corps Officer (Navy Medicine, 2026a). The NNC also has a Navy ROTC Nurse option for nursing students at universities while the student earns the BSN as they complete weekly Navy-related responsibilities such as drills, classes and summer training sessions (Ray, 2012). The NNC also has the Nurse

Candidate Program which allows nursing students to commit to serving as a nurse in the Navy, for up to five years, after earning their BSN while receiving a monthly stipend (Navy Medicine, 2026b). During this time, the student is enlisted at the rank of E-5 in the Individual Ready Reserve (IRR) and paid a monthly stipend. Unlike NROTC, the candidate does not participate in any Navy responsibilities during their schooling (Navy Medicine, 2026b).

Navy nurses follow the same officer rank structure as the Army, with most new nurses commissioned as Ensign (O-1) and able to promote up to Rear Admiral Upper Half (O-8). Along with the Army, Navy nurses fulfill assignments at Medical Treatment Facilities (MTF) or hospitals (Navy Medicine, 2026c), Expeditionary Medical Facilities (EMF) field hospitals (Kennon, 2021), and alongside Marine Corps Units providing medical support for the Fleet Marine Force (FMF) (M. O'Connor, personal communication, August 26, 2025), among other clinics and medical departments. Navy nurses are assigned to Aircraft carriers (CVN) providing nursing care to the ship's crew and the integrated air wing, along with any personnel from nearby ships who need a higher level of care than can be provided on their own ship (R. Murphree, personal communication, August 9, 2025). Nurses can be assigned to serve on the Hospital Ships (T-AH) USNS Mercy and USNS Comfort. These hospital ships provide medical facilities afloat for the military in combat situations or for humanitarian missions (Military Sealift Command [MSC], 2026). Fleet Surgical Teams, staffed with Navy nurses, are designed to provide surgical support and medical care on amphibious assault ships (LHAs/LHDs) and amphibious transport docks (LPDs) during combat and humanitarian missions, as well (Naval Surface Warfare Medical Institute [SWMI], 2024).

Much like the Army, the Navy has a wide range of specialties nurses can pursue, such as Medical-Surgical, Nurse Education, Nurse Practitioner, and health care business analytics, just to name a few (Navy Medicine, 2026c). Although most nurses remain in one or two specialties for their career, it is possible for a nurse to work in multiple specialties during their tenure in the Navy. Regardless of a nurse's specialty, Navy nurses are tasked to train hospital corpsmen, the enlisted medical corps of the Navy. Navy nurses are responsible for ensuring hospital corpsmen have the "basic healthcare skills" before they

are tasked to a ship or with the Marine Corps to provide the daily healthcare needs of the crew on their own (Navy Medicine, 2026c).

3. Air Force Nurse Corps

The Air Force Nurse Corps, the most recently established service, emphasizes strategic medical support with specialization in aeromedical evacuation and advanced clinical practice. The mission statement AFNC is "Nursing Excellence, Anytime...Anywhere" (Air Force Medical Service, 2026). This mission is reflective of the focus of the Air Force which are Aeromedical Evacuations (AE) transporting wounded personnel by aircraft and their Critical Care Air Transport Teams (CCATT) providing critical care level healthcare at 30,000 feet in the air. The AFNC is led by the Chief of the Air Force Nurse Corps, a Brigadier General (O-7), who leads 3244 active-duty nurses. Nurse Corps officers are typically assigned to "Medical Wings, Medical Groups (MDG), a component of a Medical Wing, and Aeromedical Evacuation Squadrons (AES), operational units for flight missions" (Air Force Medical Service, 2026). They can provide care in hospital environments, field tents, and as mentioned, on aircraft with mobile intensive care units. These mobile intensive care units are staffed by nurses who specialize in flight nursing, having training in not only critical care, but also aviation medicine. The flight nurse specialty is the only specialty unique to the Air Force. The other specialties within the AFNC are like both the Army and the Navy with clinical nurses, advanced practice nurses and nurse administrators (Air Force Medical Service, 2026).

Comparable to the other services, the Air Force Nurse Corps (AFNC) allows direct commissioning of registered nurses and provides a pathway for enlisted personnel to attend nursing school full time and commission as officers upon graduation (U.S. Air Force, 2026). The Air Force also offers the Health Professions Scholarship Program (HPSP), similar to the Navy's Nurse Candidate Program (Medicine + The Military, 2026). Unlike the Navy program, HPSP students are commissioned into the Individual Ready Reserve while in school, whereas Navy students remain enlisted until graduation (Medicine + The Military, 2026). After commissioning, Air Force nurses begin as Second Lieutenants (O-1) and may be promoted to Major General (O-8).

Table 1. Comparison of Organizational Characteristics Across the Three Military Nurse Corps

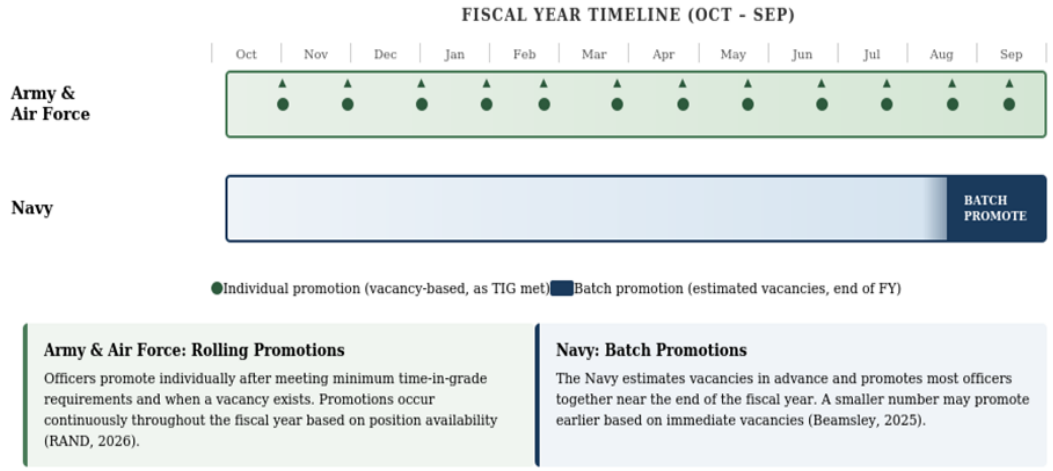
Category	Army Nurse Corps	Navy Nurse Corps	Air Force Nurse Corps
Year Established	1901	1908	1949
Active-Duty Strength	3,096	2,690	3,244
Total Force (incl. Reserve/ Guard)	6,434	3,925	3,244
Corps Chief Rank	Brigadier General (O-7)	Rear Admiral Lower Half (O-7)	Brigadier General (O-7)
Entry Rank	Second Lieutenant (O-1)	Ensign (O-1)	Second Lieutenant (O-1)
Maximum Rank	Major General (O-8)	Rear Admiral Upper Half (O-8)	Major General (O-8)
Commissioning: Direct	Yes (BSN + NCLEX + DCC)	Yes (BSN + NCLEX)	Yes (BSN + NCLEX)
Commissioning: ROTC	Army ROTC Nursing	NROTC Nurse Option	No ROTC pathway
Commissioning: Enlisted-to-Officer	AECP	MECP	Enlisted nursing pathway
Commissioning: Scholarship/ Stipend	ROTC scholarship	Nurse Candidate Program (E-5 in IRR)	HPSP (commissioned in IRR)
Licensed Practical Nurses	Yes (enlisted only)	No	No
Unique Specialty	None exclusive	Hospital corpsman training	Flight Nursing / AE
Operational Environments	MTFs, field hospitals, CSHs	MTFs, ships (CVN, T-AH), EMFs, FMF	MTFs, medical wings, AES aircraft
Advanced Degree Guidance	Master's by O-4 or 10 yrs; Doctorate by O-6 or 20 yrs	Advanced degree by O-5; no specific timeline	Advanced degree between 9–18 yrs
Promotion Timeline in Roadmap	Yes (year ranges provided)	No timeline given	Yes (year ranges provided)
Roadmap Focus	Education and assignments by rank	Education and assignments by rank	Milestones by timeline

Note. Data compiled from Army Nurse Corps (2022), Navy Personnel Command (2022), Air Force Nurse Corps (2025), Army ROTC Nursing (2026), Navy Medicine (2026a, 2026b, 2026c), Air Force Medical Service (2026), Bureau of Medicine and Surgery (2026), and personal communications. See Appendix A for each service's career roadmap. BSN = Bachelor of Science in Nursing; NCLEX = National Council Licensure Examination; DCC = Direct Commission Course; ROTC = Reserve Officers' Training Corps; NROTC = Naval Reserve Officers' Training Corps; AECP = Army Enlisted Commissioning Program; MECP = Medical Enlisted Commissioning Program; HPSP = Health Professions Scholarship Program; IRR = Individual Ready Reserve; AE = Aeromedical Evacuation; AES = Aeromedical Evacuation Squadron; MTF = Medical Treatment Facility; CSH = Combat Support Hospital; CVN = aircraft carrier, nuclear-powered; T-AH = hospital ship; EMF = Expeditionary Medical Facility; FMF = Fleet Marine Force.

The Defense Officer Promotion Act (DOPMA) is a bill passed by the United States Senate that standardizes the careers of military officers. Some of the standards it sets are, but not limited to, minimum length in service for promotions, minimum time in grade for promotions, and maximum length of service per grade, just to name a few (DOPMA, 1980). This act guides how and when promotions for officers in the "field grades" (O4–O6) should occur. However, it does give the Secretary of a military department leeway to adjust the minimums and extend them to longer limits (e.g., from minimum of three years to a minimum of four or five years in grade). Lastly, DOPMA is where military officers can

find the basis of ‘up or out’ when it comes to their promotion and career lengths. The concept of ‘up or out’ is the colloquial description of how a military officer is afforded two chances to promote, once they have reached their time to promote (“in zone”) or they are forced out of the military, ending their career. With that said, DOPMA does provide provisions on extending someone’s career through “selective continuation” under special circumstances should an officer fail to promote twice.

Once a promotion board selects an officer, they must wait to actually promote, or “pin on” their new rank. This is done in the fiscal year after the board convenes. There is an order to when officers promote, and it connected to vacancies within the next rank. The Army and Air Force promote officers after they meet minimum time-in-grade requirements (i.e., the number of months an officer holds a particular rank before promotion) and when a vacancy becomes available, which results in promotions occurring throughout the fiscal year (RAND, 2026). In contrast, the Navy estimates vacancies in advance and promotes most officers at the end of the fiscal year (Beamsley, 2025). Figure 1 displays these differences.



Note. Army and Air Force promotions occur on a rolling basis throughout the fiscal year as officers meet minimum time-in-grade requirements and vacancies arise (RAND, 2026). Navy promotions occur primarily as a batch near the end of the fiscal year based on estimated vacancies (Beamsley, 2025). This structural difference has implications for measuring and comparing promotion timing across services.

Figure 1. Comparison of Promotion Timing Mechanisms Across the Army, Navy, and Air Force

B. NURSE CORPS CAREER PROGRESSION AND PROMOTION GATES

The military uses career pathways, or "roadmaps," to provide nurses with a clear and structured guide for when to pursue increased experience and skills for professional growth (Nashwan, 2023). Nurses must gain experience and skills to maintain professional growth and advance through promotions (Sheikhi et al., 2016). Each of the three services provides its nurses with career roadmaps to guide the officers by showing what skills are expected to obtain for promotion to the next rank (see Appendix A for each service's career roadmap). Often, senior nurses will share these roadmaps to mentor junior nurses.

Comparison of the three services' career progression roadmaps reveals both commonalities in professional development philosophy and service-specific variations in timing expectations and educational requirements. Each of the career progression roadmaps is focused on the concept of a "whole person" for promotion boards. They all place strong emphasis on sustained superior performance as documented in their official

evaluation reports. Each branch focuses on clinical proficiency for junior officers (O-1 to O3) and mastery by obtaining relevant board certifications. Finally, all three branches require completion of branch-specific leadership courses as gates to promotion to the next rank (Air Force Nurse Corps, 2025; Army Nurse Corps, 2022; Navy Personnel Command, 2022).

As similar as the roadmaps are, there are some differences among the roadmaps. One large difference is that the Army and Navy seem to focus on what education and assignments a nurse should obtain while at each rank (Army Nurse Corps, 2022; Navy Personnel Command, 2022). The Air Force suggests what to do in timelines. Both the Army and Air Force roadmaps report the range of time, in years, a nurse can expect to be promoted to the next rank (Air Force Nurse Corps, 2025; Army Nurse Corps, 2022), whereas the Navy does not give any timeline whatsoever. Another difference is when it is suggested to complete advanced academic degrees. The Army Nurse Corps roadmap suggests a nurse obtains a master's degree prior to or just as being promoted to Major (O-4) or within the first ten years and have a doctorate degree prior to being promoted to Colonel or within 20 years (Army Nurse Corps, 2022). The Air Force Nurse Corps suggests that nurses obtain an advanced academic degree between 9 and 18 years (Air Force Nurse Corps, 2025). Finally, the Navy suggests a nurse should be pursuing or achieved an advanced degree to promote to Commander (O-5) (Navy Personnel Command, 2022).

1. Determinants of Promotion

Military personnel researchers maintain that promotion boards evaluate officers based on identifiable career milestones and professional credentials to identify the most qualified candidates for advancement. Multiple studies have examined promotion determinants for Navy medical personnel. Winston (2024) analyzed factors affecting Navy Medical Service Corps officers, Ray (2012) examined deployment effects on Nurse Corps promotions, as well as other determinants, and Simpson (1992) studied minority promotion opportunities in the Navy Nurse Corps. Paul Winston (2024) discussed the impact career paths have on promotions within the Navy Medical Service Corps. Unlike the civilian sector, the Medical Service Corps did not have a useful career path until 1991 (Winston,

2024). This career path development was a result of the "Blue-Ribbon Panel" held by Navy Medicine in 1988, concluding that Navy Medicine needed to publish career paths, similar to the unrestricted officers, for all the medical corps. Winston studied whether following the "Golden Path" identified on MyNavyHR, the Navy's Human Resource webpage (Navy Personnel Command, 2024), predicted promotions for approximately 15,000 Medical Service Corps (MSC) Officers. His analysis looked at aggregate sub-specialty categories such as clinicians, administrators, and scientists between 2000 and 2023 (Winston, 2024). Winston divided the billets into three duty types, Military Treatment Facility (MTF), operational, and staff. He found that when an MSC officer followed the career map as they progressed through their career were more likely to be promoted to higher ranks (Winston, 2024).

Research on Navy medical officer promotions reveals that strategic duty assignments significantly predict advancement. Winston (2024) documented substantial effects: those holding an Executive Medicine billets were 23-percentage points more likely to be promoted across Medical Service Corps specialties, while Healthcare Administrators holding staff assignments were 18–24-percentage points more likely to be promoted, depending on rank. Ray (2012) and Simpson (1992) similarly identified critical assignment patterns that enhanced Nurse Corps promotion outcomes. This body of research demonstrates that following service-defined career paths provides measurable promotion advantages, with effects varying by specialty and rank.

Similar to Winston (2024), Heather Ray (2012) evaluated promotion predictors for nearly 5,000 Navy Nurse Corps Officers between 2001 and 2010. Although Winston (2024) uses a linear probability model, Ray used logit regression and determined that like Winston, operational billets showed to be predictive of promotion among Lieutenant Commander (O4) Navy nurses. More specifically, Ray (2012) found that O4 nurses who deployed during war to somewhere in the Middle East other than Iraq or Afghanistan had an increased probability to promote by over 13-percentage points, especially nurses in critical wartime specialties such as Intensive Care Unit (ICU), Operating Room (OR), and mental health. Whereas those who were deployed to Iraq or Afghanistan had no significant increase in their probability of promotion. However, deploying during war was not

predictive of promotion for Commanders (O5) and Captains (O6). She did find higher education, master's degree and above, were significant predictors of promotions, especially when they were tied to clinical specialties such as Nurse Practitioner and Clinical Nurse Specialist, with an increase in promotion probability of 14-percentage points. Navy nurses are encouraged to fulfill an assignment overseas, however Ray (2012) found that being stationed overseas at the time of the promotion board was a negative predictor for those trying to promote to O5 or O6. This indicates that a nurse should be assigned overseas earlier in their career. As we see with Ray (2012), Peggy Simpson (1992) found education was a predictor for promotion, especially for senior ranks. Using logistic regression, Simpson determined that a Lieutenant going for promotion to O4 had a 34-percentage point increase of being promoted if they were a Nurse Practitioner or Certified Registered Nurse Anesthetist (CRNA) compared to those who were not. For selection to O5 and O6, a master's degree in nursing showed a 37- and 39-percentage point increase in promotion, respectively. However, if the master's degree was in something other than nursing, each promotion group had a negative 11 and negative 16-percentage point decrease in promotion prediction. Additionally, as with Ray, the nurse subspecialties of ICU, OR and trauma nursing had higher promotion opportunities as junior nurses, but this dwindled as the nurse reached senior ranks (Simpson, 1992).

The Navy considers officers who are best qualified for promotion engage in continuing education, such as professional military education, advanced degrees in specialty areas, and certifications, as seen in promotion board convening orders (MyNavyHR, 2025). Ray (2012) and Simpson (1992) both determined that the advanced degrees in specialty areas related to nursing increased promotion probability. Although promotion board convening orders value advanced degrees broadly, Ray (2012) and Simpson (1992) found that non-nursing degrees actually decreased promotion probability. This suggests the Nurse Corps places greater emphasis on nursing-specific education for career advancement.

Ray (2012) and Simpson (1992) continue the idea of advanced clinical specialty degrees are a positive predictor in promotions for junior officers, but find these degrees are not necessarily a predictor of promotion at the higher ranks. This pattern may indicate that

the Navy Nurse Corps values clinical experience for junior officers, but value leadership and executive medicine experience in the senior ranks. As a result, those who specialize in advanced clinical degrees, and remain in the clinical environment may see a steady pace of promotion through the junior ranks but face strong barriers for promotion to O5 or O6 regardless of their performance.

2. Service-Specific Differences

Wrolstad (2025) and Zangaro (2013) studied service-specific difference in attrition and retention among military healthcare providers. Wrolstad (2025) focused on attrition among approximately 8,000 Dental Corps Officers across the three services from 2016 to 2023. While Wrolstad's thesis does not discuss promotion directly, he does discuss variations in career length among the three services, noting that Air Force Dental Officers tend to remain in the service longer than the other two branches, with Navy having the highest attrition rate. These differences have an indirect impact on promotion timing. Furthermore, specialty training was also a factor for dentists to remain in service. General Dentists in the Air Force had a 13-percentage higher probability of attrition compared to specialists, whereas the Navy and Army General Dentists had a 30-percentage point and 32-percentage point higher probability, respectively, of attrition compared to specialists. Wrolstad discovered that oral surgeons had significantly longer careers in the service over generalists with only a 2-percentage point more than specialists' attrition rate for the Air Force, and 8-percentage points for the Navy and 6-percentage points for the Army. These statistics led Wrolstad to conclude Air Force dentists tend to stay in the military longer than dentists in the Navy and Army. Again, this can have an impact on promotions for specialty training, similar to the nurses in critical wartime specialties as Ray (2012) and Simpson (1992) observed.

Similar to Wrolstad, Zangaro (2013) studied retention across the three services among 2,574 active duty nurses from 1990 to 2006. His sample was composed of 996 Army, 590 Navy, and 988 Air Force nurses. Although Zangaro did not focus directly on promotions for nurses, he did find that promotion opportunities were the number one reason for job satisfaction and therefore retention. Zangaro found a negative correlation

between relocation and retention. Many nurses would rather not relocate their families frequently and therefore it is a factor that drives retention down. Finally, he also concluded deployment had no direct impact on job satisfaction or retention. He did not indicate if deployment led to promotion opportunities and higher rates of promotions, which would presumably cause continued retention among nurses.

The studies conducted by Wrolstad (2025) and Zangaro (2013), although not evaluating promotions directly, have implications for understanding cross-service promotion dynamics. Both researchers found that Air Force medical personnel—dentists and nurses respectively—have higher retention rates than their Army and Navy counterparts. This pattern could reflect two competing explanations: either Air Force promotion opportunities are more attractive (as Zangaro suggests drives retention), or higher retention creates more competitive promotion zones with smaller selection rates. If the latter is true, Air Force nurses staying longer would face increased competition for limited advancement slots compared to the other two branches. This tension between retention as cause versus effect of promotion opportunities remains unresolved in the current literature and warrants further investigation.

3. Methodological Approaches in Prior Research

Previous quantitative research on military nurse corps promotions has used statistical approaches to determine promotion predictions. Keme (2019) recently performed an analysis of Navy Nurse Corps promotions using a quantitative, multivariate statistical approach to find predictors of promotions. Keme (2019) identified positive and negative factors when predicting promotions. These factors included demographics, professional variables, and timing variables (Keme, 2019). He was able to do this through descriptive statistics, year-group and rank-distribution analysis, and the probit regression models. His findings were not dissimilar to previous analyses. Graduate level education, particularly Duty Under Instruction (DUINS) was a positive predictor of promotion from O3 to O4. Additionally, providers or Nurse Practitioners also more likely to promote to O4 and O5 but became negative predictors to promote to O6 (Keme, 2019).

While a wealth of research examines Navy healthcare professional promotions, particularly for the Navy Nurse Corps, very little research addresses promotions in the Army and Air Force. Although this literature review talks about cross-services research, both are on retention of military healthcare providers, dentists and nurses. This thesis fills the gap that exists in comparing promotions of the Nurse Corps across all three services. As nurses from all three services increasingly work together, particularly in joint medical treatment facilities such as the National Military Medical Center in Bethesda, Maryland, and the Alexander T. Augusta Military Medical Center at Fort Belvoir, Virginia is important for leaders to understand how to mentor nurses throughout their careers, regardless of service affiliation. This is especially critical given how strongly promotions affect retention.

C. CONCLUSION

This chapter has provided both the institutional context and the research foundation for this thesis. The first half described the three military Nurse Corps, their organizational structures, commissioning pathways, operational environments, and career progression roadmaps. While the Army, Navy, and Air Force Nurse Corps share fundamental similarities in their emphasis on clinical excellence, professional development, and leadership progression, their distinct organizational structures and career timelines reflect each service's unique operational requirements. The Army's large force structure supports extensive ground-based combat operations, the Navy's maritime mission requires nurses capable of operating in austere sea-going environments, and the Air Force emphasizes specialized capabilities in aeromedical evacuation and strategic mobility. These structural and operational differences suggest that promotion patterns and career progression may vary significantly across services, even for officers in the same profession.

The second half reviewed the existing literature on military nurse promotion determinants, cross-service retention differences, and methodological approaches. Winston (2024), Ray (2012), and Simpson (1992) identified key career determinants for promotion among Navy medical communities, including the importance of career roadmap adherence, advanced nursing education, clinical subspecialty, and deployment experience. Wrolstad

(2025) and Zangaro (2013) demonstrated that Air Force medical personnel have higher retention rates than their Army and Navy counterparts, with promotion opportunities identified as the primary driver of job satisfaction. The methodological approaches used in prior studies, including logistic regression, probit models, and linear probability models, provide a foundation for the analytical approach used in this thesis.

Critically, the literature review identified a significant gap: no study has systematically compared promotion outcomes for nurses across all three military services. Existing research focuses exclusively on the Navy, leaving it unknown whether the promotion determinants identified in Navy-specific studies extend to the Army and Air Force. This thesis addresses that gap by providing the first cross-service comparison of nurse promotion rates, timing, and subspecialty effects. Understanding these service-specific differences provides essential context for military nursing leaders as the three Nurse Corps increasingly serve together in joint medical treatment facilities.

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III. DATA AND METHODOLOGY

In this chapter, I describe the data sources, sample construction procedures, and analytical methods I used to evaluate cross-service promotion patterns among U.S. military Nurse Corps officers. The first section describes the origin and structure of the dataset used in this study. The second section explains the criteria used to construct and refine the analytical sample. The final section outlines the statistical methods employed to assess promotion rates to O-4, O-5, and O-6; time-in-grade from O-3 through O-6; and the likelihood of promotion by subspecialty across the Army, Navy, and Air Force.

A. DATA SOURCE

The Defense Medical Human Resources System Intranet (DMHRSi) is a web-based human resources management system for military medicine. As noted on the Defense Health Agency website "DMHRSi integrates human resource data from multiple sources, offering ready access to manpower, labor cost assignment, education and training, and readiness information across the Military Health System" (Defense Health Agency [DHA], 2025). The dataset from DMHRSi and the Defense Enrollment Eligibility Reporting System (DEERS) used in this study provided monthly observations of active duty, reserve, guard, civilian, and contractor personnel across clinical, nursing, paraprofessional, and administrative roles worldwide from January 2016 through September 2025.

B. SAMPLE SELECTION

The goal of this thesis is to examine Nurse Corps promotions across the Army, Navy, and Air Force. To construct the analytical sample, I first restricted the dataset to Registered Nurses and then limited the sample to officers serving on active duty. I excluded the ranks of Ensign and Second Lieutenant (O-1) because promotion to the next grade (O-2) occurs automatically upon satisfactory performance and completion of required training (DOPMA, 1980) As a result, including these grades would not provide meaningful variation in promotion outcomes. I also excluded ranks above Captain/Colonel (O-6) because promotion to flag and general officer ranks involves presidential appointment and Senate confirmation, which follows a distinct statutory process and differs fundamentally

from competitive field-grade promotion systems (DOPMA, 1980). I further restricted the sample to officers whose first observed rank transition occurred between September 2016 and October 2018, corresponding to the Fiscal Year (FY) 2017 to FY 2018 promotion cohorts. This restriction ensures that all officers in the sample have a known starting point for their promotion windows. The Army and Air Force promote officers after they meet minimum time-in-grade requirements (i.e., the number of months an officer holds a particular rank before promotion) and when a vacancy becomes available, which results in promotions occurring throughout the fiscal year (RAND, 2026). In contrast, the Navy estimates vacancies in advance and promotes most officers at the end of the fiscal year (Beamsley, 2025). Because the dataset ends in September 2025, I dropped all observations from FY 2025 to ensure that Navy promotions are fully captured in the models and are not right-censored due to fiscal timing differences. After applying these restrictions, I reduced the dataset from 1,200,844 to 245,276 person-month observations representing 2,973 unique officers. To estimate time-in-grade accurately, I further restricted to officers who were promoted at least twice in the dataset. The time-in-grade subsample consists of 119,198 person-month representing 1,150 unique officers.

Table 2. Sample Composition by Service Branch

	Army	Navy	Air Force	Total
Person-months	77,449	84,430	83,397	245,276
% of total	31.6	34.4	34.0	100.0
Unique officers	969	1,013	991	2,973
% of total	32.6	34.1	33.3	100.0
Time-in-Grade Subsample				
Person-months	31,683	42,027	45,488	119,198
% of total	26.6	35.3	38.2	100.0
Unique officers	303	403	444	1,150
% of total	26.3	35.0	38.6	100.0
Officers by promotion gate				
O-3 → O-4	180	207	275	662
O-4 → O-5	82	140	118	340
O-5 → O-6	41	56	49	146

Adapted from DMHRSi (2025); DEERS (2025).

C. VARIABLE DEFINITIONS.

I created dependent variables to compare promotions from O-3 to O-6 across the Army, Navy and Air Force. I created binary indicators to highlight if a nurse ever reached the rank of O-4, O-5, and O-6 with "1" indicating they ever reached the rank and "0" indicating they did not. I developed time-in-grade to measure how long a nurse spent in one grade before being promoted to the next. The primary independent variables are service branch, labelled as Army, Navy, and Air Force. I developed the service variable from the DMHRSi indicators and numerically encoded them to run regressions, using Army as the reference group.

I also explored nursing subspecialties in the analysis of promotions. Each branch uses different codes to identify a subspecialty for a nurse. I coded each subspecialty number for each branch to create common subspecialty labels including Medical-Surgical, Pediatrics, Perioperative, Nurse Practitioner, Emergency/Trauma, and several others. I further aggregated the subspecialties into career paths, grouping subspecialties together creating Advance Practice career (Nurse Practitioners and Nurse Anesthetists), Critical Care/Specialized (Critical Care, Emergency/Trauma, and perioperative), and Clinical/ General (Medical-Surgical, Pediatric, Professional Nursing, and several others). This reduction of subspecialties helped compare the different types of nurses as a group rather than actual subspecialties to make the comparisons easier to understand while still including gall nurses. All branches have all categories of subspecialties, which is not accurate in the real world. An example is that both the Army and Air Force do not have a specific Area of Concentration (AOC) code designating a nurse as a pediatric nurse by itself like the Navy. They are often identified as Medical-Surgical Nurses. This is one explanation as to why a subspecialty may not be listed under a service branch.

Table 3. Nursing Subspecialty Distribution by Service Branch

	Army	Navy	Air Force	Total
Subspecialty	*n (%)*	*n (%)*	*n (%)*	*n (%)*
Medical-Surgical	386 (63.8)	183 (26.3)	329 (48.7)	898 (45.4)
Critical Care	24 (4.0)	58 (8.3)	87 (12.9)	169 (8.5)
Emergency/Trauma	23 (3.8)	47 (6.7)	55 (8.1)	125 (6.3)
Perioperative	44 (7.3)	54 (7.7)	32 (4.7)	130 (6.6)
OB/GYN	20 (3.3)	67 (9.6)	61 (9.0)	148 (7.5)
Nurse Anesthetist	44 (7.3)	44 (6.3)	17 (2.5)	105 (5.3)
Family NP	23 (3.8)	9 (1.3)	—	32 (1.6)
Adult NP	—	—	32 (4.7)	32 (1.6)
Psychiatric	8 (1.3)	19 (2.7)	11 (1.6)	38 (1.9)
Psychiatric NP	10 (1.7)	1 (0.1)	—	11 (0.6)
Public Health	19 (3.1)	5 (0.7)	—	24 (1.2)
Pediatrics	—	21 (3.0)	—	21 (1.1)
Pediatrics NP	—	9 (1.3)	9 (1.3)	18 (0.9)
Neonatal ICU	—	7 (1.0)	12 (1.8)	19 (1.0)
Nurse Midwife	2 (0.3)	6 (0.9)	3 (0.4)	11 (0.6)
Nursing Administration	1 (0.2)	—	6 (0.9)	7 (0.4)
Nurse Education	—	6 (0.9)	5 (0.7)	11 (0.6)
Professional Nursing	1 (0.2)	161 (23.1)	4 (0.6)	166 (8.4)
Flight Nurse	—	—	12 (1.8)	12 (0.6)
Total	**605**	**697**	**675**	**1,977**

Note. Sample restricted to officers at risk for O-4 promotion (person_tag = 1, at_risk = 1) in the FY 2017–FY 2018 cohort. Counts represent unique officers. Subspecialties are harmonized across services using a crosswalk that maps Army AOCs, Navy NECs, and Air Force AFSCs to a common taxonomy. Em-dashes (—) indicate a subspecialty not present within that service's taxonomy or zero officers in the category. "Professional Nursing" is a Navy-specific generalist designation (1900) distinct from Medical-Surgical. Column percentages are shown in parentheses. Total (N = 1,977) is slightly smaller than the demographic table due to officers with missing subspecialty codes. Adapted from DMHRSi (2025); DEERS (2025).

The Navy's "Professional Nursing" designation (NEC 1900) is notable: it accounts for 23.1% of Navy nurses in this sample but has almost no equivalent in the Army (0.2%) or Air Force (0.6%). This code is assigned to Navy nurses who do not hold a more specific subspecialty classification, functioning as a default generalist category. The Army and Air Force do not use an equivalent default code; instead, those nurses are typically classified

under Medical-Surgical. This asymmetry inflates the Navy's Professional Nursing count and correspondingly reduces its Medical-Surgical count relative to the other services.

The demographic variables include gender, race/ethnicity, marital status, and age. Gender is coded as a binary variable indicating female. Race and ethnicity is coded as a single categorical variable with five categories: White, Black, Hispanic, Asian, and Other. Marital status is a binary indicator for married. Age is a continuous variable derived from the DMHRSi dataset.

Table 4. Demographic Profile at Entry by Service Branch

	Army	**Navy**	**Air Force**	**Total**
	n (%)	*n (%)*	*n (%)*	*n (%)*
Sex				
Female	355 (58.1)	427 (61.3)	475 (68.0)	1,257 (62.6)
Male	256 (41.9)	270 (38.7)	224 (32.0)	750 (37.4)
Race/Ethnicity				
White	370 (60.6)	405 (58.1)	473 (67.7)	1,248 (62.2)
Black	108 (17.7)	82 (11.8)	108 (15.5)	298 (14.8)
Hispanic	43 (7.0)	63 (9.0)	27 (3.9)	133 (6.6)
Asian	72 (11.8)	74 (10.6)	66 (9.4)	212 (10.6)
Other	18 (2.9)	73 (10.5)	25 (3.6)	116 (5.8)
Marital Status				
Married	429 (70.2)	469 (67.3)	494 (70.7)	1,392 (69.4)
Not Married	182 (29.8)	228 (32.7)	205 (29.3)	615 (30.6)
Total	**611**	**697**	**699**	**2,007**

Note. Sample restricted to officers at risk for O-4 promotion in the FY 2017–FY 2018 cohort. Demographics measured at each officer's first observation in the dataset. "Other" race/ethnicity includes Native American, Pacific Islander, multiracial, and unspecified. Column percentages are shown in parentheses. Total (N = 2,007) is slightly larger than the subspecialty table (N = 1,977) because some officers have demographic data but missing subspecialty codes. Adapted from DMHRSi (2025); DEERS (2025).

For the survival analysis, I constructed several time-related variables. I identified promotion transitions by comparing each officer's rank to their rank in the previous month. I defined entry into a rank as the first month an officer appeared at a new rank immediately following the prior rank (for example, the first observed month at O-3 following a month

at O-2). The failure event is defined as the first observed month at the next higher rank. Officers who did not promote by the end of the observation period are right-censored at their last observed month. I also created cohort variables based on the calendar year an officer entered each rank, which I used to control for cohort effects in the Cox proportional hazards models.

Finally, I constructed at-risk eligibility indicators to ensure that only officers with sufficient time in grade are included in each promotion analysis. For the O-4 analysis, officers must have at least 72 months of total observation time. For the O-5 and O-6 analyses, officers must have reached the prior rank and been observed at that rank for at least 60 months.

D. METHODOLOGY

I used multiple quantitative, longitudinal designs to compare the promotion timing and probability of Nurse Corps Officers in the Army, Navy, and Air Force. The first method is descriptive cross-tabulation to calculate promotion rates by service branch and entry cohort. I identified the year each officer entered a rank and created cohort groups based on that entry year. I then tabulated the percentage of officers in each cohort who eventually reached the next rank. These tables provide how promotion rates differ across services.

The second method is ordinary least squares (OLS) regression, which I use to examine any differences in time in grade across the service branches and cohorts. The dependent variable is time in grade in months. I then used marginal predictions to plot the predicted time in grade for each service and cohort. While the OLS regression provides an intuitive measure of average promotion timing, it is limited to officers who actually promoted and does not account for officers who left the service or remained in grade at the end of the observation period. To address this limitation, I also employed survival analysis methods, which incorporate information from both promoted and non-promoted officers.

The third model is logistic regression to estimate the likelihood of promotion at each rank. I estimated service-specific models with nursing subspecialties as the sole predictor, using Medical-Surgical as the reference category. These models identify which, if any, subspecialties have higher or lower odds of promotion within each service. Next, I

implemented demographic controls for gender, race/ethnicity, marital status, and age. These models test whether subspecialty advantages continue after accounting for demographics. Results are reported as odds ratios, where a value greater than one indicates higher odds of promotion relative to the Medical-Surgical reference group. For models with small cell sizes or complete separation, where a subspecialty has a 100% or 0% promotion rate, causing standard logistic regression to produce unreliable estimates, I used Firth penalized likelihood logistic regression, which applies a small bias correction to stabilize coefficient estimates (Firth, 1993; Heinze & Schemper, 2002).

The fourth method used is Kaplan-Meier survival analysis. This analysis takes into account the OLS limitations. Kaplan-Meier distinguishes between those who actually promoted and those who did not. This method calculates the average time in grade of only those who were promoted. By using this method, I took into account those who are no longer seen in observations as a result of either leaving service or at the end of the data used.

The fifth method is the Cox proportional hazards model. This method continues the work beyond Kaplan-Meier by estimating how much faster or slower a group promotes. This method quantifies what the Kaplan-Meier survival curve illustrates. The output for this model is a hazard ratio that represents the likelihood of promotion occurring in any given month.

Together, these five methods build on each other to provide a comprehensive picture of cross-service promotion disparities. The descriptive cross-tabulations establish baseline promotion rates. The OLS regressions quantify time-in-grade differences and test whether promotion speed is accelerating. The logistic regressions identify which subspecialties and demographics are associated with promotion likelihood. The Kaplan-Meier curves visualize promotion timing while properly accounting for censoring. The Cox models quantify promotion speed differences while controlling for officer characteristics.

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IV. RESULTS

A. PROMOTION RATES BY SERVICE

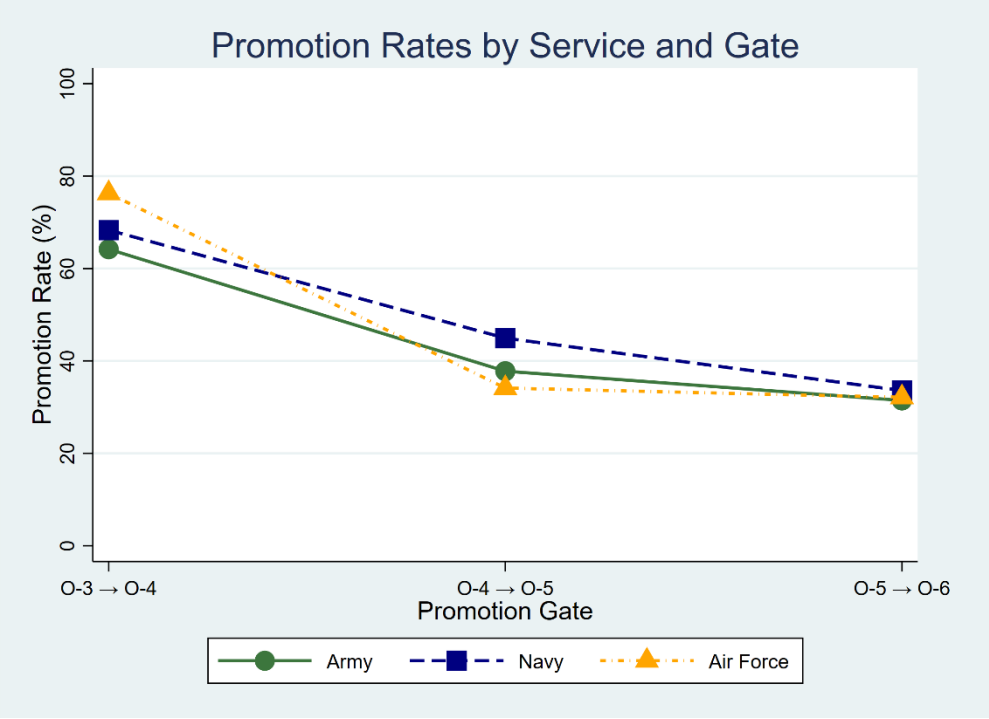
The rate of promotion varies across the services at each promotion gate (O-3 to O-4, O-4 to O-5, and O-5 to O-6). I define "entry cohort" as the year an officer first entered the starting rank for a given promotion gate, not the year they entered military service. Table 5 presents promotion rates by service branch across the three promotion gates for the Fiscal Year (FY) 2017 to FY 2018 cohort, which include officers whose first observed rank transition occurred between September 2016 and October 2018. This cohort restriction provides sufficient follow-up time to observe promotion outcomes while avoiding right-censoring from incomplete observation windows.

Table 5. Promotion Rates by Service Branch and Promotion Gate

Promotion Gate	Army	Navy	Air Force	Total
O-3 → O-4				
Eligible	969	1,013	991	2,973
Promoted	622	692	756	2,070
Rate (%)	**64.2**	**68.3**	**76.3**	**69.6**
O-4 → O-5				
Eligible	622	692	756	2,070
Promoted	235	311	258	804
Rate (%)	**37.8**	**44.9**	**34.1**	**38.8**
O-5 → O-6				
Eligible	283	384	308	975
Promoted	89	129	99	317
Rate (%)	**31.4**	**33.6**	**32.1**	**32.5**

Note. Sample restricted to active-duty nurse corps officers whose first observed rank transition occurred between September 2016 and October 2018 (FY 2017–FY 2018 promotion cohorts). "Eligible" reflects unique officers observed at the relevant starting rank. O-3 → O-4 eligibility includes all officers in the analytic sample; O-4 → O-5 eligibility requires having reached O-4; O-5 → O-6 eligibility requires having reached O-5. The O-5 → O-6 eligible pool is larger than the number promoted from O-4 → O-5 because some officers entered the sample already holding O-5 rank. Rate = percentage of eligible officers who reached the next higher rank during the observation period. Adapted from DMHRSi (2025); DEERS (2025).

Promotion rates among the FY 2017 to FY 2018 cohort reveal an interesting shift from the O-4 promotion gate to the O-5 and O-6 promotion gates. At the O-3 to O-4 promotion gate, the Air Force promoted at the highest rate (76.3%), followed by the Navy (68.3%) and the Army (64.2%), producing a 12.1- percentage point gap between the highest and lowest performing services. This ranking reverses at the O-4 to O-5 promotion gate, where the Navy had the highest promotion rate (44.9%) followed by the Army (37.8%), and the Air Force to the lowest (34.1%). These O-4 to O-5 rates are lower than in a broader sample because the cohort restriction limits follow-up time for this gate. At the O-5 to O-6 promotion gate, the three services converged tightly. The Navy again led at 33.6%, followed by the Air Force at 32.1% and the Army at 31.4%, a spread of only 2.2 percentage points. Figure 2 provides a visual analysis of the promotion rates across the three promotion gates.



Adapted from DMHRSi (2025); DEERS (2025).

Figure 2. Promotion Rates by Service and Gate (2016 Entry Cohort)

In summary, the FY 2017 to FY 2018 cohort reveals a clear pattern across promotion gates. The Air Force leads at the O-3 to O-4 promotion gate, the Navy leads at the O-4 to O-5 promotion gate, and the Navy also leads at the O-5 to O-6 promotion gate, though by a very narrow margin. No single service dominates promotion outcomes at every level, suggesting that service-specific policies, board structures, and manning requirements shape promotion differently at each career stage. These aggregate rates, however, do not account for whether differences are driven by workforce composition, specifically, the mix of nursing subspecialties within each service. The next section disaggregates promotion rates by subspecialty to examine whether the service-level patterns are held within individual specialties.

B. PROMOTION RATE BY SUBSPECIALTY

While it is informative to determine the rate nurses promote within each service branch, even more insights can be gained from studying rates of promotion for each subspecialty within each service branch. This section tabulates these rates for each of the promotion gates. Promotion rates vary both at each promotion gate, and between promotion gates.

1. O-3 to O-4 Promotion Gate

By the time a nurse is ready to promote from O-3 to O-4, they have spent enough time in a specific type of nursing to gain a specialty or area of concentration (AOC) code. Medical-Surgical nursing has the highest number of officers in each branch but consistently posts the lowest rates among major subspecialties: 74.1% in the Army, 80.9% in the Navy, and 91.2% in the Air Force. Some of the more procedural or advanced practice specialties promote at notably higher rates. Nurse Anesthetists promote at 79.5% in the Army, 86.4% in the Navy, and 100.0% in the Air Force (though only 17 officers were used for the Air Force). Perioperative nurses achieved the most consistent cross-service rates, promoting at 88.6% in the Army, 90.7% in the Navy, and 87.5% in the Air Force. Navy Professional Nursing, which accounts for approximately 23% of the Navy nurse sample, had the lowest rate among Navy subspecialties at 64.6%.

Table 6. O-3 to O-4 Promotion Rates by Nursing Subspecialty and Service Branch

	Army		Navy		Air Force	
Subspecialty	*n*	**Rate (%)**	*n*	**Rate (%)**	*n*	**Rate (%)**
Medical-Surgical	386	74.1	183	80.9	329	91.2
Critical Care	24	87.5	58	93.1	87	92.0
Emergency/Trauma	23	82.6	47	89.4	55	96.4
Perioperative	44	88.6	54	90.7	32	87.5
OB/GYN	20	100.0	67	85.1	61	85.2
Nurse Anesthetist	44	79.5	44	86.4	17	100.0
Professional Nursing	1	100.0	161	64.6	4	75.0
Family NP	23	95.7	9	88.9	—	—
Adult NP	—	—	—	—	32	87.5
Psychiatric	8	87.5	19	84.2	11	81.8
Psychiatric NP	10	80.0	1	100.0	—	—
Public Health	19	89.5	5	60.0	—	—
Pediatrics	—	—	21	76.2	—	—
Pediatrics NP	—	—	9	77.8	9	77.8
Neonatal ICU	—	—	7	85.7	12	100.0
Nurse Midwife	2	100.0	6	66.7	3	100.0
Nurse Education	—	—	6	66.7	5	100.0
Nursing Administration	1	0.0	—	—	6	0.0
Flight Nurse	—	—	—	—	12	91.7
Total	**605**	**78.8**	**697**	**79.9**	**675**	**90.1**

Note. Sample restricted to officers at risk for O-4 promotion (person_tag = 1, at_risk = 1) in the FY 2017–FY 2018 cohort. Rate = percentage of officers in each subspecialty who reached O-4 during the observation period. n = officers at risk. Em-dashes (—) indicate a subspecialty not present within that service's taxonomy. Subspecialties are harmonized across services using a crosswalk that maps Army AOCs, Navy NECs, and Air Force AFSCs to a common taxonomy. "Professional Nursing" is a Navy-specific generalist designation (1900) distinct from Medical-Surgical. Interpret rates for n < 20 with caution. Adapted from DMHRSi (2025); DEERS (2025).

2. O-4 to O-5 Promotion Gate

Promotion rates by subspecialty at the O-4 to O-5 promotion gate reveal different patterns than the O-3 to O-4 gate. Overall rates are lower at this gate, partly because the cohort restriction limits follow-up time for officers reaching the O-5 promotion window.

Medical-Surgical nurses again have the lowest rates among major subspecialties, with the Army at 39.7%, the Navy at 54.9%, and the Air Force at 43.1%. The Navy leads within Medical-Surgical by over 15 percentage points, a change from the Air Force's dominance at the O-4 gate. Nurse Anesthetists promoted at 30.8% in the Army, 65.0% in the Navy, and 50.0% in the Air Force. Navy Critical Care nurses stand out at 84.0% (25 nurses), far above Army (50.0%) and Air Force (43.6%) at the same subspecialty. Promotion rates of subspecialties that have fewer than 20 officers should be interpreted with caution due to the small sample sizes. The sharp decline in Navy Professional Nursing officers from 161 at the O-4 gate to 20 at the O-5 gate likely reflects reclassification: as Navy nurses gain clinical experience and obtain advanced certifications, many transition from the default Professional Nursing code (NEC 1900) to a more specific subspecialty such as Critical Care or Perioperative.

Table 7. O-4 to O-5 Promotion Rates by Nursing Subspecialty and Service Branch

	Army		Navy		Air Force	
Subspecialty	*n*	**Rate (%)**	*n*	**Rate (%)**	*n*	**Rate (%)**
Medical-Surgical	78	39.7	51	54.9	102	43.1
Critical Care	20	50.0	25	84.0	39	43.6
Emergency/Trauma	14	50.0	20	60.0	18	61.1
Perioperative	25	40.0	38	55.3	17	23.5
OB/GYN	16	68.8	13	69.2	18	38.9
Nurse Anesthetist	13	30.8	20	65.0	12	50.0
Professional Nursing	—	—	20	55.0	—	—
Family NP	7	42.9	7	85.7	—	—
Adult NP	—	—	—	—	15	66.7
Psychiatric	7	28.6	6	66.7	4	0.0
Psychiatric NP	6	33.3	—	—	—	—
Public Health	9	11.1	3	100.0	—	—
Pediatrics	—	—	2	50.0	—	—
Pediatrics NP	—	—	2	50.0	5	100.0
Neonatal ICU	—	—	5	60.0	9	33.3
Nurse Midwife	—	—	5	40.0	1	0.0
Nurse Education	—	—	4	75.0	3	66.7
Nursing Administration	1	100.0	1	0.0	—	—
Flight Nurse	—	—	—	—	5	40.0
Total	**196**	**41.8**	**222**	**62.2**	**248**	**44.8**

Note. Sample restricted to officers who reached O-4 and were observed at that rank for at least 60 months (at_risk_o5 = 1) in the FY 2017–FY 2018 cohort. Rate = percentage of officers in each subspecialty who reached O-5 during the observation period. n = officers at risk. Em-dashes (—) indicate a subspecialty not present within that service's taxonomy or no officers meeting the at-risk criteria. Subspecialties are harmonized across services. Interpret rates for n < 20 with caution. Adapted from DMHRSi (2025); DEERS (2025).

3. O-5 to O-6 Promotion Gate

Promotion rates by subspecialties for the O-5 to O-6 promotion gate are not reported because of the insufficient sample sizes within the subspecialty combinations. With fewer number of officers eligible for promotion, results in many subspecialties were fewer than 10 officers. Reporting rates from such small samples would be unreliable and misleading. Promotion rates presented in Table 5 are the most appropriate way to summarize the O-5 to O-6 promotion gate.

Across both promotion gates, Medical-Surgical nurses consistently had the lowest promotion rates among major subspecialties, while procedural and advanced practice specialties such as Nurse Anesthetists and Perioperative nurses promoted at higher rates. The service-level ranking observed in the aggregate rates persisted within most individual subspecialties, the Air Force advantage at O-4 and the Navy advantage at O-5 were not confined to a single specialty but appeared broadly across the workforce. These findings suggest that the differences observed in Section A are not solely a product of each service's subspecialty mix. Having established both the rate and the composition of promotions, the next section examines promotion timing, how long officers spend in each grade before promoting.

C. PROMOTION TIMING (TIME-IN-GRADE)

Having now determined the rate at which nurses in each service branch are promoted, the question becomes whether the different service branches promote its nurses at the same time. To determine the time-in-grade, I narrowed the sample size to nurses I observe promoting more than once within the dataset, resulting in 1,150 nurses (the promoted twice subsample). This reduction provides a baseline that is the same for all individuals, knowing exactly when they entered a grade, and then when they promoted to the next grade.

The lengths of time in grade vary both between service branches and the different promotion gates. At the O-3 to O-4 promotion gate, Air Force nurses promote the fastest at 66.1 months on average, followed by Army nurses at 73.2 months and Navy nurses at 78.5 months. The 12.4-month gap between the Air Force and the Navy shows that the Navy promotes to O-4 over a year after the Air Force. Furthermore, the Air Force shows a tighter distribution (Standard Deviation (SD) = 5.4), suggesting a more standardized promotion timeline compared to the Army (SD = 6.1) and Navy (SD = 6.1). At the O-4 to O-5 promotion gate, the three service branches have similar time lengths, with the Army at 80.7 months, the Navy at 77.8 months, and the Air Force at 76.4 months. The overall spread between the service branches narrowed to just 4.3 months, with the Army moving to the longest instead of the Navy. Finally, at the O-5 to O-6 promotion gate, the Air Force once

again moves to having the least time in grade as an O-5 at 57.6 months, Army has 64.7 months, and the Navy having the longest time in grade at 68.0 months. However, Air Force has a higher variation in time in grade from O-5 to O-6 (SD = 8.8), suggesting a broader spread in time in grade to promote to O-6 compared to the Army (SD = 5.8) and the Navy (SD = 6.8). Table 8 and Figure 3 present mean time-in-grade by service branch and promotion gate, showing that the Air Force promoted faster at all three gates, but the service-level gap narrowed at the O-4 to O-5 promotion gate before widening again at the O-5 to O-6 promotion gate.

Table 8. Mean Time-In-Grade (Months) by Service Branch and Promotion Gate

	Army			Navy			Air Force		
Promotion Gate	*M*	*SD*	*N*	*M*	*SD*	*N*	*M*	*SD*	*N*
O-3 to O-4	73.2	6.1	180	78.5	6.1	207	66.1	5.4	275
O-4 to O-5	80.7	4.4	82	77.8	6.8	140	76.4	7.3	118
O-5 to O-6	64.7	5.8	41	68.0	6.8	56	57.6	8.8	49

Note. Sample restricted to 1,150 officers in the promoted-twice subsample (held ≥ 3 ranks during the observation period) from the FY 2017–FY 2018 cohort. Time-in-grade measured in months for complete rank spells only (both entry into and exit from the rank observed). M = mean; SD = standard deviation; N = number of officers with a complete spell at that gate. Officers may appear at multiple gates. Adapted from DMHRSi (2025); DEERS (2025).

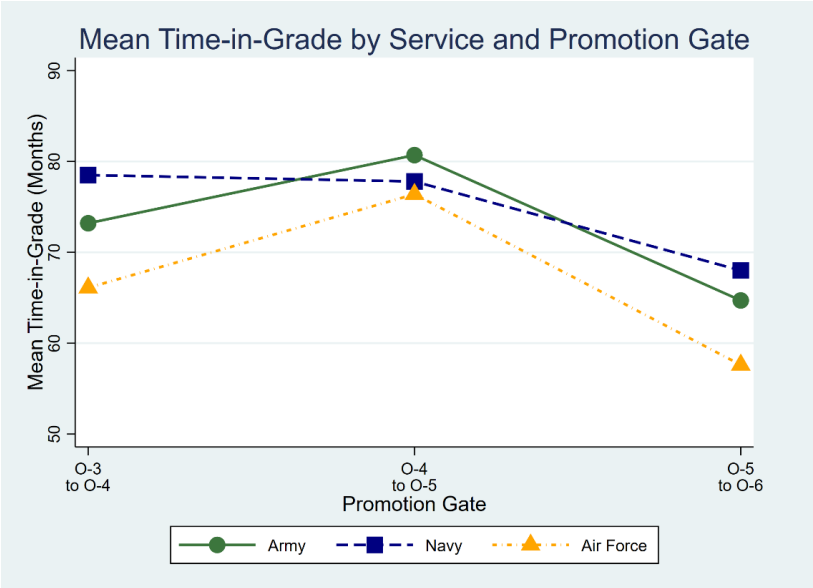


Figure 3. Mean Time-In-Grade by Service and Promotion Gate

Having the average or mean time-in-grade at each promotion gate provides nurses in the military an idea as to how long they will serve in any given grade for each service branch, but it is not the whole picture. Each year, the head of each service branch determines the number of nurses who should be promoted (DOPMA, 1980). This number can, and often does, change from year to year, depending on the Nurse Corps manning needs for each service branch. I evaluated if these differences can be noted in the years the dataset covered, by developing cohorts for entry year. Each cohort year is when nurses are seen to promote to an increased grade during that year, and then the time-in-grade is calculated from that entry year until they are promoted again.

The time-in-grade from O-3 to O-4 across two entry cohorts (2017 and 2018). Here, "entry cohort" refers to the year an officer first entered the O-3 rank, not when they entered military service. The 2016 entry cohort is excluded because the dataset begins in January 2016, leaving October through December 2015 unobserved and left-censoring the O-3 entry date for that cohort. The Navy O-3 to O-4 promotion gate experienced the largest shift, the 2017 entry cohort averaged 80.1 months to promotion, while the 2018 entry cohort had only 75.2 months, a decrease of 4.9-months. The Army and Air Force were essentially flat across cohorts, suggesting that the Navy has been actively accelerating its promotion timelines while the other services remained stable.

Similar to the O-3 to O-4 promotion gate entry cohort, the Navy shows the largest acceleration in time-in-grade at the O-4 to O-5 promotion gate. Table 10 presents the 2017 and 2018 entry cohorts (again, the 2016 cohort is excluded due to left-censoring). Time-in-grade amongst Navy nurses fell 7.2 months between cohorts (79.0 to 71.8 months), and it fell by 2.5 months (76.1 to 73.6) amongst Air Force nurses. The Army 2018 cohort contains only 1 officer, making that change estimate unreliable.

Table 9. Mean Time-In-Grade (Months) by Promotion Gate and Service (2017-2018 Entry Cohorts)

Promotion Gate	Army	Navy	Air Force
O-3 to O-4	72.3 (134)	77.7 (177)	66.1 (221)
O-4 to O-5	80.6 (72)	75.9 (108)	75.6 (85)

Note. Values represent mean months in grade; sample sizes in parentheses. Restricted to officers with complete rank spells in the promoted-twice subsample whose entry cohort falls in 2017 or 2018. The 2016 entry cohort is excluded because the dataset begins in January 2016, leaving October–December 2015 unobserved and left-censoring entry dates for that cohort. "Entry cohort" refers to the year an officer first entered the starting rank for the given promotion gate, not the year they entered military service. O-3 to O-4 gate: N = 532. O-4 to O-5 gate: N = 265. Adapted from DMHRSi (2025); DEERS (2025).

The time-in-grade analysis reveals that the Air Force promotes nurses faster at every gate, with the largest advantage at the O-3 to O-4 promotion gate. The 12.4-month gap between the Air Force and the Navy at the O-3 to O-4 promotion gate narrows to 4.3 months at the O-4 to O-5 promotion gate, suggesting that promotion timelines converge as officers advance through the rank structure. Cohort-level trends indicate that the Navy has been accelerating its promotion timelines, reducing O-3 to O-4 time-in-grade by 4.9 months between the 2017 and 2018 entry cohorts while the other services remained stable. Together, the promotion rate and timing analyses establish that service branch differences are substantial and consistent, but they do not control for individual-level factors such as demographics, subspecialty, or career trajectory.

D. PROMOTION LIKELIHOOD

To determine whether subspecialty independently predicts promotion likelihood, I estimated separate logistic regression models for each service branch at the O-3 to O-4 promotion gate, with Medical-Surgical nursing as the reference category. The likelihood-ratio (LR) chi-squared test, which assesses whether the full set of subspecialty coefficients jointly differs from zero, indicated that the Army model was statistically significant (LR $\chi^2 = 16.41$, $p = .037$, $N = 581$), the Navy model was highly significant (LR $\chi^2 = 41.89$, $p < .001$, $N = 696$), and the Air Force model was not statistically significant (LR $\chi^2 = 8.41$, $p = .493$, $N = 632$). Table 10 presents the predicted probabilities derived from these models.

Five subspecialties were present in all three services' margins output (OB/GYN and Nurse Anesthetists were dropped from one or more service models due to perfect prediction), allowing direct cross-service comparison of promotion likelihood within the same specialty. Medical-Surgical nurses had the lowest predicted probability in every service, but the Air Force (.912) exceeded the Army (.741) by 17.1-percentage points, the widest gap in the table, indicating that even for the most common specialty, the service context matters substantially. Emergency/Trauma nurses showed a 13.8-percentage point spread, with the Air Force (.964) for above the Army (.826). Critical Care nurses promoted best in the Navy (.931). Perioperative nurses had the narrowest spread at 3.2-percentage points (Navy .907, Army .886, Air Force .875). Psychiatric nurses showed a 5.7-percentage point spread, with the Army (.875) leading.

I also estimated separate Firth penalized logistic regression models for the O-4 to O-5 promotion gate. None of the three service-specific models were statistically significant (Army Wald $\chi^2 = 8.97$, $p = .440$; Navy Wald $\chi^2 = 10.87$, $p = .696$; Air Force Wald $\chi^2 = 14.54$, $p = .337$), indicating that subspecialty does not significantly predict promotion likelihood at the O-5 level. The smaller sample sizes at this gate and the more selective nature of O-5 promotion boards are likely to contribute to the lack of statistical power. Logistic regression models were not estimated for the O-5 to O-6 promotion gate due to the likelihood of the results having no statistically significant output based on the sample size for this group being smaller than the O-4 to O-5 promotion gate.

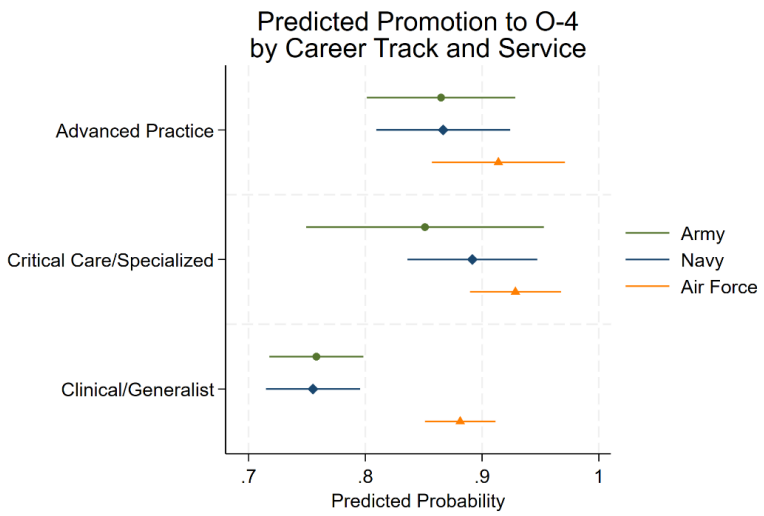
The above logistic regression models only focused on the subspecialties that every branch had, which left a lot of subspecialties out. When grouping the subspecialties together into three categories by career track, it was easier to compare the service branches. Advance Practice nurses (Nurse Practitioners and Nurse Anesthetists) had high predicted promotion probabilities across all three branches (.865 in the Army, .867 in the Navy, and .914 in the Air Force), with a spread of only 4.9-percentage points. The Air Force leads all three career tracks. Critical Care/Specialized nurses (Critical Care, Emergency/Trauma, Flight Nurse, Neonatal ICU, and Perioperative) nurses showed a 7.8-percentage point spread, with the Air Force (.929) leading, followed by the Navy (.881) and Army (.851). The largest cross-service differences are among Clinical/Generalist nurses. The Air Force

is well above (.881) with the Army (.758) and Navy (.755) closely matched. A 12.6-percentage point spread. These results suggest that advanced credentials provide a consistent promotion advantage regardless of service context, while generalist nurses are more sensitive to the institutional environment in which they serve.

Table 10. Predicted Probability of Promotion to O-4 by Service Branch

	Army	Navy	Air Force
Panel A: Shared Subspecialties			
Emergency/Trauma	.83	.89	.96
Critical Care	.88	.93	.92
Perioperative	.89	.91	.88
Psychiatric	.88	.84	.82
Medical-Surgical	.74	.81	.91
Panel B: Career Track			
Advanced Practice	.87	.87	.91
Critical Care/Specialized	.85	.89	.93
Clinical/Generalist	.76	.76	.88

Note. Panel A uses Medical-Surgical as the reference category and is restricted to five subspecialties present in all three services' margins output; OB/GYN and Nurse Anesthetist were dropped from one or more models due to perfect prediction. Panel B uses Clinical/Generalist as the reference category. Advanced Practice includes Nurse Practitioners and Nurse Anesthetists; Critical Care/Specialized includes Critical Care, Emergency/Trauma, Flight Nurse, Neonatal ICU, and Perioperative; Clinical/Generalist includes Medical-Surgical, OB/GYN, Pediatrics, Professional Nursing, Public Health, Nurse Education, Nursing Administration, and Psychiatric. Predicted probabilities from service-specific logistic regression models (see Section D for model fit statistics). Adapted from DMHRSi (2025); DEERS (2025).



Adapted from DMHRSi (2025); DEERS (2025).

Figure 4. Predicted Promotion to O-4 by Career Track and Service

I also estimated career track logistic regression models at the O-4 to O-5 promotion gate. Although the models produced predicted probabilities, with Critical Care/Specialized nurses showing the highest predicted probability across all three services (Army .52, Navy .70, Air Force .54), the confidence intervals for all three career tracks overlapped substantially within each service (Army N = 188; Navy N = 221; Air Force N = 254). As with the subspecialty-level models, the smaller sample sizes at this gate limit the ability to detect career track effects that may exist in the population. I did not estimate O-5 to O-6 models due to insufficient cell sizes.

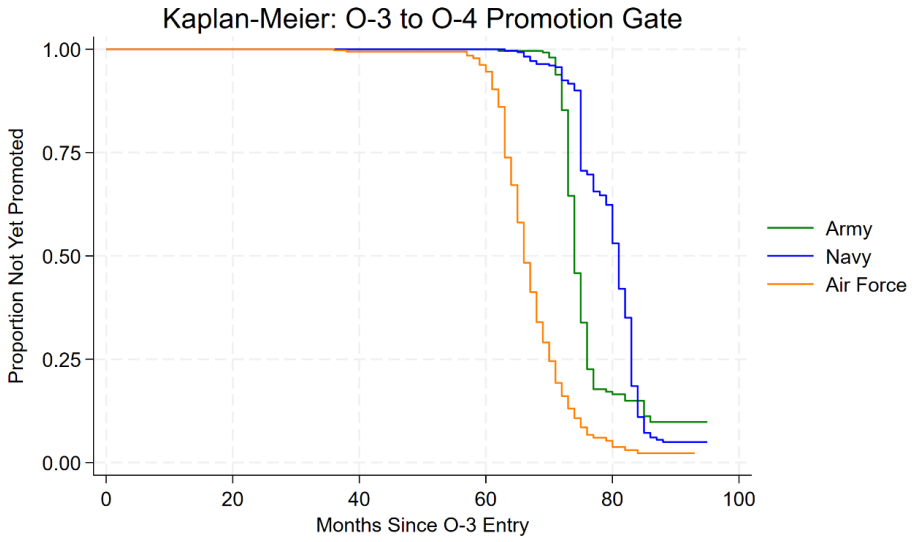
E. SURVIVAL ANALYSIS

Kaplan-Meier survival curves show how long officers remain in a rank before promoting. The curves display the percentage of officers who have not yet been promoted at each point in time, visually comparing promotion timing across services. Unlike the average time-in-grade in Section C, Kaplan-Meier curves account for officers who had not yet promoted by the end of the dataset (right-censored cases). Instead of giving just one average number, the curves show the entire pattern of how promotions occur over time.

1. O-3 to O-4 Promotion Gate

The O-3 to O-4 promotion gate survival curves show clear separation across all three services. Air Force nurses begin promoting earliest followed by steeply dropping promotion rates between 55 and 70 months; nearly all Air Force nurses are promoted by 75 months. Army nurses remain at full strength until approximately 63 months, then experience a steep decline through 80 months. The Navy curve begins declining last, around 65 months, and follows a more gradual trajectory extending to approximately 90 months, indicating that Navy promotions are spread across a wider window.

A logarithm test on rank, log-rank test, reinforces the timing differences observed in the analysis. The log-rank test is a statistical comparison on the number of promotions actually observed in each service at each time point to the number of promotions expected if all services promoted at the same rate. The result of the test results in a Chi-square with 2 degrees of freedom equals 504.54, p-value less than .001 ($\chi^2(2) = 504.54$, $p < .001$).The p-value explains how likely it is that the observed differences occur by chance. Since the p-value is less than .001, the differences in promotion timing across the services are extremely unlikely to be random. Figure 3 illustrates this separation.

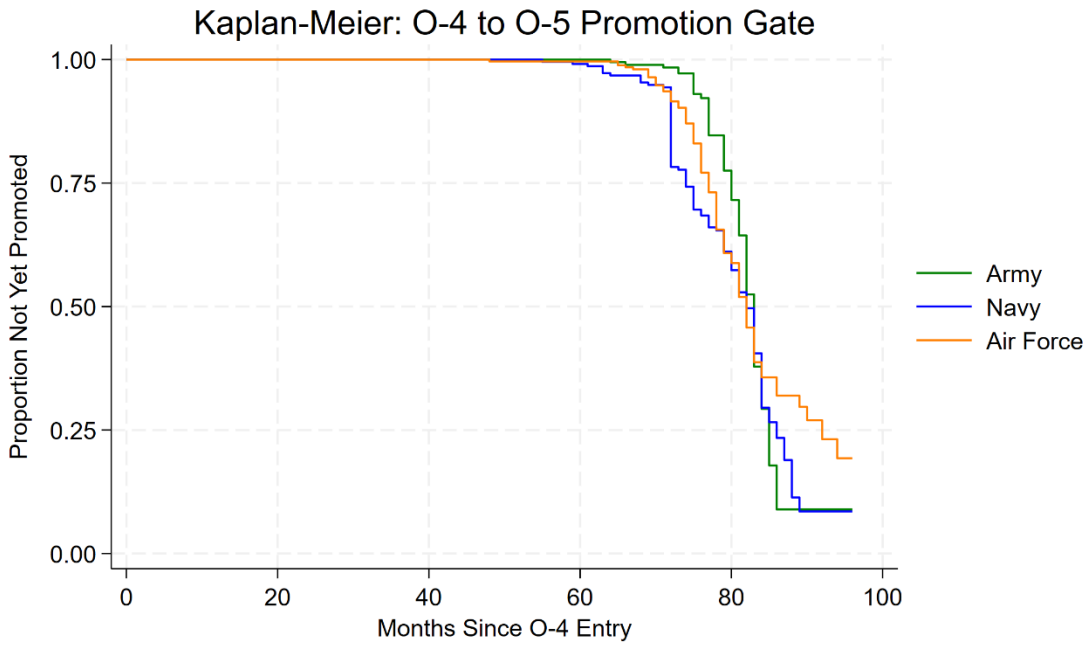


Adapted from DMHRSi (2025); DEERS (2025).

Figure 5. Kaplan-Meier Curve O-3 to O-4 Promotion Gate

2. O-4 to O-5 Promotion Gate

Unlike the O-3 to O-4 promotion gate, the three service branch curves at the O-4 to O-5 promotion gate are much closer together. The Navy and Air Force curves largely overlap through approximately 75 months, while Army promotions are slightly delayed. The log-rank test was not statistically significant a Chi-square with 2 degrees of freedom equals 3.91, p-value equal to .141 ($\chi^2(2) = 3.91$, $p = .141$), indicating that the differences in promotion timing could be due to chance. The convergence is consistent with the narrowing of the mean time-in-grade gap reported in Table 8, where the spread between the services decreased from 12.4 months at the O-4 promotion gate to 4.3 months at the O-5 promotion gate.



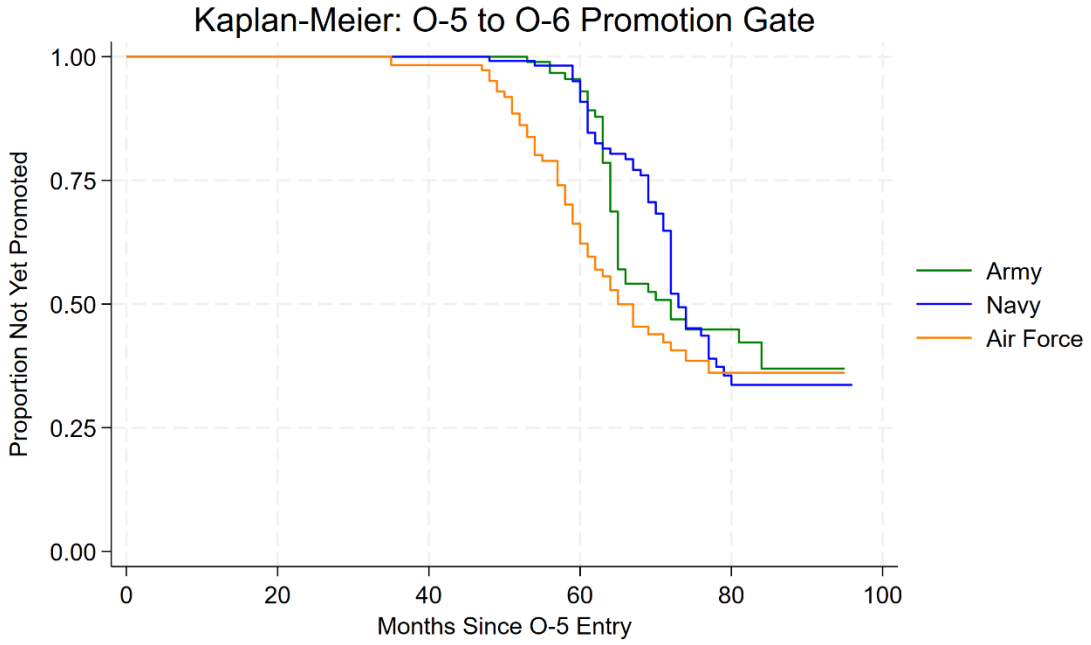
Adapted from DMHRSi (2025); DEERS (2025).

Figure 6. Kaplan-Meier Survival Curve O-4 to O-5 Promotion Gate

3. O-5 to O-6 Promotion Gate

At the O-5 to O-6 promotion gate, the Air Force curve again separates earliest, beginning its decline around 40 months, while the Army and Navy curves remain flat until

approximately 55 months. The log-rank test was statistically significant ($\chi^2(2) = 7.31$, $p = .026$), indicating that promotion timing differences persist even at the senior gate. However, with only 146 total promotion events (Army 41, Navy 56, Air Force 49), these results should be interpreted cautiously given the small sample size. Figure 6 shows the promotion pattern.



Adapted from DMHRSi (2025); DEERS (2025).

Figure 7. Kaplan-Meier Survival Curve O-5 to O-6 Promotion Gate

F. COX PROPORTIONAL HAZARDS

After completing the Kaplan-Meier Survival Curve analysis, I estimated Cox proportional hazards models for each promotion gate to determine whether service branch differences in promotion timing persist after controlling for entry cohort, gender, and race and marital status. These models account for those who have not yet been promoted (right-censored cases). Army serves as the reference service, 2016 as the reference cohort, White as the race reference, Male as the gender reference, and Not Married as the marital status reference.

1. O-3 to O-4 Promotion Gate

As noticed in the above statistical analysis, service branch is the best predictor of promotion timing for the O-3 to O-4 promotion gate. Air Force nurses had a hazard ratio of 3.88 (p-value < .01), meaning they were promoted nearly 3.9 times faster than Army nurses after controlling for the entry cohort, gender, race, and marital status. Navy nurses promoted slower, with a hazard ratio of 0.58 (p-value < .01), meaning they are 42% less likely to promote at the same time as Army nurses. The 2018 entry cohort promoted faster than the 2016 cohort with a hazard ratio of 1.30 (p-value < .05). Gender was a significant predictor at this gate, female nurses promoted faster (HR = 1.30, p-value < .01) and married nurses also promoted faster (HR = 1.33, p < .01). Asian nurses showed a significantly lower hazard of promotion (HR = .75, p-value < .05), and Hispanic nurses showed a marginally lower likelihood of promoting (HR = 0.76, p-value < .10).

2. O-4 to O-5 Promotion Gate

The overall O-4 to O-5 model is statistically significant (LR $\chi^2 = 24.70$, $p = .006$). Navy nurses promoted significantly faster than Army nurses (HR = 1.35, p-value < .05), while the Air Force was the same as the Army (HR = 1.00). Both the 2017 (HR = 1.52, p-value < .01) and 2018 (HR = 1.65, p-value < .05) entry cohorts promoted faster than the 2016 cohort, suggesting acceleration in promotion timelines. Female was marginally significant (HR = 1.24, p-value < .10). Race and marital status were not significant predictors of promotion at this gate.

3. O-5 to O-6 Promotion Gate

Unlike the O-4 to O-5 promotion gate model was not statistically significant (LR $\chi^2 = 10.52$, $p = .396$). The Navy showed no difference in timing from the Army (HR = 1.00). The Air Force promoted significantly faster (HR = 1.56, p-value < .05), though with less magnitude than at the O-4 promotion gate. Entry cohort, gender, race, and marital status were not significant predictors for promotion.

Table 11. Cox Proportional Hazards Models: Hazard Ratios for Time to Promotion by Gate

	O-3 → O-4	O-4 → O-5	O-5 → O-6
Service Branch			
Army	*(ref)*	*(ref)*	*(ref)*
Navy	0.576*** (0.062)	1.351** (0.199)	0.997 (0.213)
Air Force	3.879*** (0.389)	1.001 (0.147)	1.557** (0.339)
Entry Cohort			
2016	*(ref)*	*(ref)*	*(ref)*
2017	0.990 (0.107)	1.522*** (0.224)	0.767 (0.178)
2018	1.302** (0.154)	1.652** (0.333)	0.872 (0.205)
Demographics			
Female	1.299*** (0.112)	1.235* (0.146)	1.094 (0.202)
Married	1.331*** (0.113)	1.175 (0.159)	1.089 (0.249)
Race/Ethnicity			
White	*(ref)*	*(ref)*	*(ref)*
Black	1.049 (0.120)	0.816 (0.137)	1.030 (0.252)
Hispanic	0.758* (0.118)	0.727 (0.196)	0.907 (0.320)
Asian	0.746** (0.090)	0.804 (0.155)	1.133 (0.354)
Other	0.866 (0.141)	1.292 (0.277)	0.408 (0.295)
Observations	**1,368**	**940**	**463**
Failures	**664**	**340**	**146**
Time at Risk	**74,961**	**60,382**	**26,020**
LR χ^2	**389.17*** **	**24.70*** **	**10.52**

Note. Hazard ratios (HR) reported; standard errors in parentheses. HR > 1 indicates faster promotion relative to the reference category; HR < 1 indicates slower promotion. Army is the reference for service; 2016 for cohort; White for race/ethnicity; Male for gender; Not Married for marital status. Each column is a separate Cox model. Sample restricted to FY 2017–FY 2018 cohort with complete rank spells. * p < .10 ** p < .05 *** p < .01. Adapted from DMHRSi (2025); DEERS (2025).

V. DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This chapter interprets the results presented in Chapter IV in the context of the existing literature and the institutional differences described in Chapter II. The chapter is organized around the principal findings, beginning with the service-level promotion rates, followed by promotion timing, subspecialty effects, demographic factors, and the narrowing of service outcomes at the senior ranks. It then discusses implications for policy and practice, acknowledges limitations, identifies contributions to the literature, and offers recommendations for future research.

A. CROSS-SERVICES PROMOTION DIFFERENCES

The finding that stood out the most is the shift in promotion rates across the service branches at successive promotion gates. In the Fiscal Year (FY) 2017 to FY 2018 cohort, the Air Force led the rate of promotions at the O-3 to O-4 promotion gate (76.3%), the Navy led the promotion rate at the O-4 to O-5 promotion gate (44.9%), and the Navy also led the promotion rate at the O-5 to O-6 promotion gate (33.6%) though by a very narrow margin (2.2-percentage point spread). This pattern is consistent within individual subspecialties, the Air Force led most subspecialties at the O-3 to O-4 promotion gate and the Navy led most at the O-4 to O-5 promotion gate, suggesting the differences are driven primarily by how each service handles promotions rather than by differences in who makes up the workforce.

The pattern is consistent with the structural differences described in Chapter II, with regards to Defense Officer Personnel Management Act (DOPMA) flexibility and career roadmaps. Each service must comply with DOPMA, which establishes minimum time-in-grade for all ranks. For each of the ranks of O-3 through O-6, this minimum time-in-grade is 36 months or three years. However, DOPMA allows each service secretary to set promotion zone timing, selection rates, and vacancy requirements. The Air Force's higher O-4 promotion rate and faster time-in-grade may reflect their career roadmap, which provides specific timelines for advancement and suggests obtaining advanced degrees between nine and 18 years of service. Whereas, the Navy's roadmap does not provide

promotion timelines, which may contribute to the broader and more gradual promotion windows observed in the survival curves.

Despite the Air Force leading the rate of promotions at the O-4 promotion gate, a shift occurs at the O-5 promotion gate where the Navy leads with a 44.9% promotion rate compared to the Army (37.8%) and Air Force (34.1%). This shift may reflect the Navy's batch promotion system described in Chapter II. The Navy's smaller active-duty Nurse Corps (approximately 2,690 nurses) compared to the Army (approximately 3,096) and Air Force (approximately 3,244) may also mean fewer officers competing for proportionally similar numbers of senior billets. Additionally, the Navy's career roadmap emphasizes pursuing an advanced degree by O-5, which may make Navy nurses who reach this gate particularly competitive. The Army's career roadmap, which recommends obtaining a master's degree prior to or concurrent with promotion to O-4, may front-load competitiveness at the O-4 gate rather than the O-5 gate.

The convergence of all three services at the O-5 to O-6 promotion gate is notable, with the Navy leading at 33.6%, the Air Force at 32.1% and Army at 31.4%, yielding a 2.2-percentage point spread. This convergence is a stark contrast from the O-4 gate with a 12.1-percentage point spread. This finding may relate to the literature suggesting that the Navy Nurse Corps places increasing value on leadership and executive medicine experience at senior ranks (Ray, 2012; Simpson, 1992). Both Ray and Simpson found that while clinical specialization was a positive predictor of promotion for junior officers, the effect diminished at senior ranks where broader leadership experience was prioritized. The tight clustering of all three services at this promotion gate suggests that DOPMA's statutory constraints, the shrinking pool of available positions, and the increasing importance of leadership experience may override service-specific promotion practices at the senior ranks. Although, whether fewer competitive billets, converging board criteria, or the diminishing role of subspecialty, cannot be determined from this data alone.

B. PROMOTION TIMING AND THE AIR FORCE ADVANTAGE

The time-in-grade analysis and Cox proportional hazard models revealed that the Air Force promotes nurses faster than the other services, particularly at the O-4 promotion

gate. Air Force nurses averaged 66.1 months in grade before being promoted to O-4, compared to 73.2 months for the Army and 78.5 months for the Navy, a 12.4-month gap between the fastest and slowest services. The Cox model quantified this difference. Air Force nurses promoted nearly 3.9 times faster than Army nurses (HR = 3.88, $p < .01$), while Navy nurses were 42% less likely to promote at the same time as Army nurses (HR = 0.58, $p < .01$). Notably, being female (HR = 1.30, $p < .01$) and married (HR = 1.33, $p < .01$) were also significant predictors of faster promotion.

The Air Force's tighter distribution in time-in-grade (standard deviation (SD) = 5.4 at the O-4 promotion gate, compared to SD = 6.1 for both the Army and the Navy) suggests a more standardized promotion process. This difference is consistent with the Air Force's promotion system, which promotes officers when they meet minimum time-in-grade requirements and a vacancy becomes available. The Navy's broader distribution aligns with their practice of estimating vacancies in advance and promoting most officers at the end of the fiscal year, which may cause variability in individual promotion timing.

Another finding is the narrowing of promotion timing at higher ranks. The service-level gap narrowed from 12.4 months at the O-4 promotion gate to 4.3 months at the O-5 promotion gate. At the O-5 promotion gate, the Navy was significantly faster (HR = 1.35, $p < .05$), while the Air Force and Army were nearly the same. The advantage changed back to the Air Force at the O-6 promotion gate (HR = 1.56, $p < .05$), though the overall model was not significant. This narrowing pattern may reflect DOPMA's increasing constraint at senior ranks with limited vacancies reducing variation for service-specific acceleration.

The entry cohort trends provide an interesting finding. The Navy reduced its mean time-in-grade for the O-3 to O-4 promotion gate by 4.9 months between the 2017 and 2018 entry cohorts, while the Army (+0.4 months) and Air Force (+0.3 months) were essentially flat. At the O-4 to O-5 promotion gate, the Navy's acceleration was even more pronounced, with a 7.2-month reduction between cohorts. The consistency of the Navy's acceleration across both promotion gates, while the other two services remained stable, suggests the Navy has been actively adjusting its promotion timelines rather than experiencing random variation. One explanation for this adjustment may be related to retention, as Zangaro (2013) found that promotion opportunities were a primary driver of job satisfaction and

retention among military nurses. This finding may be one reason for the Navy's acceleration of promotion timelines.

C. SUBSPECIALTY AND CAREER TRACK EFFECTS

Medical-Surgical nurses consistently had the lowest promotion rates among major subspecialties at both the O-4 and O-5 promotion gates, despite comprising the largest share of the nurse workforce. At the O-4 promotion gate, Medical-Surgical promotion rates ranged from 74.1% in the Army to 91.2% in the Air Force. The logistic regression models confirmed that Medical-Surgical nurses had the lowest predicted promotion probabilities across all three services, with the Air Force (.91) exceeding the Army (.74) by 17.1 percentage points, the widest gap among shared subspecialties.

This finding is consistent with prior literature on Navy nurse promotions. Ray (2012) and Simpson (1992) both found that nurses in critical wartime specialties such as Intensive Care Unit, Operating Room, and mental health had higher promotion opportunities as junior officers. Simpson (1992) specifically found that Nurse Practitioners and Certified Registered Nurse Anesthetists had a 34-percentage point increase in promotion probability to O-4 compared to other nurses. The present study extends these findings by demonstrating that the subspecialty advantage is not unique to the Navy but exists across all three service branches.

The career track analysis provides additional insight. When subspecialties were grouped into Advanced Practice, Critical Care/Specialized, and Clinical/Generalist tracks, the Advanced Practice track showed high promotion probabilities across service branches (.87 in the Army, .87 in the Navy, .91 in the Air Force), with a spread of only 4.9-percentage points. The Air Force led all three career tracks. The Clinical/Generalist track showed the largest cross-service variation, with a 12.6-percentage point spread, and the widest gap between the Air Force and both the Army and Navy. These differences indicate that advanced credentials have a more even promotion advantage regardless of service, while generalist nurses are most sensitive to the institutional environments in which they serve.

The finding that subspecialty did not significantly predict promotion at the O-5 gate in any service is not surprising. The O-4 to O-5 promotion gate had substantially smaller sample sizes than the O-3 to O-4 promotion gate, and none of the Firth logistic regression models reached statistical significance. This pattern, however, is consistent with prior literature suggesting that promotion boards shift their emphasis at senior ranks. Ray (2012) found that clinical specialization became less predictive of promotion at the O-5 and O-6 levels, and both Ray and Simpson (1992) observed that leadership and executive medicine experience gained importance over clinical credentials at senior ranks.

D. DEMOGRAPHIC FACTORS

Gender and marital status were significant predictors of promotion timing at the O-3 to O-4 promotion gate. Female nurses promoted faster than male nurses (HR = 1.30, $p < .01$), and married nurses promoted faster than unmarried nurses (HR = 1.33, $p < .01$). Among race and ethnicity categories, Asian nurses showed a significantly lower hazard of promoting at the O-4 gate (HR = 0.75, $p < .05$) and Hispanic nurses showed a marginally lower likelihood (HR = 0.76, $p < .10$). At the O-4 to O-5 promotion gate, female was marginally significant (HR = 1.24, $p < .10$), but no other demographic variables reached significance. At the O-5 to O-6 promotion gate, no demographic variables were significant predictors. The appearance of gender and marital status as significant predictors at the O-4 promotion gate, but not at higher gates, may reflect that these factors influence early career promotion timing, while service-level and institutional factors dominate at senior ranks. The finding that Asian and Hispanic nurses face slower promotion timing at the O-4 promotion gate warrants further investigation, as this study cannot determine whether these differences reflect unobserved factors such as duty assignment patterns, educational credentials, or other variables not available in this dataset.

E. SENIOR RANKS

A recurring finding across the results is that service-level differences in promotion rates become smaller at higher promotion gates even as timing differences persist. The Kaplan-Meier curves converged at the O-4 to O-5 gate, and the log-rank test confirmed that timing differences were not statistically significant at that gate ($\chi^2(2) = 3.91$, $p = .141$).

However, at the O-5 to O-6 promotion gate, the log-rank test was statistically significant ($\chi^2(2) = 7.31$, $p = .026$), driven by the Air Force's faster promotion timing at this gate. While promotion rates converge at senior ranks, the 2.2-percentage point spread at the O-6 promotion gate is the narrowest across all three gates. Promotion timing differences reemerge, with the Air Force maintaining a speed advantage even at the most senior levels. These results suggest that DOPMA's statutory constraints and the shrinking pool of available positions narrow how many officers each service promotes, but do not fully equalize how quickly those promotions occur.

F. IMPLICATIONS FOR POLICY AND PRACTICE

The findings from this study have several implications for military nursing leadership. First, the substantial cross-service differences in promotion rates and timing at the O-4 promotion gate suggest that the three services are effectively applying different standards to equivalent career milestones. DOPMA allows flexibility by giving the service chiefs some input on timing of promotion past the minimum time-in-grade, leaders should consider whether these differences create inequities that affect morale and retention, especially in medical treatment facilities where all three branches serve in the same facility. Zangaro (2013) identified promotion opportunity as a primary driver of job satisfaction among military nurses. The 12.1-percentage point gap in O-4 promotion rates between the highest and lowest services may have retention consequences, should some nurses tire of promoting later than others.

The second concern is the apparent disadvantage for Medical-Surgical nurses. Medical-Surgical nursing accounts for approximately 45% of the total nursing workforce and represents the foundation of military nursing capability. If the lowest promotion rates among this group are driven by a genuine lack of competitive credentials, then services should consider whether career development opportunities are equally distributed across subspecialties. For example, a nurse working in the Intensive Care Unit (ICU) will have opportunities to learn more skills than a Medical-Surgical nurse. While this is part of the nature of the different specialties, as ICU nurses require more training, it can appear that

the Medical-Surgical nurse is not interested in learning more skills and therefore can be overlooked for promotion.

The third implication is the finding that subspecialty effects disappear at the O-5 promotion gate, calling for increased career mentoring. Senior nurse leaders should help junior nurses understand that clinical specialization, while critical for early career advancement, becomes less important at senior ranks. Instead, experience in leadership positions or executive medicine take precedence. This is important for those with advanced nursing degrees such as Nurse Practitioners or Nurse Anesthetists to be cognizant of if they wish to promote to the more senior ranks. These nurses do not have to abandon their advanced practice but rather determine where they can show leadership skills beyond their day-to-day patient care experience.

G. LIMITATIONS

Several limitations should be considered when interpreting the results of this study. First the observation window of 2016 through 2024 provides sufficient follow-up for the O-4 promotion gate but is not sufficient for the O-5 and O-6 promotion gates as they underestimate the true promotion rates for later entry cohorts. Although the survival analysis methods accounted for the right-censoring caused by the small number of observations, the logistic regression models and descriptive rates should be interpreted with caution.

The second limitation is the dataset used from Defense Medical Human Resources System Intranet (DMHRSi). This dataset does not include several variables that prior research has identified as important predictors of promotion. Educational credentials, specific duty stations, deployment history, performance evaluation scores, and completion of professional military education were not available in this dataset. Because this dataset lacks these variables, the models cannot determine whether the service-level differences in promotion outcomes are driven by these unobserved factors or other factors altogether. For example, the Air Force career roadmap suggests nurses obtain an advanced degree by the time they are ready for promotion to O-4. The advantage this study found in promotion rates for the Air Force may be related to obtaining higher level of education instead of

institutional policy. Winston (2024), Ray (2012), and Simpson (1992) all found that specific assignment types and educational credentials were significant predictors of promotion in the Navy. Without these variables, it is difficult to make that determination across all three services.

A third limitation occurred when trying to map subspecialties across the three service branches. The Army's Area of Concentration (AOCs), Navy Subspecialty Codes (SSC), and Air Force's Air Force Subspecialty Code (AFSC) are not the same. I made every effort to align subspecialties, some proved to be challenging. The Navy's "Professional Nursing" is a standard SSC if a nurse does not have another listed. The other two branches do not have a similar code, which made mapping these nurses to equivalent nurses in the other two branches challenging. Having more accurate listings of subspecialties, possibly matched with the current billet a nurse is filling would provide more accurate results across subspecialties.

H. CONTRIBUTIONS TO THE LITERATURE

This study makes several contributions to the military personnel research literature. First, it represents the first systematic cross-service comparison of nurse promotion patterns encompassing the Army, Navy, and Air Force. Prior research on military nurse promotions, most notably by Simpson (1992), Ray (2012), and Winston (2024), focused exclusively on the Navy Nurse Corps. By extending the analysis to all three services, this study establishes that the subspecialty advantages identified in prior Navy-focused studies are not unique to the Navy but exist across all service branches.

Second, the identification of the service-level promotion rates is a new contribution to the understanding of military promotion systems. Previous studies examined single-service promotion determinants but did not compare how service-level rankings shift across successive promotion gates. The finding that the Air Force leads at O-4, the Navy leads at O-5, and the Navy again leads at O-6 highlights the importance of examining promotion outcomes across the full career trajectory rather than at a single point.

Third, the career track grouping approach provides a practical framework for cross-service comparison when subspecialty codes do not align across services. By grouping

subspecialties into Advanced Practice, Critical Care/Specialized, and Clinical/Generalist tracks, the analysis demonstrated that advanced credentials provide a consistent promotion advantage regardless of service context, while generalist nurses are most affected by institutional differences. This framework may be useful for future cross-service studies in other medical communities.

Fourth, this study quantified the cumulative career impact of promotion timing differences. The approximately 12-month advantage the Air Force holds at the O-4 gate, combined with faster timing at the O-6 gate, produces a cumulative career advantage exceeding one year to reach O-6. This quantification provides concrete evidence for policymakers considering whether cross-service promotion timing differences warrant attention.

I. RECOMMENDATIONS FOR FUTURE RESEARCH

While this study addressed a significant gap in the literature, several avenues for future research remain. The following recommendations are organized by their potential to extend or refine the findings presented in this thesis.

The most important recommendation is the inclusion of additional individual-level variables that were not available in the DMHRSi dataset. Future research should incorporate educational credentials, specific duty station assignments, deployment history, performance evaluation scores, and completion of professional military education. Winston (2024), Ray (2012), and Simpson (1992) all found that specific assignment types and educational credentials were significant predictors of promotion in the Navy. Without these variables, it remains unclear whether the service-level differences identified in this study are driven by institutional policies, workforce composition, or individual career choices. Access to this data would enable researchers to decompose the service-level effects into their component factors and provide more targeted policy recommendations.

A second recommendation is to extend the observation window beyond fiscal year 2024. The current dataset provides sufficient follow-up for the O-4 gate but results in right-censored outcomes for later entry cohorts at the O-5 and O-6 gates. A longer observation window would allow researchers to capture complete promotion outcomes at senior ranks

and to evaluate whether the narrowing pattern observed at higher gates persists with additional data. Additionally, extending the dataset would enable the inclusion of more entry cohorts, improving statistical power for cohort-level trend analysis and potentially revealing whether the Navy's acceleration in promotion timing is a sustained policy shift or a temporary adjustment.

Third, future studies should examine the relationship between promotion outcomes and retention. Zangaro (2013) identified promotion opportunity as a primary driver of job satisfaction among military nurses. The 12.1-percentage-point gap in O-4 promotion rates between services, combined with the nearly one-year timing difference, may have retention consequences that this study was not designed to measure. A study linking promotion outcomes to subsequent separation decisions would provide evidence for whether cross-service promotion disparities contribute to differential attrition across the Nurse Corps.

Fourth, the subspecialty mapping challenge identified in this study warrants dedicated attention. The Army's Area of Concentration codes, Navy's Subspecialty codes, and Air Force's Air Force Specialty Codes do not align directly. Future research should develop a validated crosswalk between these coding systems, ideally in collaboration with the Nurse Corps leadership from each service. A more refined mapping would enable more precise cross-service subspecialty comparisons and reduce the measurement error introduced by approximating equivalences.

Fifth, researchers should consider applying the analytical framework used in this study to other military medical communities. The Medical Service Corps, Medical Corps, and Dental Corps each face similar cross-service promotion questions, and the methodology developed here could be replicated to determine whether the promotion patterns and subspecialty effects observed among nurses are unique to the Nurse Corps or reflect broader patterns in military medical promotions.

Finally, a study examining the effect of joint-service medical environments on promotion perceptions would be valuable. Military nurses from all three services often serve together in joint Medical Treatment Facilities. Research examining whether exposure to cross-service peers with different promotion timelines affects morale, satisfaction, or

retention intentions would provide practical evidence for whether promotion disparities create tangible workforce management challenges in joint environments.

J. CONCLUDING REMARKS

Military nurses serve a critical role in maintaining the health and readiness of the armed forces. Whether providing care in fixed medical facilities, aboard ships at sea, or on aeromedical evacuation flights, these officers represent a highly trained and essential component of the military medical enterprise. The promotion systems that govern their career progression should reflect the value of their service and provide equitable pathways for advancement.

This study has demonstrated that promotion outcomes for military nurses vary substantially across the Army, Navy, and Air Force. The service-level promotion pattern, the Air Force's timing advantage at the O-4 gate, the consistent disadvantage for Medical-Surgical nurses, and the narrowing of service differences at senior ranks collectively paint a picture of a promotion landscape shaped as much by institutional context as by individual merit. While DOPMA provides a common statutory framework, the flexibility it affords each service has produced meaningfully different career experiences for nurses performing equivalent roles.

The findings of this thesis provide military nursing leaders, personnel planners, and policymakers with empirical evidence to inform decisions about promotion policy, career development, and workforce management. As the military health system continues to evolve toward integrated joint environments, understanding how promotion systems affect the nurses who sustain it is essential to attracting, retaining, and developing the nursing workforce the nation's military requires.

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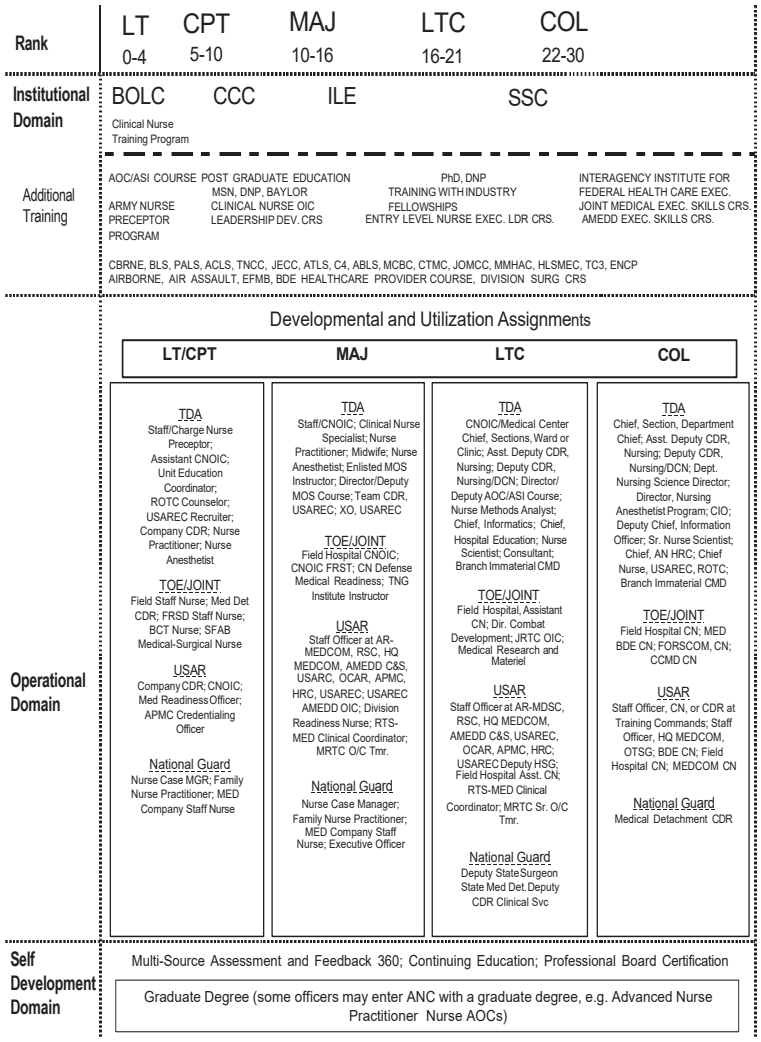
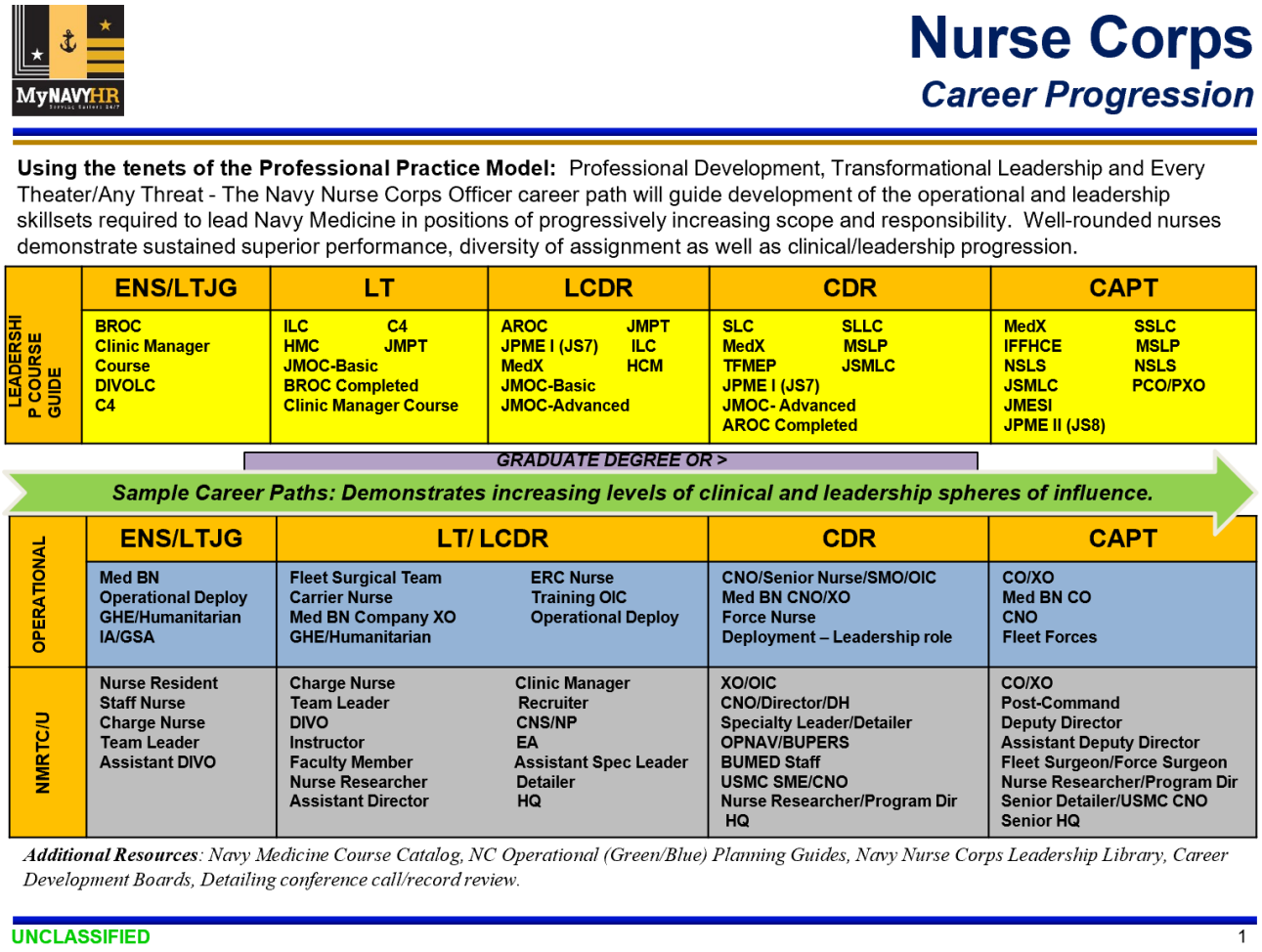
APPENDIX A. CAREER ROADMAP EXAMPLES

A1. ARMY NURSE CORPS CAREER ROADMAP



Source: Army Nurse Corps career development guidance (n.d.); email to author Magyar, Louis, personal communication, September 29, 2025

A2. NAVY NURSE CORPS CAREER ROADMAP



Nurse Corps

Career Progression

Using the tenets of the Professional Practice Model: Professional Development, Transformational Leadership and Every Theater/Any Threat - The Navy Nurse Corps Officer career path will guide development of the operational and leadership skillsets required to lead Navy Medicine in positions of progressively increasing scope and responsibility. Well-rounded nurses demonstrate sustained superior performance, diversity of assignment as well as clinical/leadership progression.

LEADERSHIP COURSE GUIDE	ENS/LTJG	LT	LCDR	CDR	CAPT
	BROC Clinic Manager Course DIVOLC C4	ILC C4 HMC JMPT JMOC-Basic BROC Completed Clinic Manager Course	AROC JMPT JPME I (JS7) ILC MedX HCM JMOC-Basic JMOC-Advanced	SLC SLLC MedX MSLP TFMEP JSMLC JPME I (JS7) JMOC- Advanced AROC Completed	MedX SSLC IFFHCE MSLP NSLS NSLS JSMLC PCO/PXO JMESI JPME II (JS8)

GRADUATE DEGREE OR >

Sample Career Paths: Demonstrates increasing levels of clinical and leadership spheres of influence.

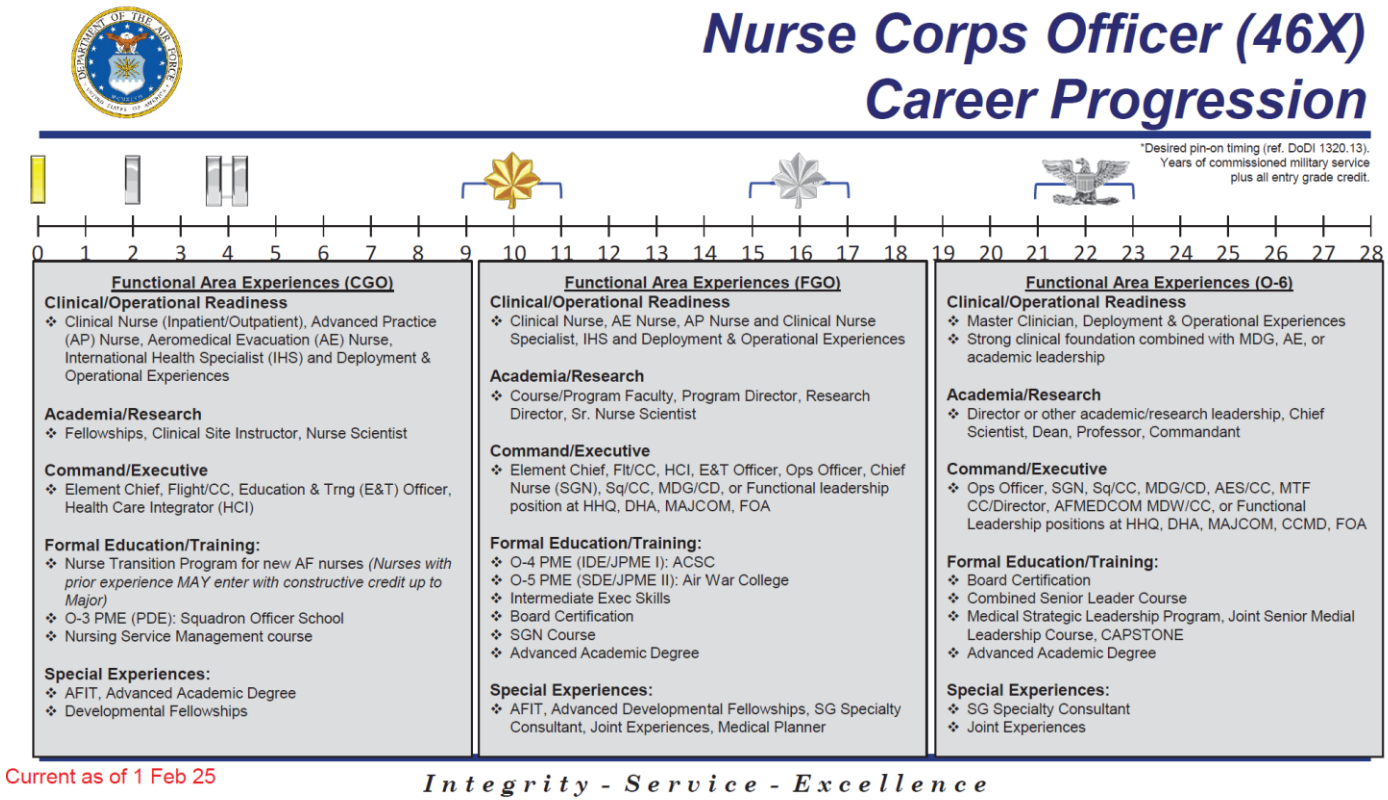
	ENS/LTJG	LT/ LCDR	CDR	CAPT
OPERATIONAL	Med BN Operational Deploy GHE/Humanitarian IA/GSA	Fleet Surgical Team ERC Nurse Carrier Nurse Training OIC Med BN Company XO Operational Deploy GHE/Humanitarian	CNO/Senior Nurse/SMO/OIC Med BN CNO/XO Force Nurse Deployment – Leadership role	CO/XO Med BN CO CNO Fleet Forces
NMRTC/U	Nurse Resident Staff Nurse Charge Nurse Team Leader Assistant DIVO	Charge Nurse Clinic Manager Team Leader Recruiter DIVO CNS/NP Instructor EA Faculty Member Assistant Spec Leader Nurse Researcher Detailer Assistant Director HQ	XO/OIC CNO/Director/DH Specialty Leader/Detailer OPNAV/BUPERS BUMED Staff USMC SME/CNO Nurse Researcher/Program Dir HQ	CO/XO Post-Command Deputy Director Assistant Deputy Director Fleet Surgeon/Force Surgeon Nurse Researcher/Program Dir Senior Detailer/USMC CNO Senior HQ

***Additional Resources**: Navy Medicine Course Catalog, NC Operational (Green/Blue) Planning Guides, Navy Nurse Corps Leadership Library, Career Development Boards, Detailing conference call/record review.*

UNCLASSIFIED 1

Source: Navy Personnel Command (2025)

A3. AIR FORCE NURSE CORPS CAREER ROADMAP



Source: Nurse Corps (46X) Career Development Brief (2025); email to author Damiani, Darren, personal communication, September 29, 2025

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APPENDIX B. O-5 TO O-6 PROMOTION RATES BY NURSING SUBSPECIALTY AND SERVICE BRANCH

	Army		Navy		Air Force	
Subspecialty	*n*	**Rate (%)**	*n*	**Rate (%)**	*n*	**Rate (%)**
Medical-Surgical	24	58.3	14	64.3	8	50.0
Critical Care	3	66.7	10	60.0	9	44.4
Emergency/Trauma	6	50.0	10	70.0	6	50.0
Perioperative	10	30.0	12	66.7	2	0.0
Nurse Anesthetist	13	23.1	13	53.8	8	25.0
Family NP	8	62.5	6	50.0	—	—
Adult NP	—	—	—	—	6	66.7
OB/GYN	1	0.0	3	33.3	2	0.0
Professional Nursing	—	—	8	37.5	—	—
Public Health	6	66.7	2	50.0	—	—
Psychiatric	1	0.0	1	0.0	—	—
Psychiatric NP	2	50.0	1	100.0	—	—
Pediatrics	—	—	1	0.0	—	—
Pediatrics NP	—	—	5	60.0	—	—
Nurse Midwife	2	100.0	1	0.0	1	100.0
Nurse Education	—	—	3	33.3	2	0.0
Nursing Administration	—	—	1	100.0	—	—
Flight Nurse	—	—	—	—	2	50.0
Neonatal ICU	—	—	—	—	1	0.0
Total	**76**	**48.7**	**91**	**56.0**	**47**	**40.4**

Note. Sample restricted to officers who reached O-5 and were observed at that rank for at least 60 months (at_risk_o6 = 1) in the FY 2017–FY 2018 cohort. Rate = percentage of officers in each subspecialty who reached O-6 during the observation period. n = officers at risk. Em-dashes (—) indicate a subspecialty not present within that service's taxonomy or no officers meeting the at-risk criteria. Subspecialties are harmonized across services using a crosswalk that maps Army AOCs, Navy NECs, and Air Force AFSCs to a common taxonomy. Nearly all cells contain fewer than 20 officers; individual rates should be interpreted with extreme caution. Adapted from DMHRSi (2025); DEERS (2025).

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