GlobalData.

HAWAIʻI NURSE WORKFORCE PROJECTIONS 2022-2037

PREPARED FOR
THE HAWAIʻI STATE CENTER FOR NURSING
BY **GLOBALDATA PLC | FEBRUARY 2025**

HAWAIʻI STATE CENTER FOR **NURSING**
Connecting Nurses. Transforming Healthcare.

Prepared for the Hawai‘i State Center for Nursing by GlobalData Plc.

Clark Ruttinger MPA, MBA, Consulting Director

Ryan Reynolds, MS, Principal Economist

Ritashree Chakrabarti, PhD, Principal Economist

Patrick Zarek, MS, Senior Consultant

Owen Parker, BA, Consultant

Tim Dall, MS, Executive Director

Suggested citation:

Hawai‘i State Center for Nursing. (2025). *Hawai‘i Nurse Workforce Projections, 2022–2037*. Honolulu, HI. Prepared by GlobalData Plc.

Abbreviations used in the report

ACS- American Community Survey

APRN - Advanced Practice Registered Nurse

CNM - Certified Nurse Midwife

CRNA - Certified Registered Nurse Anesthetist

CNS- Clinical Nurse Specialist

ED- Emergency Department

FTE - Full-Time Equivalent

HSCN - Hawai‘i State Center for Nursing

LPN - Licensed practical nurse

NP - Nurse Practitioner

NSSRN- National Sample Survey of Registered Nurses

RN - Registered Nurse

List of Contents

List of Exhibits

Executive Summary

This report presents an in-depth analysis of the supply and demand for nursing professionals in Hawai‘i, including RNs, LPNs and APRNs—comprising NPs, CNMs and CRNAs[i]. Utilizing a robust microsimulation approach, the study integrates demographic trends, health risk factors, and disease prevalence data to forecast future workforce needs and assess alignment with projected population demands. The report highlights key workforce trends, regional disparities at the county level, and the broader implications for healthcare access and service delivery across the state. A summary of important findings is provided here. For a detailed discussion of key findings and policy implications please refer to the discussion section at the end of the report.

- **RNs:** The RN workforce in Hawai‘i is projected to experience steady Hawai‘i growth, with supply slightly outpacing demand. The statewide adequacy ratio is expected to increase from 100% in 2022 to 103% by 2037, indicating that on average the supply of RNs is sufficient to meet the expected demand for their services across the state. However, county-level disparities persist. In 2022, Honolulu County had a surplus of RNs (106% adequacy), while both Maui (90%) and Hawai‘i (89%) counties faced moderate shortages. Kaua‘i had the lowest adequacy ratio (74%), indicating a more severe shortfall. Adequacy ratios across most of the state are expected to improve over time with the exception of Kaua‘i County. These variations highlight the need for targeted workforce initiatives, particularly in Kaua‘i and rural areas, to ensure equitable healthcare access statewide.
- **LPNs:** A marked decline in supply (–0.3% annually) versus increasing demand (0.5% annually) will exacerbate a severe statewide shortage, with adequacy falling from 34% in 2022 to 31% by 2037. All counties have a shortage of LPNs in 2022. and by 2037 all counties except Maui are projected to have significantly lower LPN adequacy. Adequacy in the county of Maui is anticipated to grow by +84 percentage points over the projection period. In areas facing a shortage of LPNs, providers may be inclined to employ RNs to help address staffing needs. While adequacy of RN supply and LPN supply is projected separately, considering nurse adequacy projections for both professions provides a more complete understanding of nurse adequacy in the state.
- **NPs**: The adequacy ratio for total NPs is expected to improve from 89% in 2022 to 114% in 2037. This indicates an overall trend toward a potential surplus of NPs in the state. However, this overall growth is not unform across all NP specialties or all counties in the state of Hawai‘i.
- **CRNAs:** While the supply of CRNAs in Hawai‘i is projected to grow, it will remain significantly below demand. In 2022, the adequacy ratio was just 37%. Supply is expected to increase resulting in a slightly improved adequacy ratio of 41% by 2037. However, demand will rise more quickly than supply. This persistent shortage contrasts with other APRN categories, such as NPs and CNMs, which are projected to have a surplus. Addressing this gap will require targeted workforce development strategies to

[i] Clinical Nurse Specialists were not included in this study due to data limitations further described in the strengths and limitations section of the report.

expand training opportunities, improve retention, and attract more providers to meet the growing need for anesthesia services in Hawai‘i.

- **CNMs:** The adequacy ratio for CNMs is projected to improve from 77% in 2022 to 107% by 2037. This indicates a shift from a shortage to a slight oversupply by the end of the projection period. This is driven by strong growth in supply coupled with declining demand. There are also geographic disparities to consider, which could further impact access to care in some areas. The counties of Hawai‘i and Maui are projected to decline in adequacy (-41%, -30% percentage points respectively). The county of Honolulu is expected to increase in adequacy by 23% points.

Focus group interviews were conducted to provide a qualitative perspective on the challenges and potential recommendations for Hawai‘i's nursing workforce, complementing the quantitative data from the modeling. These interviews reveal challenges in recruitment, retention, shortages in specialty areas particularly in rural and neighbor islands, highlighting the need for policy interventions and workforce strategies.

Introduction

States play a pivotal role in shaping health workforce policies, aiming to ensure an adequately skilled healthcare workforce that meets the unique needs of their populations. This responsibility encompasses the regulation of health professions through state-level licensing, funding for health education programs, and the establishment of policies governing public insurance reimbursement which dictates the professions authorized to deliver healthcare services. All these activities have an impact on the overall supply and demand for healthcare workers across the country.

This report examines projected trends in the state of Hawai‘i’s nurse workforce, analyzing the supply and demand of RNs, LPNs and APRNs from 2022 to 2037. The report utilizes microsimulation modeling, a proven approach that simulates individual career decisions and healthcare utilization patterns to project future workforce needs.

Key factors driving these projections include:

- **Population Growth and Aging:** Hawai‘i's population is expected to grow at a stable rate, with increase in the elderly population, a demographic that utilizes healthcare services at higher rates. This demographic shift is expected to fuel demand for healthcare services.
- **Prevalence of Disease and Health Risk Factors:** Hawai‘i exhibits lower prevalence rates of disease and health risk factors compared to national averages. These factors are incorporated into demand modeling, recognizing their influence on healthcare utilization.
- **Healthcare Utilization Patterns:** National data on healthcare use, adjusted for Hawai‘i-specific hospital utilization data, are used to project future demand for healthcare services, which in turn drives the projected demand for various healthcare occupations.
- **Health Workforce Characteristics:** Comprehensive data and surveys from HSCN provide detailed information about the current nursing workforce, including demographics, education levels, county location, and hours worked. These data form the basis for supply modeling.
- **New Entrants and Attrition:** The model accounts for new entrants entering the workforce through graduation from local training programs and migration to the state, as well as healthcare providers leaving due to retirement, out-of-state migration, or career changes (e.g., LPNs becoming RNs). These dynamics are crucial for understanding the evolving composition of the nursing workforce.

The report examines various workforce projection scenarios, including a *Status Quo* scenario that assumes the continuation of current trends, as well as alternative scenarios that explore the potential impact of factors such as changes in retirement patterns, increases in new graduates, and reduced barriers to healthcare access. This detailed analysis provides valuable insights into the future state of Hawai‘i’s nurse workforce, aiming to inform policy decisions and strategic planning efforts to ensure an adequate supply of clinicians to meet the healthcare needs of the state's growing and aging population.

Methodology

This section outlines the methodology, data sources, and key assumptions used in the supply and demand modeling of Hawai‘i’s nursing workforce. The projections are based on GlobalData’s workforce demand and supply modeling framework, which has been extensively documented in reports and academic literature. [1, 2, 3, 4] The analysis covers the period from 2022 to 2037, with 2022 serving as the baseline year for demand modeling and the starting point for supply projections, as it represents the most recent year with comprehensive data from all sources.

Modeling Overview

This study employs a microsimulation approach, using individual nurses as the units of observation for supply modeling and a representative sample of Hawai‘i’s population for demand modeling. These workforce models have been rigorously validated through applications for federal and state governments, professional associations, and healthcare systems. Further methodological details are available in the model’s technical documentation.[5]

The workforce projections span from 2022 to 2037, with 2022 serving as the baseline year, as it is the most recent year with comprehensive population, national employment, and hospital utilization data. Demand modeling begins with a representative sample of the population in each county, projecting healthcare service utilization based on demographic trends, health risk factors, disease prevalence, and observed hospital usage patterns in Hawai‘i. National healthcare utilization trends are also incorporated to refine state-level estimates. Projected future demand for healthcare services are used to estimate future demand for nurses.

Supply modeling also begins in 2022, using de-identified survey data on RNs and LPNs. The model tracks workforce dynamics by incorporating demographic factors, labor force participation trends, and geographic distribution. New entrants are added annually based on recent data on nursing graduates and migration patterns, while attrition is simulated as nurses exit the workforce. The model also accounts for career progression, including LPNs transitioning to RNs and RNs advancing to become APRNs. Furthermore, APRNs are excluded from RN workforce projections and are analyzed separately by specialty, including CNMs, CRNAs, and nurse practitioners.

All supply and demand projections are reported in FTEs, with an FTE defined as the Hawai‘i average weekly hours worked among nurses in the given occupation and specialty who work at least eight hours per week.

Demand Modeling

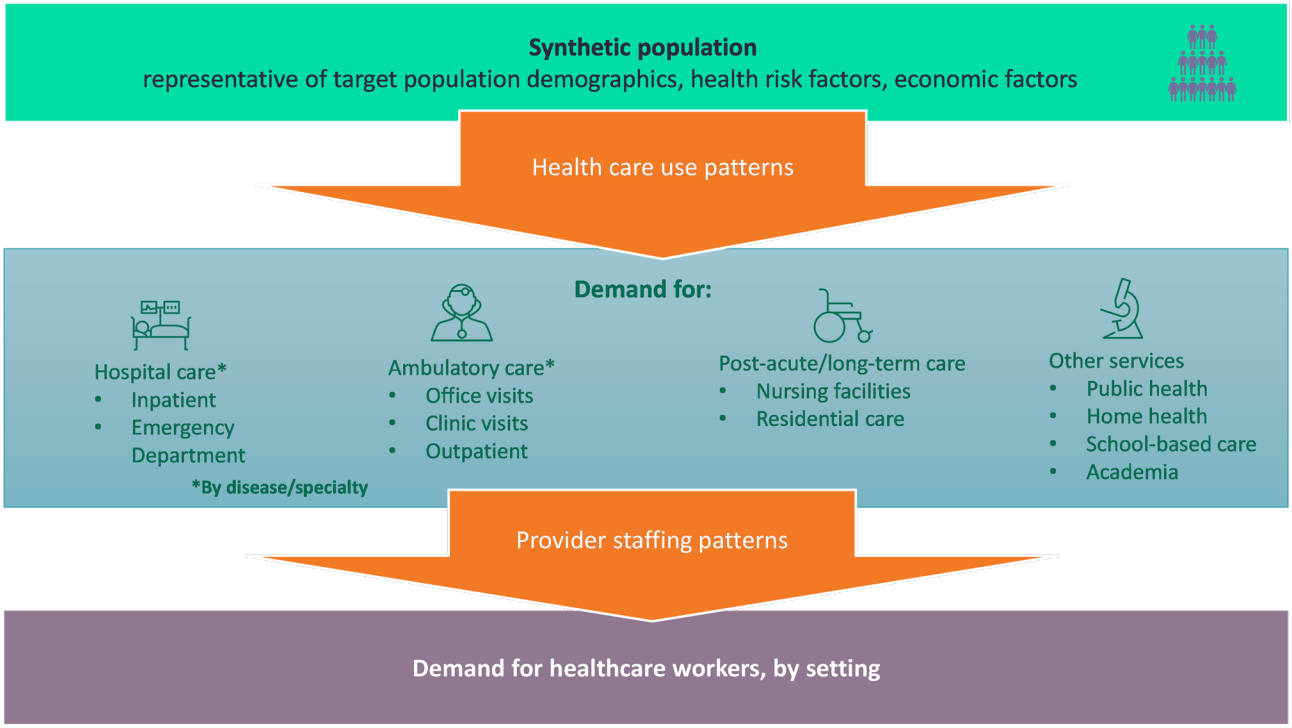
A Healthcare Demand Microsimulation Model was used to estimate both base year and projected future demand for healthcare services and nursing providers in Hawai‘i. Demand modeling analyzes key characteristics of the state's population to predict healthcare service utilization in future years and estimate the number of nurses required to meet these needs (Exhibit 1). Demand is assessed across various care settings, including inpatient facilities, emergency departments, ambulatory care centers, long-term care facilities, schools, public health departments, and other patient care environments.

Additionally, demand projections include non-patient care roles, such as those in academia and insurance organizations. The baseline demand is established and projected forward over the projection period by accounting for key factors influencing employment growth in each setting over time.

The *Status Quo* demand for healthcare services in Hawai‘i is estimated by applying national healthcare utilization patterns—based on demographics, socioeconomic factors, health conditions, and insurance status—to a representative population sample from each county. Adjustments are made to reflect Hawai‘i-specific utilization of hospital-based services, including care provided to non-resident tourists. County-level demand projections are aggregated to produce state-level estimates. Future healthcare utilization is projected based on expected changes in Hawai‘i’s population size, demographic shifts, and the anticipated rise in chronic disease prevalence due to an aging population.

Demand for RNs, LPNs and APRNs is derived from the expected demand for the services they provide, based on national staffing patterns (existing nurse-to-patient ratios) in healthcare delivery. These national benchmarks serve as a reference point for comparison but do not imply an optimal staffing level for Hawai‘i.

Exhibit 1: Overview of the Demand Modeling Framework



This study estimates and projects demand for healthcare services and nurses, defined, respectively, as the amount and types of healthcare services patients are willing and able to purchase at prevailing prices and the number of nurses that employers are willing and able to hire at prevailing salary levels. The concept of demand for services differs from need for services, which represents the services that patients would use based on clinical or epidemiological considerations combined with an assessment of the level of care that would be considered appropriate. Likewise, the demand estimates for nurses do not imply an optimal level of nurse staffing independent of economic and other realities.

Modeling Methods and Data Sources

The primary components of the Healthcare Demand Microsimulation Model include:

Population Database. The constructed population database contains information about the characteristics of an unidentified but representative sample of the resident population in each county in state of Hawai‘i from 2022 through 2037. Characteristics used to estimate demand for healthcare services include each person’s demographics (age, sex, and race/ethnicity), health conditions and risk factors (arthritis, asthma, cardiovascular disease, diabetes, hypertension, history of heart attack, history of cancer, history of stroke, body weight status, and smoking status), household income range, and health insurance status (whether insured, on public insurance, and in a managed care plan). Key data sources used to construct this file are Hawai‘i residents’ responses to the 2022 ACS; Hawai‘i residents’ responses to the 2021- 2022 Behavioral Risk Factor Surveillance System BRFSS; 2021 files from the Centers for Medicare & Medicaid Services (CMS) on the characteristics and prevalence of health risk factors of residents of nursing homes and residential care facilities in the state of Hawai‘i; and county-specific data on prevalence of health risk factors from the 2023 Centers for Disease Control and Prevention (CDC) Places.[6,7, 8,9] Projections of demand for healthcare services and healthcare providers made at the county-level are aggregated to the state level.

The constructed file starts with ACS data containing information on demographics, household income, medical insurance type, and home status (used to identify people living in the community or in a group setting such as a nursing home). ACS does not contain health-related information. Each Hawai‘i resident in the ACS whose residency information indicated a community-based setting was statistically matched with a Hawai‘i resident in the BRFSS with the same demographics, household income category, and medical insurance type. Hawai‘i residents in institutionalized settings in the ACS were statistically matched with a person with similar demographics residing in a Hawai‘i nursing home or residential care facility from CMS data.

Using information on the size of the population in each county by demographic, the ACS sample weights were re-weighted such that the constructed population matched county population numbers in 2022 reported by the U.S. Census Bureau.[10] Population projections through 2037 accounting for future changes to population size by age, sex, race/ethnicity, and counties in the state of Hawai‘i come from S&P Global Population Projections Data.[11]

Healthcare use prediction equations. These equations are estimated from national data sources and link the patient characteristics included in the population database to an individual’s expected use of healthcare services. Separate prediction equations exist by type of care—office visits by physician or provider specialty, hospitalizations and inpatient bed days by diagnosis category, emergency visits, home health visits, and outpatient visits. Key data sources are the combined 2017-2021 files of the Medical Expenditure Panel Survey (MEPS), and the 2021 National Inpatient Sample (NIS). Applying these equations to the constructed population database produces projections of healthcare service demand for the state of Hawai‘i’s resident population (e.g., the number of office visits, number of expected hospitalizations and inpatient bed days), based on national patterns of healthcare use.

Care delivery patterns. Provider staffing patterns in the state are assumed to be consistent with the national average level of staffing, in terms of the number of nurses required to provide a set amount

of services by care delivery setting. For example, demand for nurses in the ED is calculated by multiplying (a) projected Hawai‘i emergency visits in each year and (b) the base year national ED nurses to national ED visits ratio. These staffing ratios are calculated separately for RNs and LPNs and are applied analogously to estimate demand for nurses in the inpatient, outpatient, office, and home health settings. For residential care and nursing home settings, the factors expected to drive demand for nurses are the size of the population living in residential care facilities and nursing homes, respectively, while the age 6-17 population is assumed to drive demand for nurses in schools, and the total Hawai‘i state’s population is assumed to drive demand for nurses in the public health and all other settings. The number of new providers in each profession being trained is the main driver of demand for providers by occupation in teaching/academia. The staffing ratios for these settings are calculated by dividing national estimates of the demand driver by national estimates of FTE nurses working in the setting. Staffing ratios are modeled as remaining constant throughout the modeling period.

The use of these national ratios assumes that at the national level the supply and demand for provider services are in equilibrium, excepting adjustments where there are setting- and specialty-specific estimates of national shortfall. To begin, three settings retain a direct and robust analogue to existing literature, specifically regarding accurate vacancy rates in certain practice settings. A Nursing Solutions Inc. (NSI) report [12] shows that RN vacancy rates across hospitals remained relatively constant between 8.0 and 9.0 percent from 2020 to 2021, only jumping to 17.0% in 2022. Some of these vacancies in prior years likely were covered by traveling nurses, and some vacancies are the result of time lags between when a nurse leaves a position and when a replacement is found. Therefore, it is assumed that vacancy rates above 8.0% reflect a shortfall—suggesting that the 17.0% vacancy rate is indicative of about a 9.0% headcount shortfall of RNs in hospitals. This 9.0% headcount shortfall indicates an inpatient shortfall of 9.0% and an outpatient FTE shortfall of 9.0%. Additionally, the American Association of Colleges of Nursing (AACN) reports [13] 1,977 full-time faculty vacancies for nursing programs across the country, or a 7.8% vacancy rate. The natural rate of unemployment (~4.4%) was subtract out to yield a national demand shortfall of 3.3%. These national shortfall rates are applied to Hawai‘i’s RN estimates. Analysis of nurse education program capacity in the state conducted by HSCN, estimates the full-time faculty vacancy rate to be closer to 13%[14]. This supply projection takes into consideration existing enrollment numbers, which account for the limitation that faculty vacancies place on program growth.

Despite anecdotal evidence, we are unable to estimate precise nurse shortfalls across most of the other settings due to inadequate and insufficient literature. Therefore, to model unfilled capacity in the market for nurses, we assume that demand for nurses follows its respective population to provider ratios from the pre-pandemic levels. In 2019, 1 nurse worked in the nursing home setting for every 9 nursing home residents or so; likewise, the pre-COVID nurse-to-patient ratio in residential care stood around 1 nurse for every 15 patients. Since 2019, despite nursing home and residential care populations either holding or increasing, fewer nurses work in the nursing home and residential care settings. Thus, the percent change in nurse-to-patient ratio from the pre-COVID era through 2022 represents a nursing shortfall that will continue to persist as long as the nurse-to-patient ratio remains depressed. Accordingly, RN shortages are estimated to be 9.2% in nursing homes and 15.3% in residential care settings. A similar methodology was applied to calculate LPN shortages, suggesting shortfalls of 42.1% in office settings, 15.3% in home health, 10.6% in nursing homes, and 28.4% in

residential care. These shortfall estimates are applied to the demand estimates of Hawai‘i’s nursing workforce.

Hospital Discharge Data Adjustments to the Model

In addition to demand scaling based on workforce shortages, modeling assumptions of care patterns based on population demographics were adjusted to Hawai‘i’s inpatient care use patterns. To aid in calibrating the model to the state of Hawai‘i, national utilization patterns were applied to Hawai‘i’s resident population in 2022. The resulting predicted demand for hospital-based services was compared to actual usage reported in Hawai‘i’s 2022 and 2023 discharge data.[15]

HSCN provided summary discharge information from Hawai‘i’s 2022 and 2023 discharge database allowing for calibration of the model-based hospital utilization. The initial model was on target for inpatient days with an accuracy level of 99% and overpredicted demand for emergency visits by 12%. The alignment of inpatient days with actual usage based on Hawai‘i’s discharge data strengthens the credibility of the modeling methodology. The overprediction likely stems from a lower rate of emergency visits in Hawai‘i compared to national trends. To address this, resident emergency-care demand was adjusted to set estimated and observed use equal for the current year, with the correction carrying forward through the projection period.

Additionally, based on the hospital discharge data approximately 20,363 days of inpatient care in Hawai‘i hospitals was provided to patients from out-of-state, or 3% of the 670,000 total inpatient days delivered in the state. The inpatient days were adjusted by county to account for services provided to out-of-state residents. Thus, projections of future demand for hospital services and the resulting demand for nurses assume that the proportion of care provided in Hawai‘i hospitals to out-of-state patients will continue over the projection horizon.

Approximately 31,297 (7%) of the nearly 470,000 emergency department (ED) visits provided in Hawai‘i hospitals were for out-of-state residents. A two-step scaling approach was implemented to adjust demand for emergency services by county. Multiplicative demand scalars were applied to address the difference between predicted and actual resident emergency usage in 2022, and to account for out-of-state emergency services provided in each county.

Changing Demographics, Disease Prevalence, and Projected Demand for Healthcare Services

Understanding the relationship between demographic trends and healthcare demand is crucial for strategic workforce planning and service delivery. This section explores the methodologies and data sources used to estimate future healthcare demand, emphasizing the impact of demographic shifts, disease prevalence, and other health risk factors. By leveraging robust population projections and detailed health datasets, insights into the anticipated healthcare needs across state of Hawai‘i’s unique geographic regions and age groups, setting the stage for targeted policy and workforce interventions can be gained.

Population growth and changing demographics are the key drivers of changes in expected demand for healthcare services (and therefore the demand for nurses) over the projection period. The aging

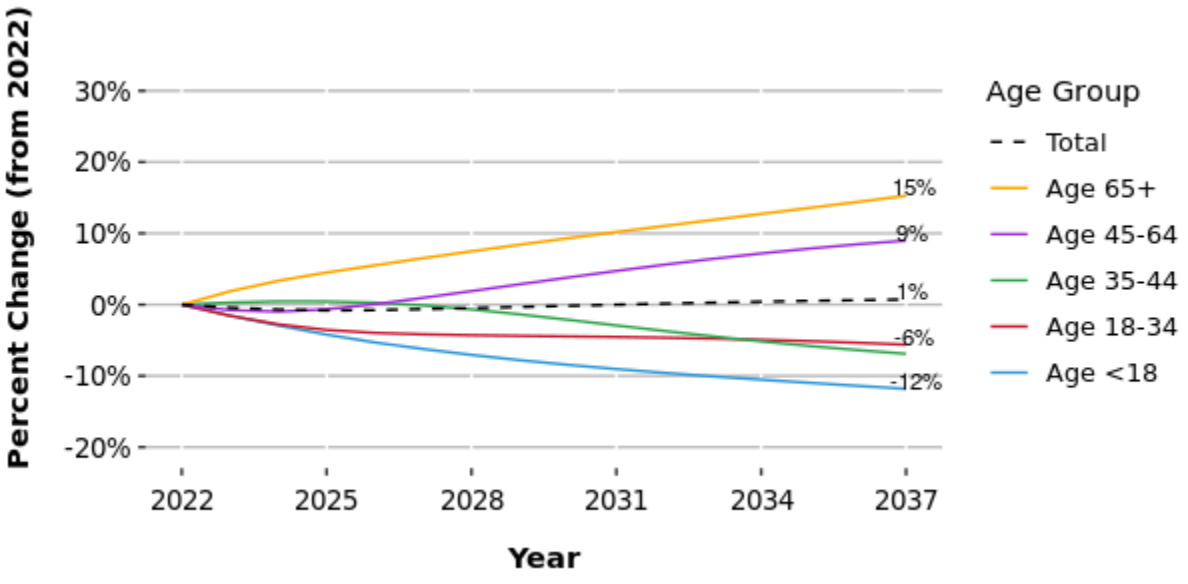
effect in particular will have an outsized impact on future demand for services, as the oldest population cohorts generally use services at a higher rate than those in younger age groups. Both the *Status Quo* and *Reduced Barriers* scenarios employ the same projected population changes over time.

The population of Hawai‘i is 1.4 million in 2022 and is projected to increase by about 10,400 residents (0.7%) by 2037. There is considerable variation in population growth rates by age group (Exhibit 2). Most of this growth is among the population aged 65 years or older with a projected increase of 45,000 residents (15.3%). The rapidly growing population of older people in the state is projected to drive high growth in demand for healthcare services.

Meanwhile, the traditional working age population is projected to decline. The population aging into the 18-44 year old range is projected to decrease by 30,800 residents (-6.1%), while the number of residents aging into the 45-64 year old range is projected to increase by nearly 31,100 (9.0%). The increase in the age 45-64 population shows a gain of experience in the workforce. In net, the traditional working age population aged 18-64 years is projected to remain unchanged growing by about 300 residents (0.03%). Population decline is projected among the population under age 18 (34,800 residents, or -11.8%).

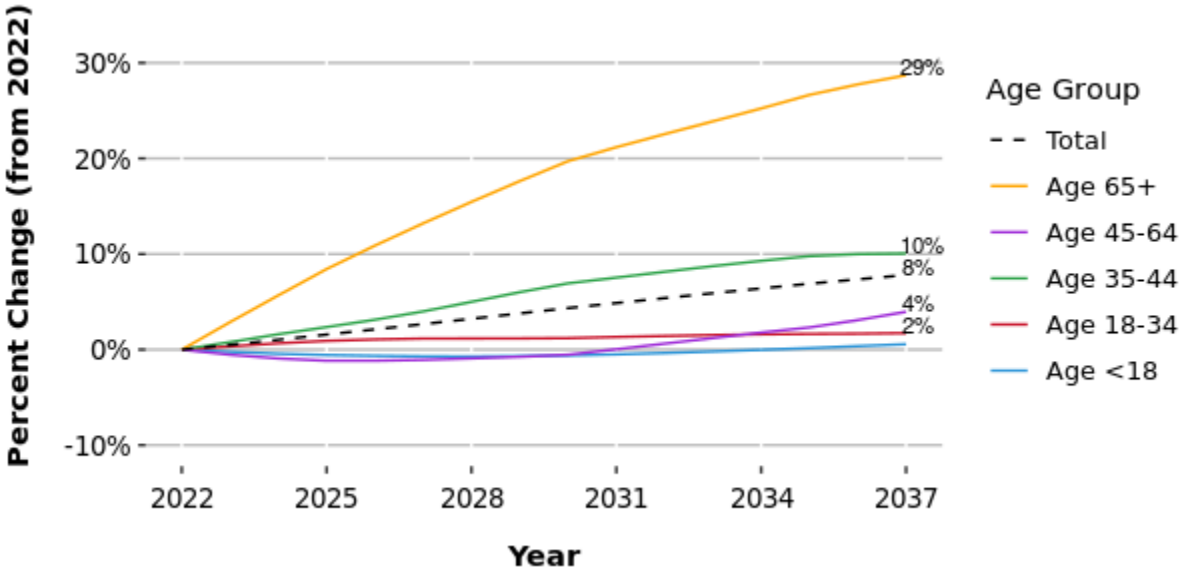
The variation in population growth rates by age group is also observed nationally (Exhibit 3). Similar to state of Hawai‘i’s population trends, much of the growth in population is among the elderly in the U.S. The population aged 65 years or older is projected to increase by 28.7%. In contrast to the state (Exhibit 4), the overall national working age population (18–64 year old range) is projected to increase at about 4%. This is driven by a projected 5% increase in the age 18-44 group and a 4% increase in the age 45-64 group. The population under 18 is predicted to remain relatively unchanged growing at about 1%.

Exhibit 2: Expected Population Growth in Hawai‘i by Age Group, 2022-2037



Source: Analysis of S&P Global Population Projections data

Exhibit 3: Expected Population Growth in U.S. by Age Group, 2022-2037



Source: Analysis of S&P Global Population Projections data

Exhibit 4: Comparison of Growth by Age Group in Hawai‘i vs US Population, 2022 – 2037

Age Group	HI Percent	HI Growth	US Percent	US Growth
<18	-12%	-34,843	1%	401,293
18-34	-6%	-17,621	2%	1,338,739
35-44	-7%	-13,205	10%	4,393,665
45-64	9%	31,105	4%	3,269,560
65+	15%	44,961	29%	16,594,450
Total	1%	10,396	8%	25,997,707

Source: GlobalData analysis of national and state of Hawai‘i population projections

Prevalence of Disease and Health Risk Factors

While aging and demographic changes are the main drivers of increased demand for healthcare services, other factors, such as the prevalence of diseases and health risk factors like smoking and obesity, also contribute to demand for healthcare services. The health care use prediction equations, which are based on analysis of the Medical Expenditure Panel Survey, estimate the relationship between annual use of healthcare services (hospitalizations and inpatient days, emergency visits, visits to doctor offices and outpatient clinics, and home health visits) to people’s demographics, presence of various diseases, health risk factors such as smoking and obesity, and other socioeconomic information including household income level and having medical insurance.

As summarized in Hawai‘i’s disease prevalence and risk factors are overall slightly lower compared with the national average for most conditions tracked by the CDC.[12] Furthermore, there are some variations in prevalence across different counties, driven by population distribution. Additionally, Hawai‘i has a higher percentage of residents over 65 years of age compared to the national average.

Exhibit 5: Raw Prevalence of Disease and Health Risk Factors among Adults by County

County	Arthritis	Asthma	Hypertension	Heart Disease	Diabetes	Cancer	Heart Attack	Stroke	Smoker	Obese	Population Age 65+
Hawai‘i County	24%	10%	31%	7%	11%	8%	3%	4%	13%	27%	23%
Honolulu County	20%	8%	30%	5%	11%	6%	3%	3%	11%	24%	20%
Kaua‘i County	24%	9%	30%	6%	11%	7%	3%	3%	13%	24%	22%
Maui County	22%	9%	27%	6%	10%	7%	3%	3%	12%	24%	21%
HI avg	21%	8%	30%	5%	11%	6%	3%	3%	12%	24%	20%
US avg	25%	10%	33%	6%	11%	7%	4%	3%	15%	33%	17%

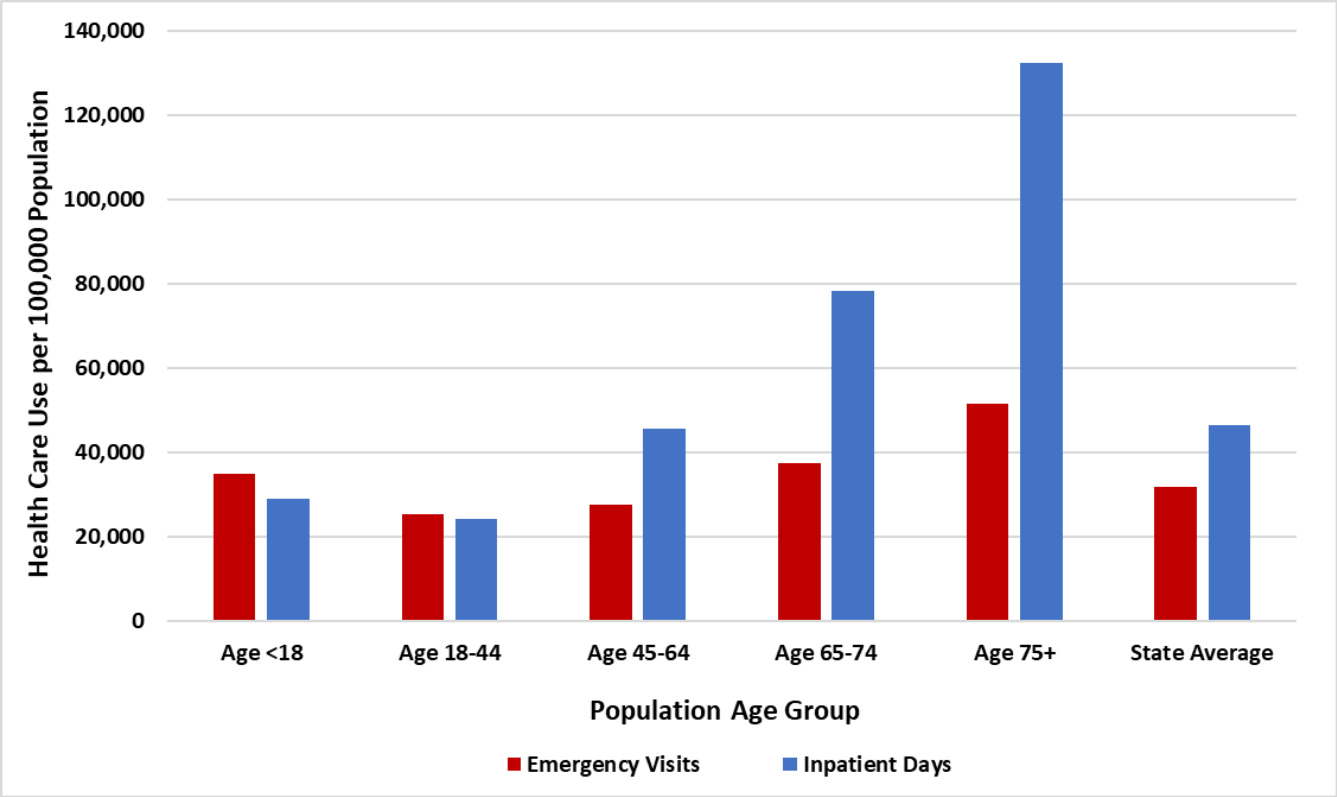
Source: Centers for Disease Control and Prevention. PLACES: Local Data for Better Health, Published 2023

Projected Demand for Healthcare Services

Healthcare demand projections apply prediction equations of healthcare use to the population database. These equations are estimated from national data sources and supplemented with Hawai‘i-specific data for hospital use to predict demand for services across care settings and healthcare occupations. Key data sources are the combined 2017-2021 files of the Medical Expenditure Panel Survey (MEPS), and the 2021 National Inpatient Sample (NIS).

Exhibit 6 represents the relationship between population age and demand for hospital-based services. As people age they tend to use more hospital services. The Hawai‘i annual average utilization per 100,000 population for individuals under age 65 is approximately 28,539 emergency visits and 31,883 inpatient bed days. Annual utilization for individuals within the aged 65-74 cohort is 37,546 emergency visits and 78,342 inpatient days per 100,000 population. Annual utilization within the 75-years-and-older cohort is 51,583 emergency visits and 132,448 inpatient days per 100,000 population. Thus, as the Hawai‘i population ages over the projection period, expected demand for healthcare services used disproportionately by older age cohorts (and consequently for healthcare workers in those settings) will increase faster than overall population growth.

Exhibit 6: Rate of Annual Use of Hospital-based Care by Population Age Group, 2022



Source: Analysis of Medical Expenditure Panel Survey data for 2017-2021 & National Inpatient Sample 2021 applied to Hawai‘i’s population and scaled by 2022 -2023 aggregate hospital discharge data provided by Hawai‘i State Nursing Center

Demand Scenarios

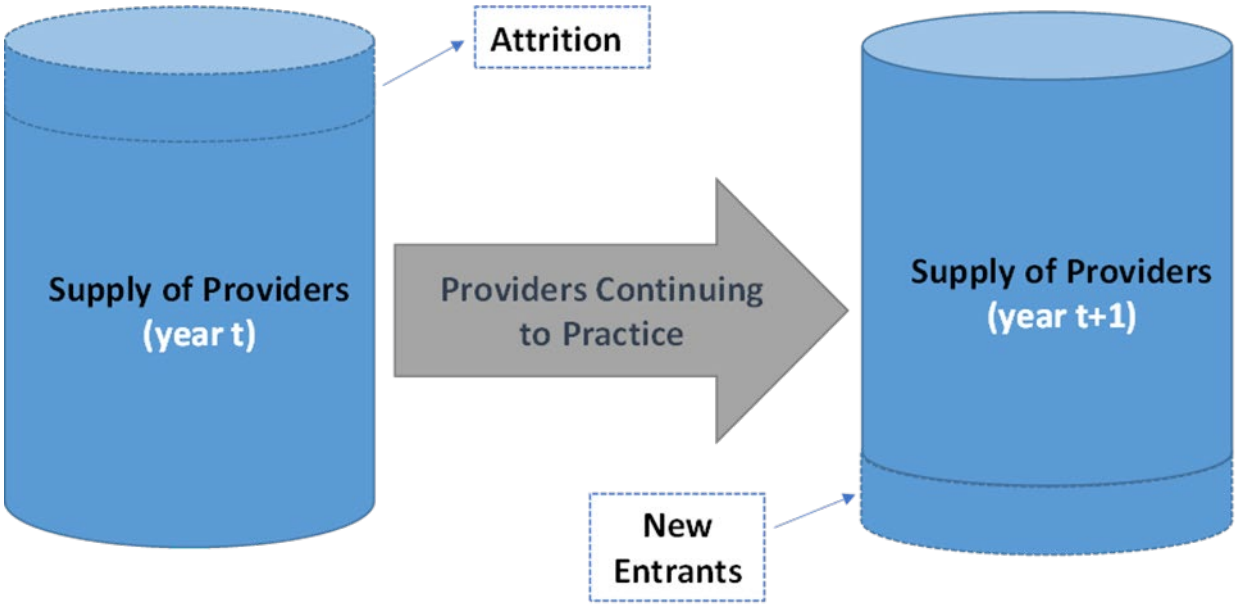
The demand projections discussed in this report are modeled under a *Status Quo* scenario, which assumes future continuation of base year healthcare use and delivery patterns; thus, projected changes over time reflect projected changes to the size and demographics of Hawai‘i’s population. An alternative scenario, the *Reduced Barriers* scenario builds upon the *Status Quo* modeling assumptions that changes over time are associated with changing demographics but includes alternative assumptions around the population’s use of healthcare services, described below.

As such, alternative or “what-if” scenarios are modeled to assess how projections would be affected by certain possible changes to the *Status Quo*. The alternate demand scenario models if all people were to access care at the rates of otherwise identical insured, non-Hispanic Whites in metropolitan areas. This *Reduced Barriers* scenario explores how the demand for healthcare workers would change with substantial progress toward healthcare access and equity goals articulated by the Hawai‘i State Department of Health, other Hawai‘i organizations, and federal agencies.[16,17,18] It should be noted that this scenario is not meant to identify individual members of the population who face significant barriers to obtaining care and/or are underserved; nor is it meant to suggest that healthcare usage of insured, non-Hispanic Whites living in metropolitan areas is appropriate or adequate. Rather, this “what-if” scenario yields general insights regarding the relationship between expected workforce adequacy and reducing barriers of access to care.

Supply Modeling

Supply is modeled using a microsimulation approach, starting with building a representative population of nurses licensed and actively working in Hawai‘i. The model simulates each nurse’s labor force decisions, including probability of being active in the workforce, weekly hours worked, probability of leaving the workforce, and other career activities, such as furthering one’s education to change careers. The major components to supply modeling are: (1) estimating the size and characteristics of the starting year supply; (2) modeling the number and characteristics of new entrants to the workforce; (3) modeling the weekly hours worked for those in the workforce; and (4) modeling attrition from the workforce—including nurses who retire, as well as those who move out of state. Using simulation during each subsequent year of modeling, workers’ ages increase by one year, weekly hours worked and retirement probabilities are applied for these new ages, new entrants are added to the workforce, and attrition is subtracted from the workforce.

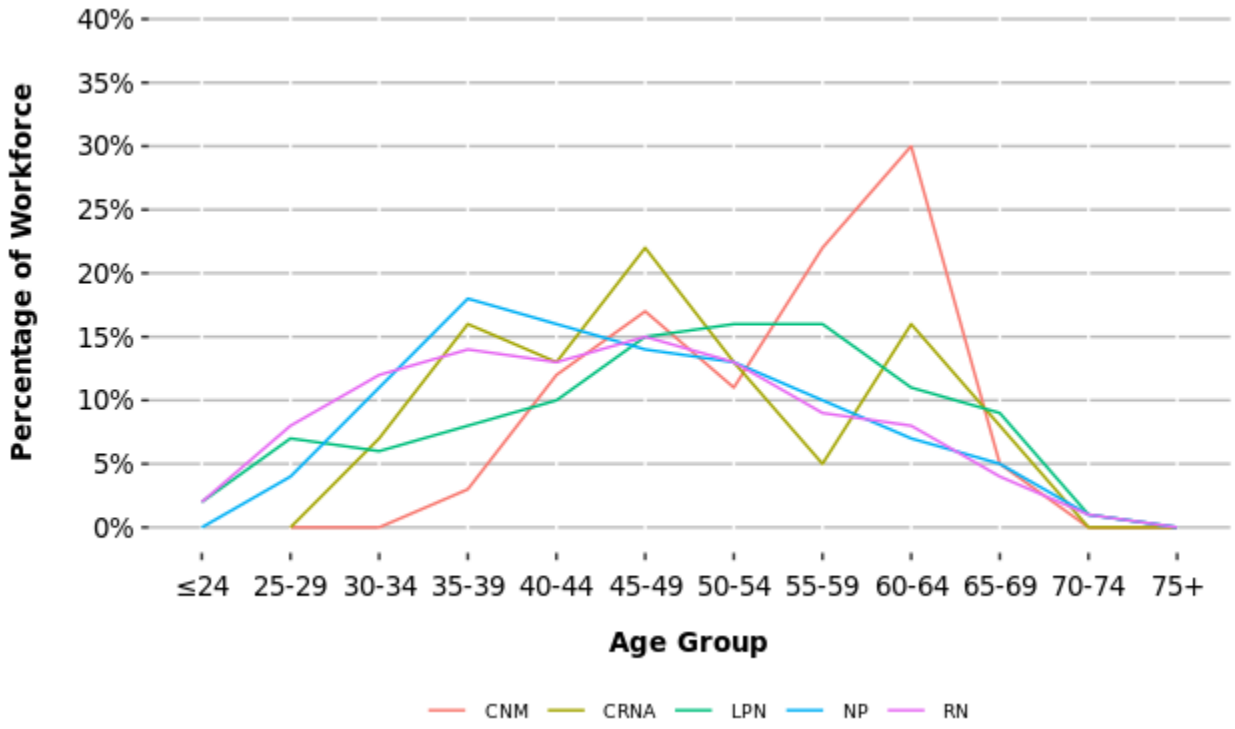
Exhibit 7: Overview of the Supply Modeling Framework



Developing Starting Supply

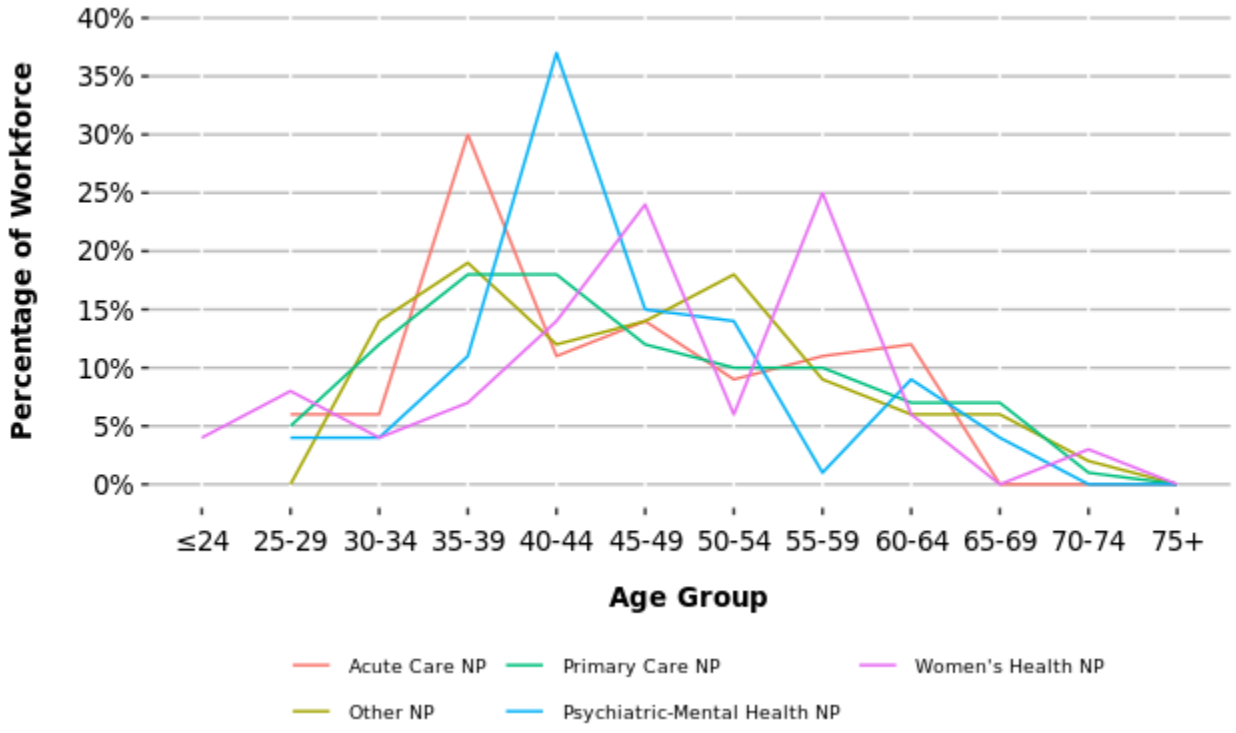
Survey data maintained by HSCN is the main data source for the starting supply of RNs, LPNS and APRNs. Demographic profiles of survey respondents were combined with the HSCN estimate of the number of nurses of each type working in Hawai‘i in 2023 using random sampling.[19] The demographic characteristics sampled include age, sex, and race/ethnicity. Practice specialty for APRNs was also sampled from available survey results. Exhibit 8 shows the age distribution for RNs, LPNs, CNMs and CRNAs. **Exhibit** 9 shows the age distribution of NPs by specialty category.

Exhibit 8: Age Distribution of Hawai‘i’s Active Nurse Workforce



Source: GlobalData analysis of HSCN data

Exhibit 9: Age Distribution of Hawai‘i’s Active NP Workforce by Specialty Category



Source: GlobalData analysis of HSCN data

Supply Modeling Inputs

In addition to the starting supply, the supply model requires inputs on the number and characteristics of new nurses joining the Hawai‘i workforce year, sources of attrition for active nurses, and the number of weekly hours worked for nurses.

New Entrants to the Hawai‘i Nurse Workforce

The first row of Exhibit 10 lists the assumption of the number of new nurses of each that are expected to join the Hawai‘i nurse workforce each year from 2023 to 2037. These numbers are the state totals of the numbers of new nurses by county in 2022-2023 provided by HSCN. New nurses can be either recent graduates from Hawai‘i nursing programs or nurses who started their career in other states and moved to Hawai‘i. The number of APRN specialties are based on the proportions of these specialties observed in the survey data. Exhibit 11 shows the same assumptions for NPs by specialty.

The sex, age, and race/ethnicity demographic information were created using the HSCN survey data, which included a question asking respondents when they received their first nursing degree. This response was used to create the demographic profiles in Exhibit 10 and Exhibit 11 using only nurses who received their degrees recently.

Exhibit 10: Number and Characteristics of Annual New Entrants, RNs, LPNs, CNMs, CRNAs

Measure	Bachelor's degree RN	Associate's degree RN	LPN	CNM	CRNA
Annual New Entrants	735	242	105	3	9
% Female	85	83	88	100	67
% Age					
<26	58	37	44	28	62
26-30	21	26	19	44	27
31-40	17	28	27	19	11
>40	5	8	9	9	0
% Race/Ethnicity					
White	20	27	17	52	42
Non-Hispanic Black	1	1	3	0	13
Non-Hispanic Other	70	62	67	43	24
Hispanic	10	11	14	5	20

Source: GlobalData analysis of HSCN data

Exhibit 11: Number and Characteristics of Annual New Entrants, NPs

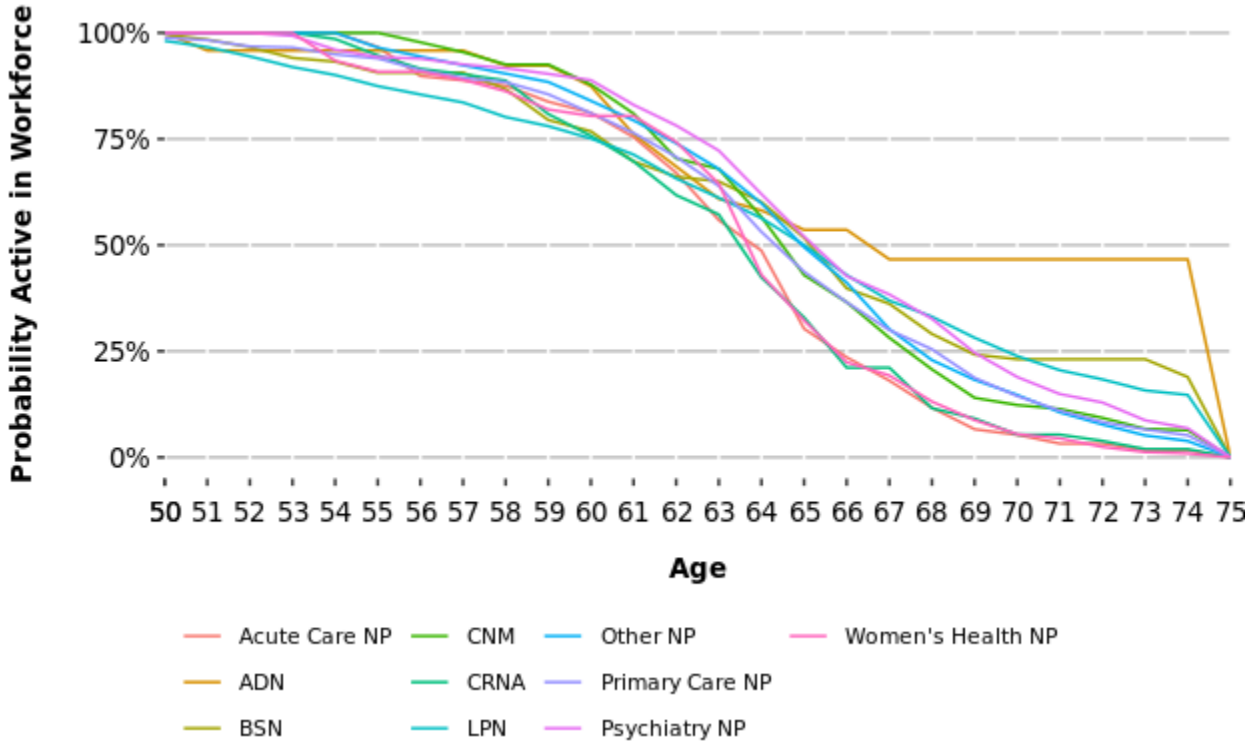
Measure	Primary Care NP	Acute Care NP	Women's Health NP	Psychiatric-Mental Health NP	Other NP
Annual New Entrants	41	9	6	6	32
% Female	82	69	100	60	91
% Age					
<26	46	61	44	26	52
26-30	21	24	16	10	26
31-40	25	15	33	59	16
>40	8	0	7	5	5
% Race/Ethnicity					
White	28	52	18	52	34
Non-Hispanic Black	1	0	11	7	4
Non-Hispanic Other	63	38	48	38	54
Hispanic	8	10	23	2	8

Source: GlobalData analysis of HSCN data

Labor Force Participation and Attrition

The nurse supply model includes two forms of attrition that causes nurses to leave the workforce in any of the simulation years. First, nurses at the end of their career can retire. For RNs, HSCN survey data, combining the 2017, 2019, 2021, and 2023 survey years to increase sample size was used to estimate retirement rates. The survey question asking nurses if they were likely to leave the nursing workforce in the next year and why were used to create retirement patterns. If nurses responded that they were "likely" or "very likely" to leave the nursing workforce in the next year, they were considered probable retirees only if the reasons they gave were "plan to retire," "plan to leave workforce for reason other than retirement," "plan to leave nursing for another field," and "plan to move out of state." Then the probability was calculated that an RN would retire at each age 50 through 74 using those responses. For LPNs, the 2018-2022 ACS asking a similar question nationwide was used since the sample of LPNs in the Hawai‘i survey was insufficient. For APRNs, the 2022 NSSRN also asking a similar question nationwide was used since the sample of APRNs in the Hawai‘i survey was insufficient.

Exhibit 12: Probability a Clinician Aged 50 Remains Active Over Time, by Occupation



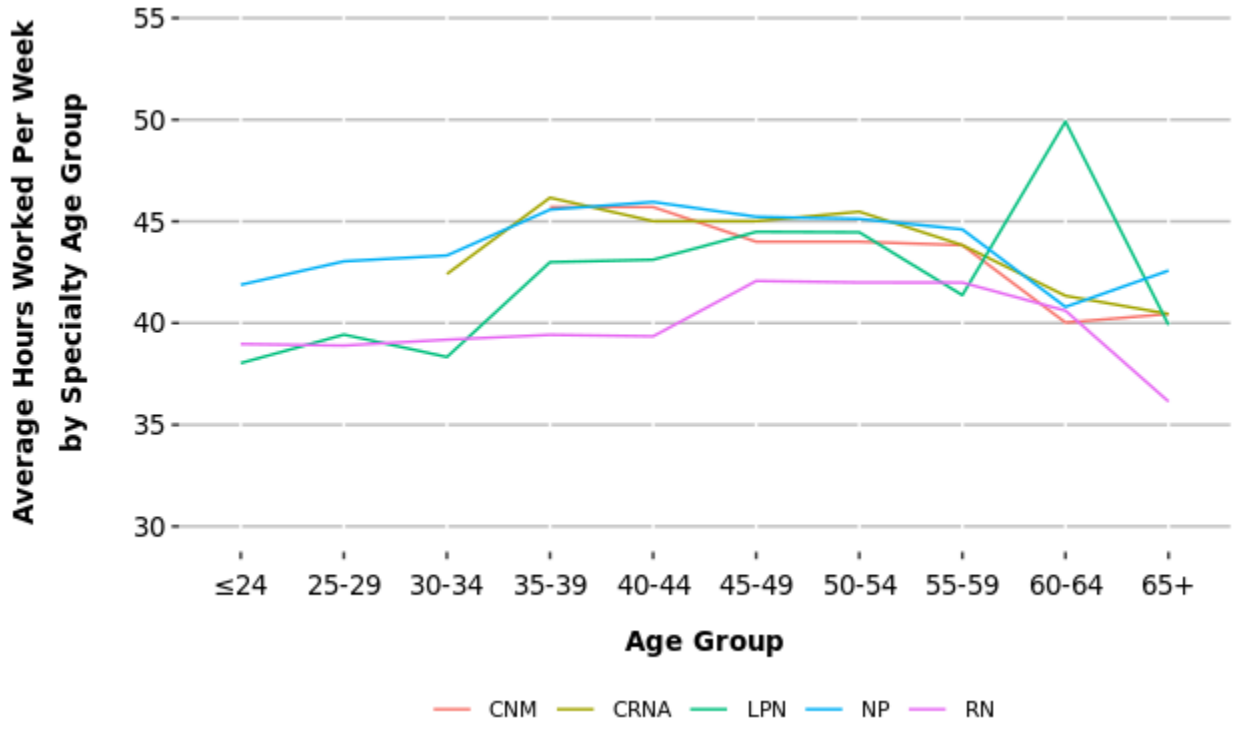
Source: GlobalData analysis of HSCN data

Hours Worked Patterns

HSCN provided a sum of the questions asking nurses how many hours they work by practice location. The total hours worked for nurses that reported at least 8 hours worked was used to calculate the average number of hours worked. Nurses reporting fewer than 8 total hours worked were omitted from the analysis.

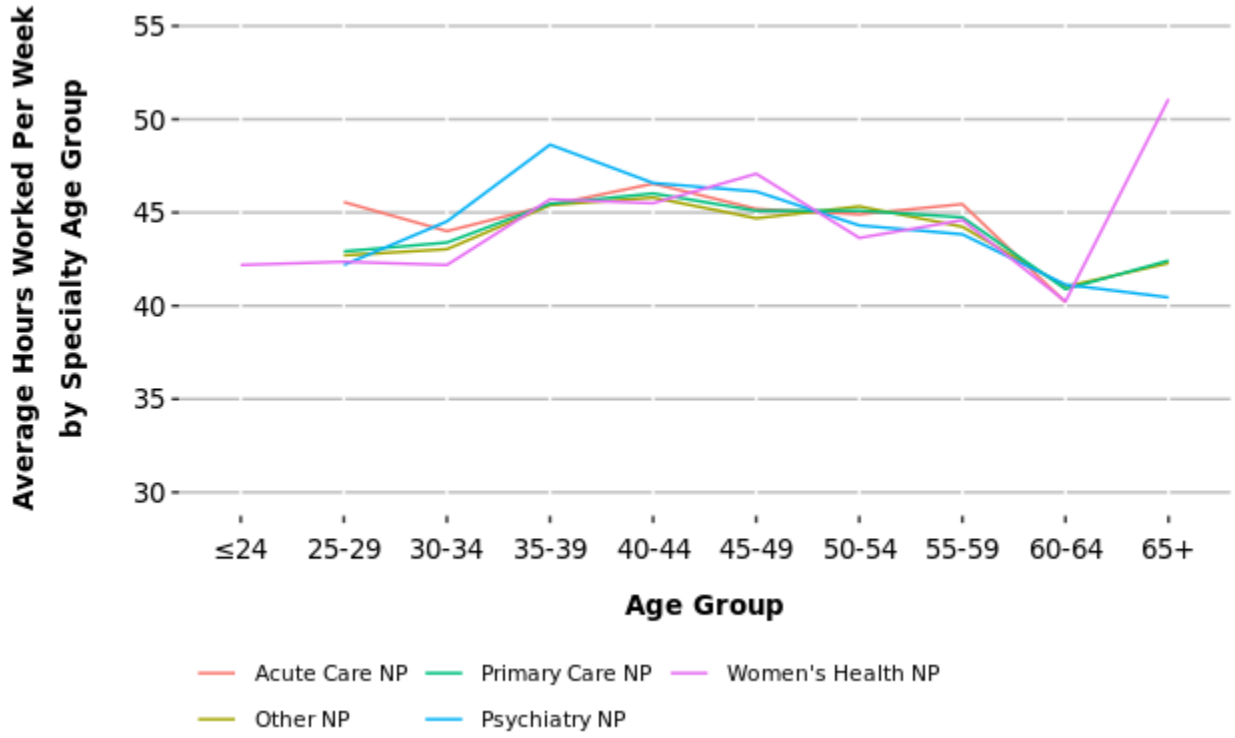
Hours worked patterns for each nursing role were created using an ordinary least squares regression with sex, age group, and race/ethnicity as the independent variables. These hours worked patterns are applied to the microsimulation model, which includes these same demographic variables. The relationship between age and average hours worked for all nurse types and specialties is available in Exhibit 13 and Exhibit 14.

Exhibit 13: Average Hours Worked Per Week of Hawai‘i’s Active Nurse Workforce



Source: GlobalData analysis of HSCN data

Exhibit 14: Average Hours Worked Per Week of Hawai‘i’s Active NP Workforce by Specialty Category



Source: GlobalData analysis of HSCN data

Supply Scenarios Modeled

The described supply modeling process reflects the modeling assumptions for the *Status Quo* scenario. This scenario projects future supply if the most recent estimates of supply inputs remain unchanged over the projection period. Alternative scenarios modeled provide a range for the projections if there are changes in key supply determinants. The *Early Retirement* scenario reflects individuals retiring two years earlier than they do currently, while the *Delayed Retirement* scenario reflects individuals retiring two years later than they do currently. The former scenario could reflect the impact of worsening provider burnout, while the latter could reflect the results of efforts by employers to retain staff.

Similarly, two scenarios are modeled that assume a 10% increase or a 10% decrease in annual new entrants to the workforce projected into the future (named the *10% More Entrants* and *10% Fewer Entrants* scenarios, respectively). The former scenario could reflect, for example, the impact of increased efforts within the state to attract and recruit new nurses to the profession.

Finally, an *Expansion* scenario was developed which includes expected future increase in the number of RNs and psychiatric NPs being trained in the state of Hawai‘i. The *Status Quo* scenario projections for these two occupations reflects this *Expansion* scenario. The number of new psychiatric NPs increase by 16 in 2026 and later years, while the number of new RNs increase by 24 in 2027 and later years.

Findings

This section outlines the projected trends in state of Hawai‘i’s nursing workforce from 2022 to 2037, highlighting distinct challenges and opportunities for RNs, LPNs and APRNs. Within this report, a nurse shortfall, or shortage, is defined as nurse demand exceeding nurse supply, and a nurse surplus occurs when nurse supply exceeds nurse demand. All supply and demand projections are reported as FTEs, unless otherwise indicated. In addition, the terms adequacy and adequacy of supply are also used to describe whether or not the nurse supply is sufficient to meet demand. Adequacy is calculated as supply divided by demand, and the resulting percentage can be interpreted as the percentage of projected demand that can be met with the projected supply.

The RN workforce is projected to grow steadily under all scenarios, maintaining an adequacy ratio close to equilibrium at around 100%. However, the LPN workforce faces a more uncertain future, with declining supply and rising demand leading to a drop in already low adequacy rate from 34% in 2022 to 31% by 2037. Some of the shortage in LPNs maybe due to the nature of small hospitals across the state that need to employ RNs to perform certain hospital functions. Much like a small Emergency Department still must employ an Emergency Medical Physician. County-level disparities further complicate these trends, as RN and LPN adequacy improves in some counties and declines in others. In areas facing a shortage of LPNs, providers may be inclined to employ RNs to help address staffing needs. While adequacy of RN supply and LPN supply is projected separately, considering nurse adequacy projections for both professions provides a more complete understanding of nurse adequacy in the state.

APRNs are poised for robust growth, playing a critical role in addressing workforce imbalances through expanded practice capabilities and increasing participation in team-based care models. Together, these findings highlight the importance of developing targeted policy initiatives to strengthen the pipeline, retain current practitioners, and optimize care delivery to ensure equitable access to healthcare services across state of Hawai‘i.

Supply and Demand Projections

The number of new RNs entering the Hawai‘i workforce is 8.5% of the total supply in the first year of the projection. As the workforce grows the assumed constant number of new entrants shrinks to 6.8% of the total supply in 2037. Additionally, the *Status Quo* RN projections shown here incorporate assumptions about legislative funding to increase nursing slots in the state. Retirements from the workforce initially is close to the number of new entrants with 6.1% of total supply in 2022 retiring in that year. Retirements increase to 6.7% of the total supply in 2037. Assumed retirements and new entrants by year are summarized in Exhibit 57 in the appendix.

Over the projection period, supply of RNs in Hawai‘i is expected to grow by 8.7% (or 0.6% average per year) a total of 1,136 RN FTEs under the *Status Quo* scenario, with projected growth over the period between 1.0% (or 131 RN FTEs under the *10% Fewer Graduates* scenario) and 14.0% (or 1,828 RN FTEs) under the *10% More Graduates* scenario).

Population demand for RN services under the demand *Status Quo* scenario is projected to increase by 5.4% (0.4% per year) for a total of 700 RN FTEs. Projected demand in the *Reduced Barriers* scenario increases above the *Status Quo* supply by 10.7% (1.397 RN FTEs) in the first year of the projection and continues to grow annually until it is 17.5% (2,289 RN FTEs) above the starting year *Status Quo* supply in the final year of the projection.

The ratio of supply over demand reflects the extent to which the estimated supply is adequate to meet estimated demand each year. *Status Quo* RN supply over demand adequacy is at 100% in 2022 and is projected to increase to 103% by 2037 as supply and demand both continue to grow over the projection period. Projected RN supply modeling results from all scenarios are summarized in the appendix.

Exhibit 15: State of Hawai‘i RN Supply and Demand Projections, 2022 - 2037

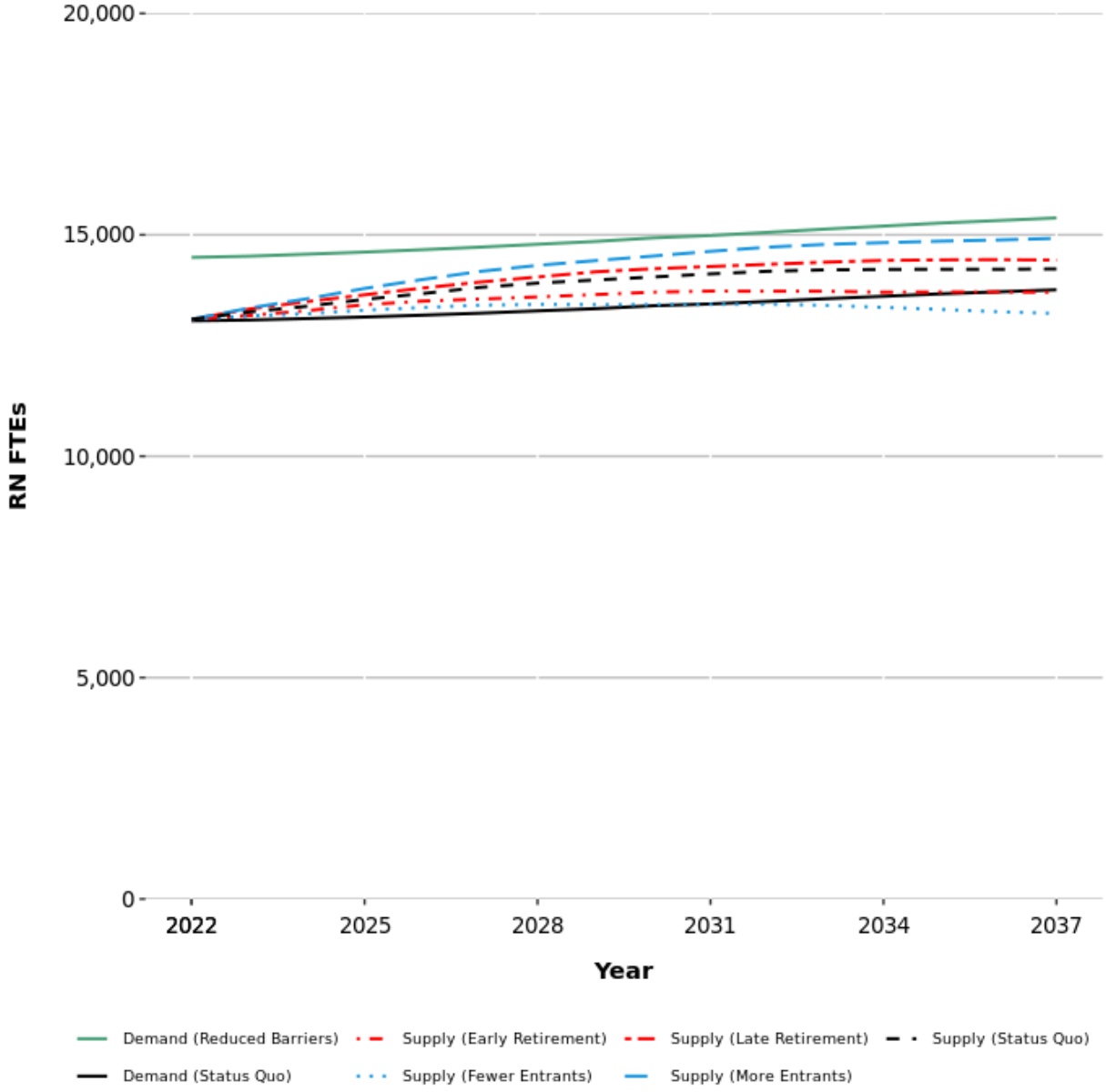


Exhibit 16: State of Hawai‘i RN Adequacy Summary Table

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	13,092	13,058	34	100%
2037	14,228	13,758	470	103%

The number of new LPNs entering the Hawai‘i workforce starts at 10.1% of the total supply in the first year of the projection. As the workforce shrinks over time due to expected retirements, the assumed constant number of new entrants grows to 10.5% of the total supply in 2037. Retirements from the workforce is close to the number of new entrants each year with 8.9% of total supply in 2022 retiring in that year. Retirements increases slowly over the projection to 11.5% of the total supply in 2037. Assumed retirements and new entrants by year are summarized in Exhibit 58 in the appendix.

Population demand for LPN services under the demand *Status Quo* scenario is projected to increase slightly more rapidly than for RNs over the projection period. Demand for LPNs is projected to increase by 7.0% (average of 0.5% per year) for a total of 198 LPN FTEs. Projected demand in the *Reduced Barriers* scenario increases above the *Status Quo* supply by 219% in the first year of the projection and continues to grow until it is 244% above the starting year *Status Quo* supply in the final year of the projection.

The ratio of supply over demand reflects the extent to which the estimated supply is adequate to meet estimated demand each year. *Status Quo* LPN supply over demand adequacy is at 34% in 2022 and is projected to decline to an adequacy ratio of 31% by the end of the projection period due to increased population demand for LPN services and declines in the LPN workforce supply. Projected LPN supply modeling results from all scenarios are summarized in the appendix.

Exhibit 17: State of Hawai‘i LPN Supply and Demand Projections, 2022 - 2037

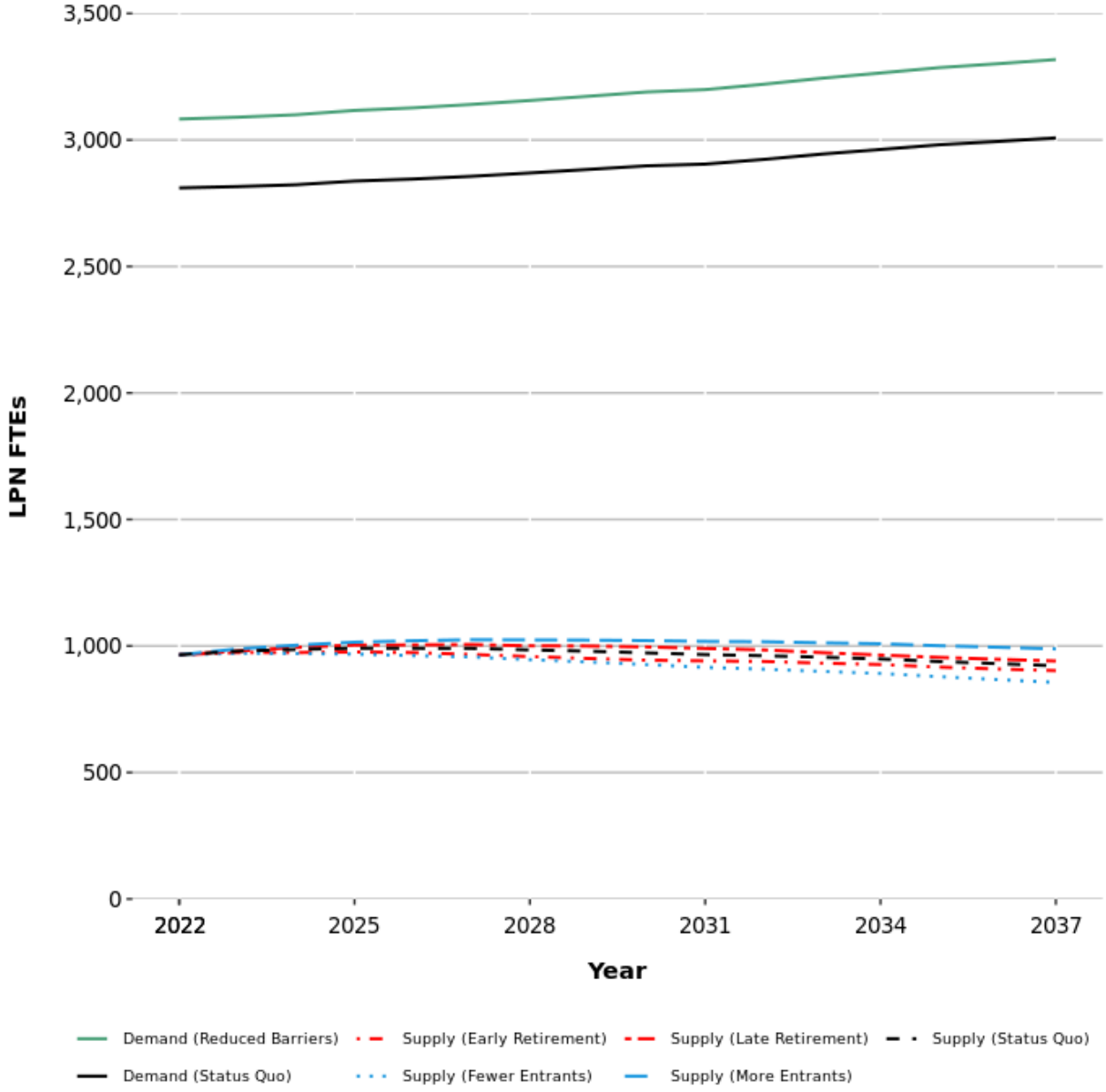


Exhibit 18: State of Hawai‘i LPN Adequacy Summary Table

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	965	2,810	-1,845	34%
2037	921	3,008	-2,087	31%

The APRN workforce overall (comprising NPs, CRNAs, and CNMs) shows a slight trend of oversupply in aggregate, particularly among NPs and CNMs. NPs, in particular, experience substantial growth in supply, which is well above demand, resulting in an improvement of adequacy from 89% in 2022 to 114% in 2037. The *Status Quo* projections presented here include assumptions of increased psychiatric- mental health NP graduates anticipated from Hawai‘i nursing programs.

CRNAs experience a persistent shortfall with adequacy improving slightly in 2037 compared to 2022. The number of new CRNAs entering the Hawai‘i workforce starts at 8.6% of the total supply in the first year of the projection. As the workforce grows the assumed constant number of new entrants shrinks to 7.5% of the total supply in 2037. Retirements from the workforce initially offset three quarters of new entrants with 6.5% of total supply in 2022 retiring in that year. Retirements increases to 7.3% of the total supply in 2037. Assumed retirements and new entrants by year are summarized in Exhibit 60.

Exhibit 19: State of Hawai‘i CRNA Supply and Demand Projections, 2022 – 2037

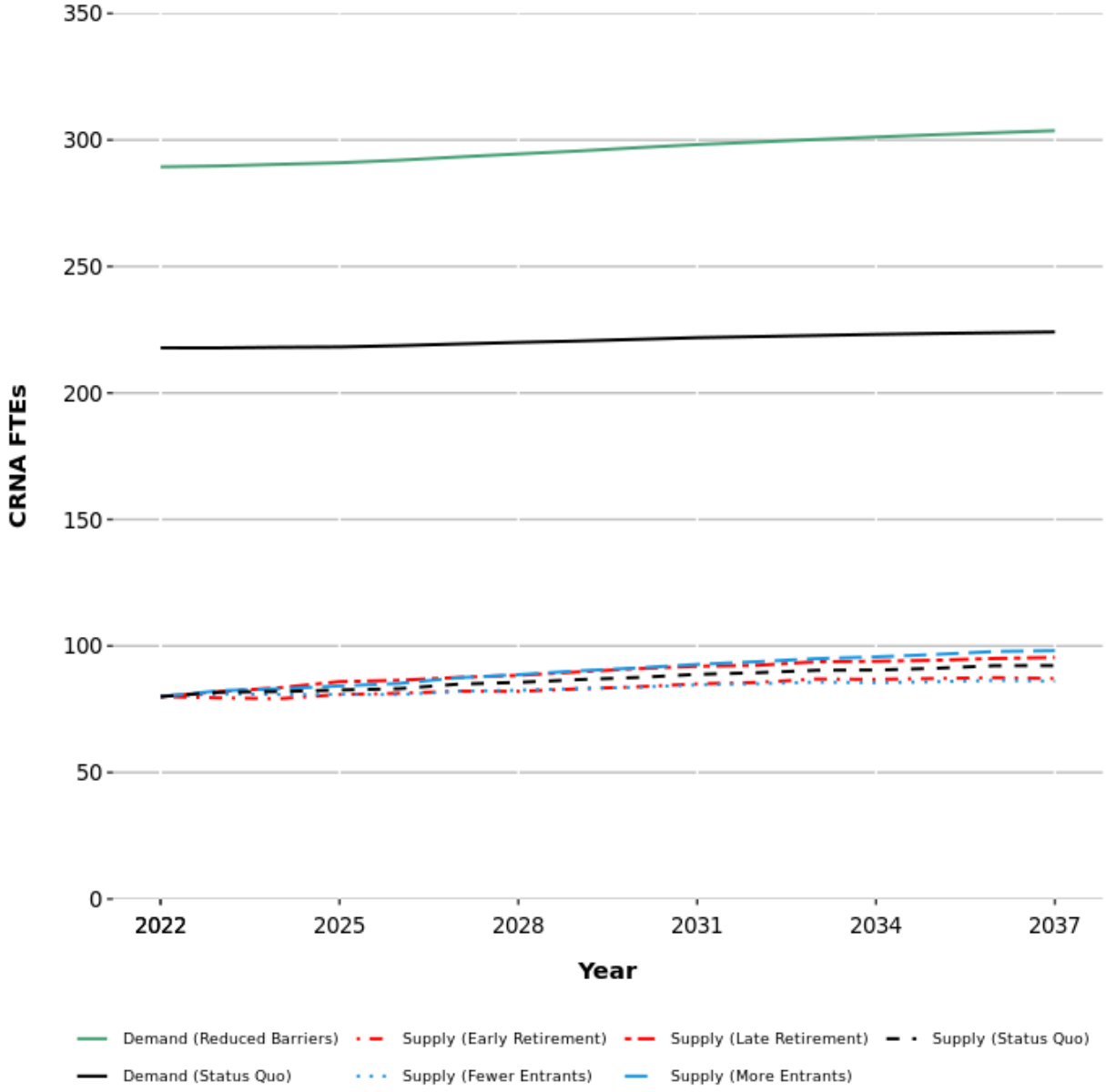


Exhibit 20: State of Hawai‘i CRNA Adequacy Summary Table

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	80	218	-138	37%
2037	92	224	-132	41%

Over the projection period, supply of CRNAs in Hawai‘i is expected to grow by 15.3% (or 1.0% per year) a total of 12 FTE CRNAs under the *Status Quo* scenario, with projected growth over the period between 7.6% (or 6 CRNA FTEs under the *10% Fewer Graduates* scenario) and 22.7% (or 18 CRNA FTEs) under the *10% More Graduates* scenario).

Population demand for CRNA services under the demand *Status Quo* scenario is projected to increase by 2.9% (0.2% per year) for a total of 6 CRNA FTEs. Projected demand in the *Reduced Barriers* scenario is above the *Status Quo* supply by 262% (209 CRNA FTEs) in the first year of the projection and continues to widen to 224 in the final year of the projection.

The projections for CNMs reflect improving adequacy from a shortfall in 2022 which is corrected by 2037. The number of new CNMs entering the Hawai‘i workforce starts at 10.9% of the total supply in the first year of the projection. As the workforce grows the assumed constant number of new entrants shrinks to 8.2% of the total supply in 2037. Retirements from the workforce initially offsets slightly less than two thirds of new entrants with 6.8% of total supply in 2022 retiring in that year. Retirements drop slightly to 6.2% of the total supply in 2037. Assumed retirements and new entrants by year are summarized in Exhibit 59.

Exhibit 21: State of Hawai‘i CNM Supply and Demand Projections, 2022 – 2037

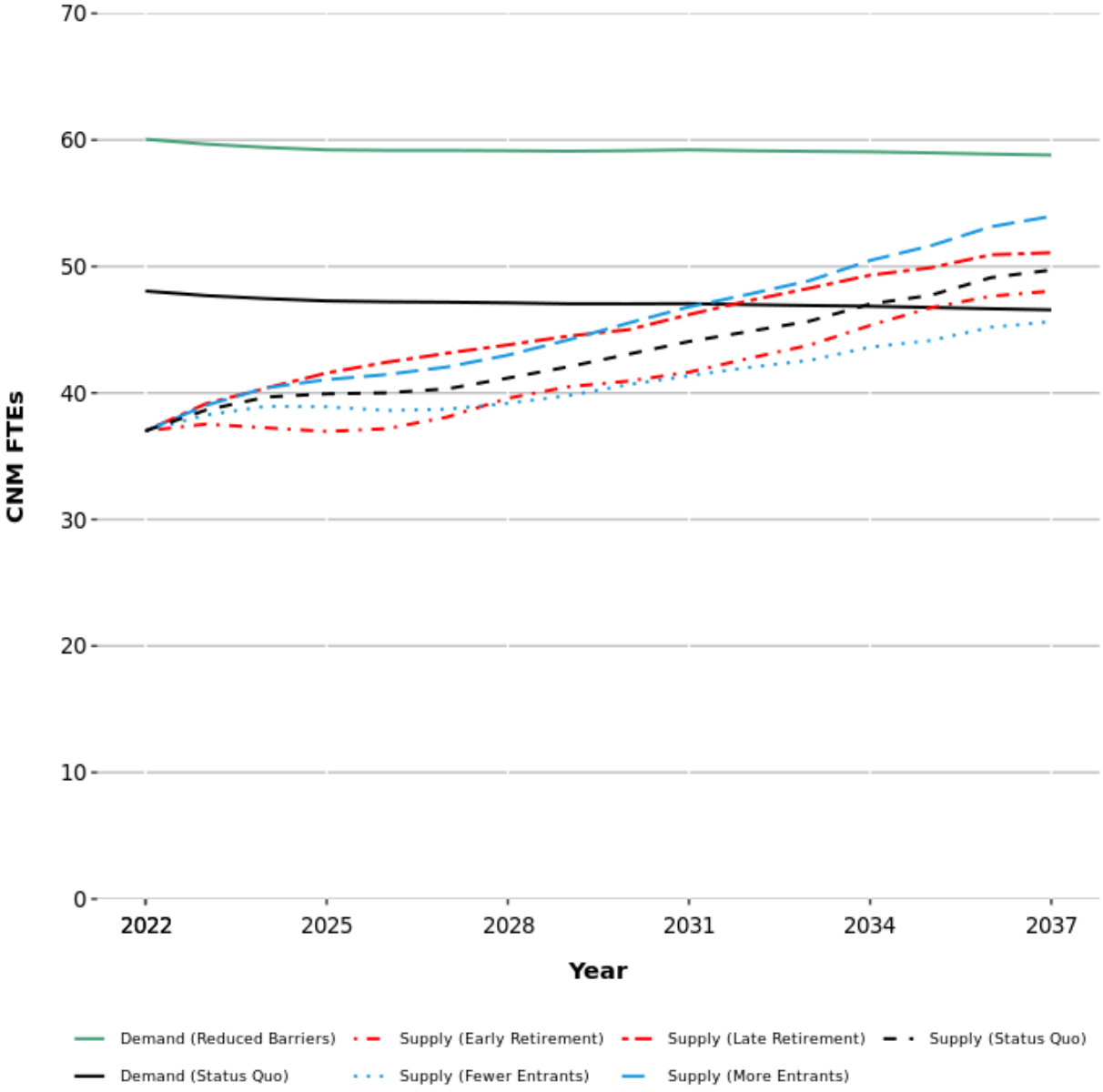


Exhibit 22: State of Hawai‘i CNM Adequacy Summary Table

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	37	48	-11	77%
2037	50	47	3	107%

Over the projection period, supply of CNMs in Hawai‘i is expected to grow by 34.4% (or 2.3% per year) a total of 13 CNM FTEs under the *Status Quo* scenario, with projected growth over the period between 23.3% (or 9 CNM FTEs under the *10% Fewer Graduates* scenario) and 45.8% (or 17 CNM FTEs) under the *10% More Graduates* scenario).

Population demand for CNM services under the demand *Status Quo* scenario is projected to fall by -3.1% (-0.2% per year) for a total decline of 1 CNM FTEs. Projected demand in the *Reduced Barriers* scenario increases above the *Status Quo* supply by 62% initially (23 CNM FTEs) in the first year of the projection. The rapid growth of supply catches up with the *Status Quo* demand scenario by the end of the projection.

The number of new NPs entering the Hawai‘i workforce starts at 8.5% of the total supply in the first year of the projection. As the workforce grows the assumed constant number of new entrants shrinks to 6.6% of the total supply in 2037. Retirements from the workforce initially nearly offset the number of new entrants by approximately two-thirds at 5.8% of total supply in 2022 retiring in that year. Retirements drop marginally to 5.6% of the total supply in 2037. Assumed retirements and new entrants by year are summarized in Exhibit 61.

Exhibit 23: State of Hawai‘i Total NP Supply & Demand Projections, 2022 – 2037

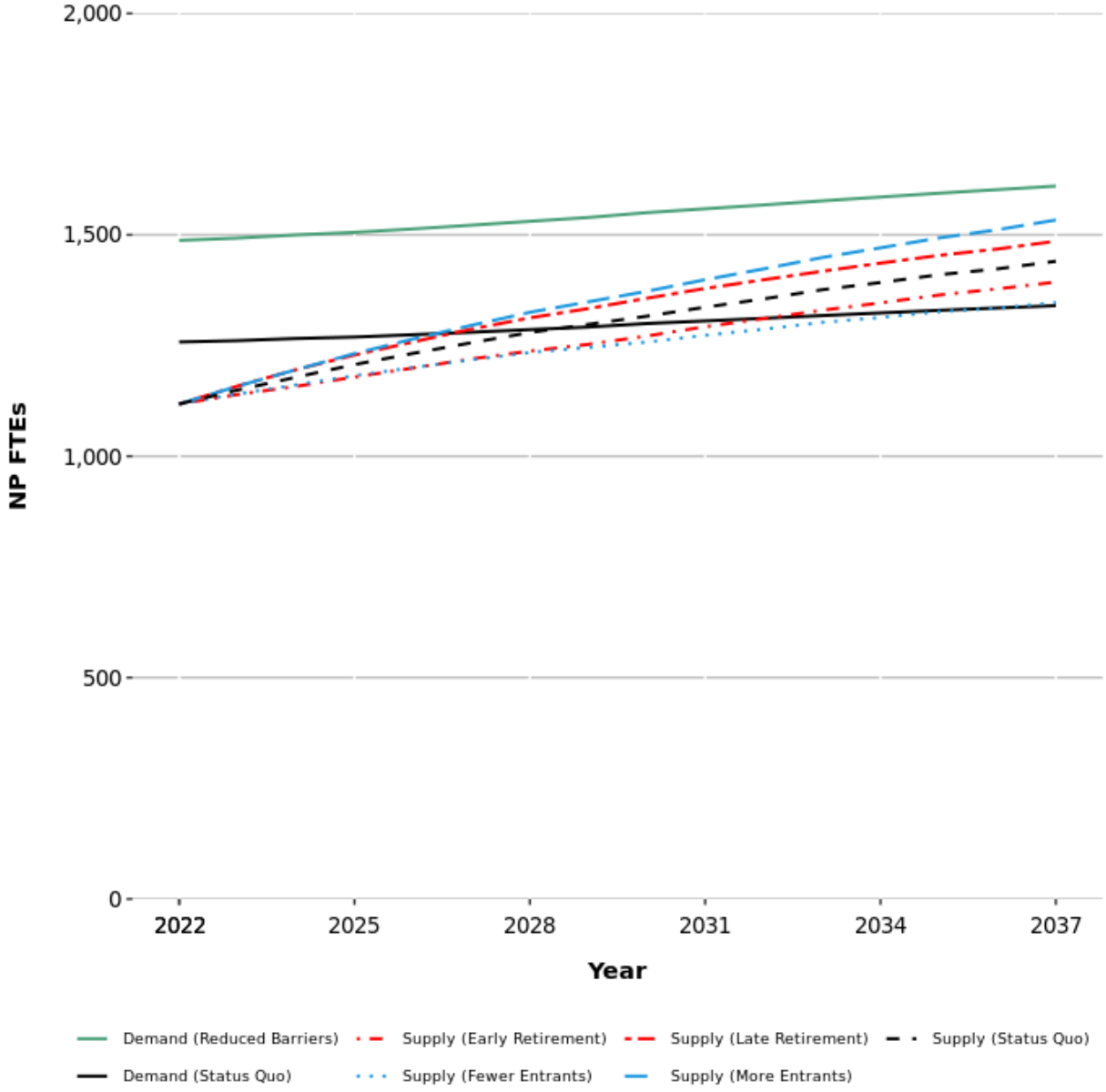


Exhibit 24: State of Hawai‘i Total NP Adequacy Summary Table

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	1,118	1,258	-140	89%
2037	1,527	1,340	187	114%

Over the projection period, overall supply of NPs in Hawai‘i is expected to grow by 36.6% (or an average of 2.4% per year) a total of 409 NP FTEs under the *Status Quo* scenario, with projected growth over the period between 20.5% (or 229 NP FTEs under the *10% Fewer Graduates* scenario) and 37.2% (or 415 NP FTEs) under the *10% More Graduates* scenario).

Population demand for NP services under the demand *Status Quo* scenario is projected to increase by 6.5% (0.4% per year) for a total of 82 NP FTEs. Projected demand in the *Reduced Barriers* scenario increases above the *Status Quo* supply by 33% (369 NP FTEs) in the first year of the projection and grows to a gap of 492 NP FTEs as supply continues to grow at a faster rate through the final year of the projection.

NP Specialty Category Projection Comparison

The projections are also analyzed at a more granular level and broken out by broader NP areas including primary care, acute care, psychiatric-mental health, women's health, and other. The results emphasize the varying trends within these detailed NP specialty categories. Although physicians are not within the scope of this study, the results should be interpreted in context to the most recent physician workforce projections for Hawai'i.[20] This allows for a clearer comparison between NP and physician adequacy across different specialties.[ii]

[ii] Note: The broader categories for physicians in the most recent Hawai'i workforce report may not align with the NP categories reported in this study. As a result, comparisons between physician and NP projections can only be made for the categories that directly correspond to each other.

Exhibit 25: State of Hawai‘i Primary Care NP Supply and Demand Projections, 2022 – 2037

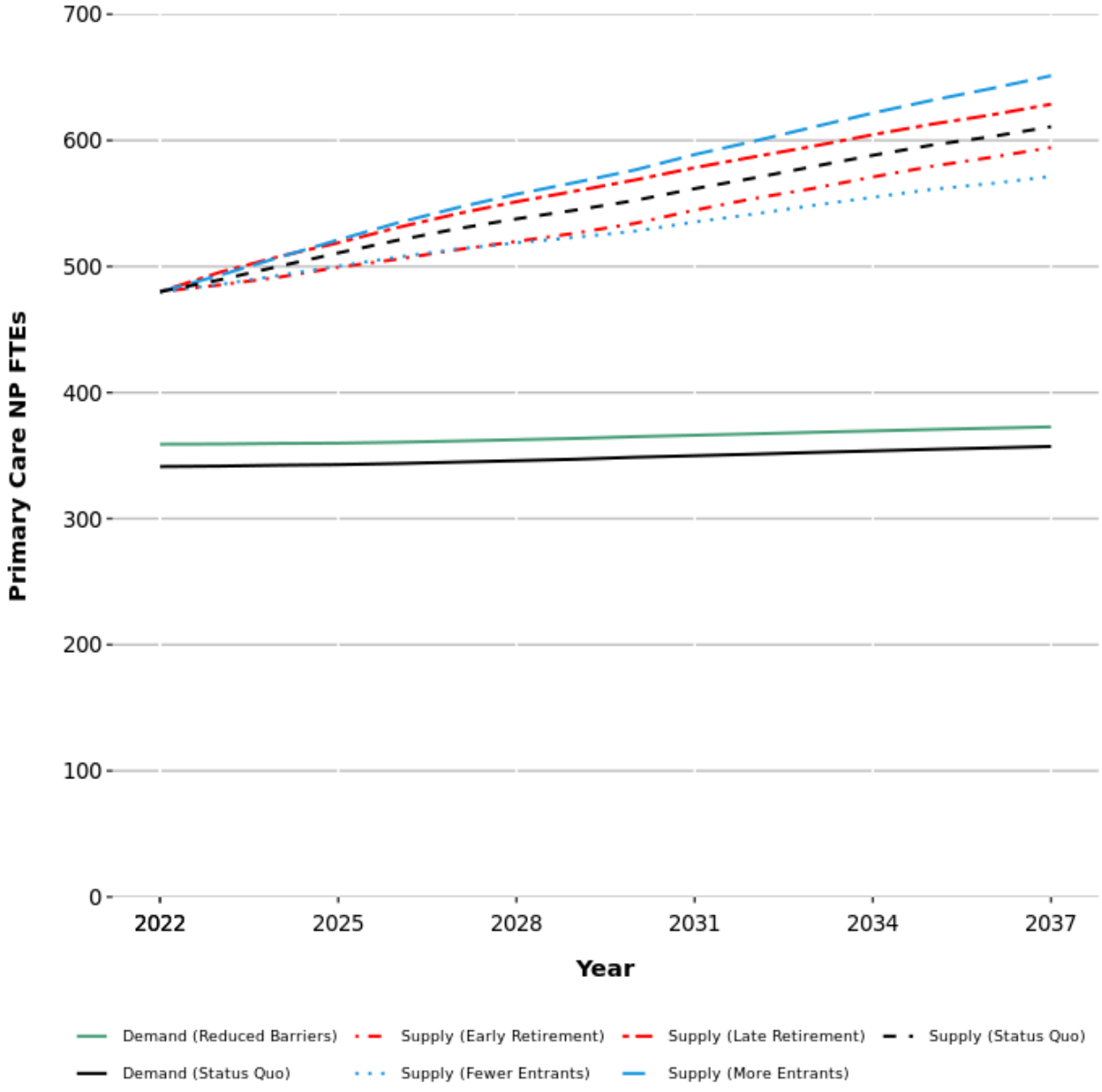


Exhibit 26: State of Hawai‘i Primary Care NP Adequacy Summary Table

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	480	341	139	141%
2037	611	357	254	171%

Primary care NPs show a promising trend, with adequacy improving from 141% in 2022 to 171% in 2037, reflecting robust growth in supply compared to more modest increases in demand. The trend towards increased supply of NPs offers hope for reducing workforce physician gaps by 2037. According to the Hawai‘i Physician Workforce Report, 2023, there is an 11% shortage of primary care physicians statewide.[20] NP specialties included in primary care based on HSCN survey data are adult-gerontology, primary care and pediatric primary care. Whereas physician specialties included in primary care are family medicine, general internal medicine, geriatric medicine and pediatrics. There is a challenge in making direct comparisons between physicians and NPs when specialties do not align exactly. The data highlights an ongoing reliance on NPs nationally and the need for continued expansion of their roles to address these shortages in primary care.[21, 22]

Exhibit 27: State of Hawai‘i Acute Care NP Supply & Demand Projections, 2022 - 2037

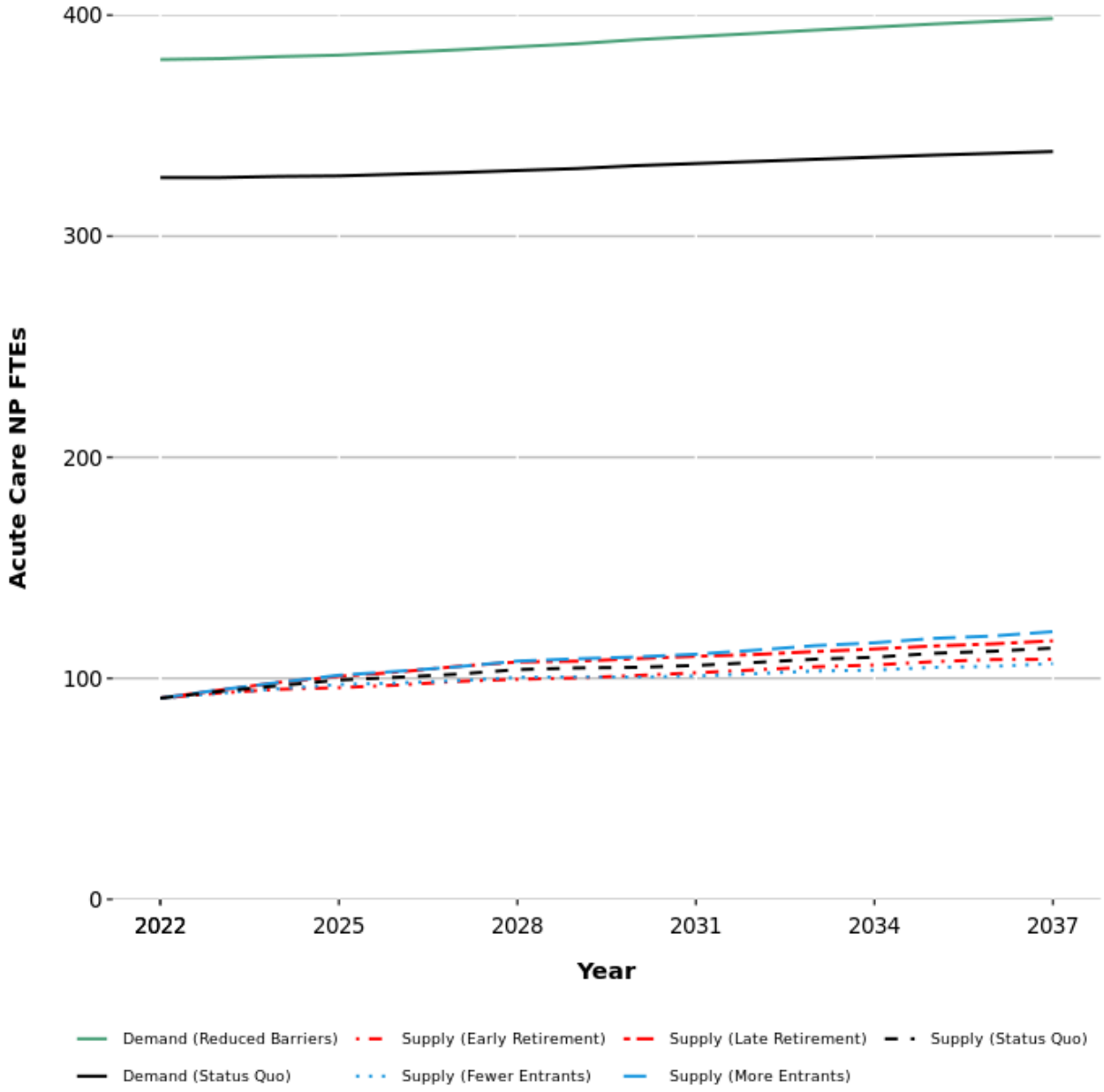


Exhibit 28: State of Hawai‘i Acute Care Adequacy Summary Table

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	91	327	-236	28%
2037	114	338	-225	34%

Over the projection period, acute care NP supply is expected to by 24.9% (an average of 1.7% per year) a total of 23 acute care NP FTEs under the Status Quo scenario. Population demand for acute care NPs services under the demand Status Quo scenario is projected to increase modestly by 3.6% (0.2% per year) for a total of 12 acute care NP FTEs over this period. In 2022, there is a significant supply-demand imbalance for acute care NPs leading to an adequacy of 28%. Despite the projected growth in supply, by 2037, the gap between supply and demand will remain, with adequacy rising to only 34%. This suggests that, even with supply increasing, there will still be a shortage of acute care NPs to meet the growing demand. NP specialties included in the acute care category are critical care medicine, orthopedic surgery, surgery, hospital medicine, emergency medicine, neonatology and acute care pediatric.

Exhibit 29: State of Hawai‘i Psychiatric-Mental Health NP Supply & Demand Projections, 2022 – 2037, Without Expansion Scenario

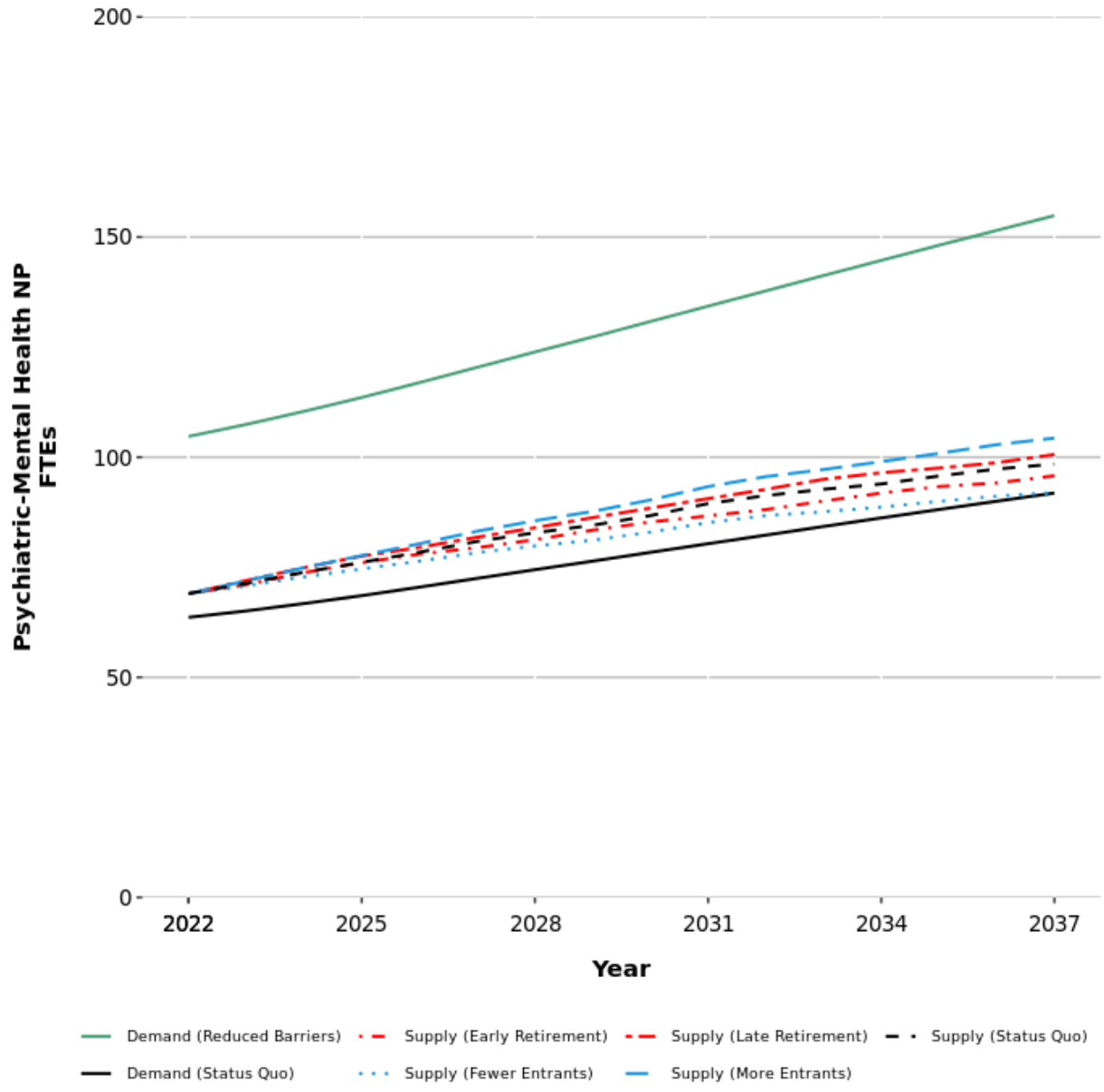


Exhibit 30: State of Hawai‘i Psychiatric-Mental Health NP Supply & Demand Projections, 2022 – 2037, Expansion Scenario

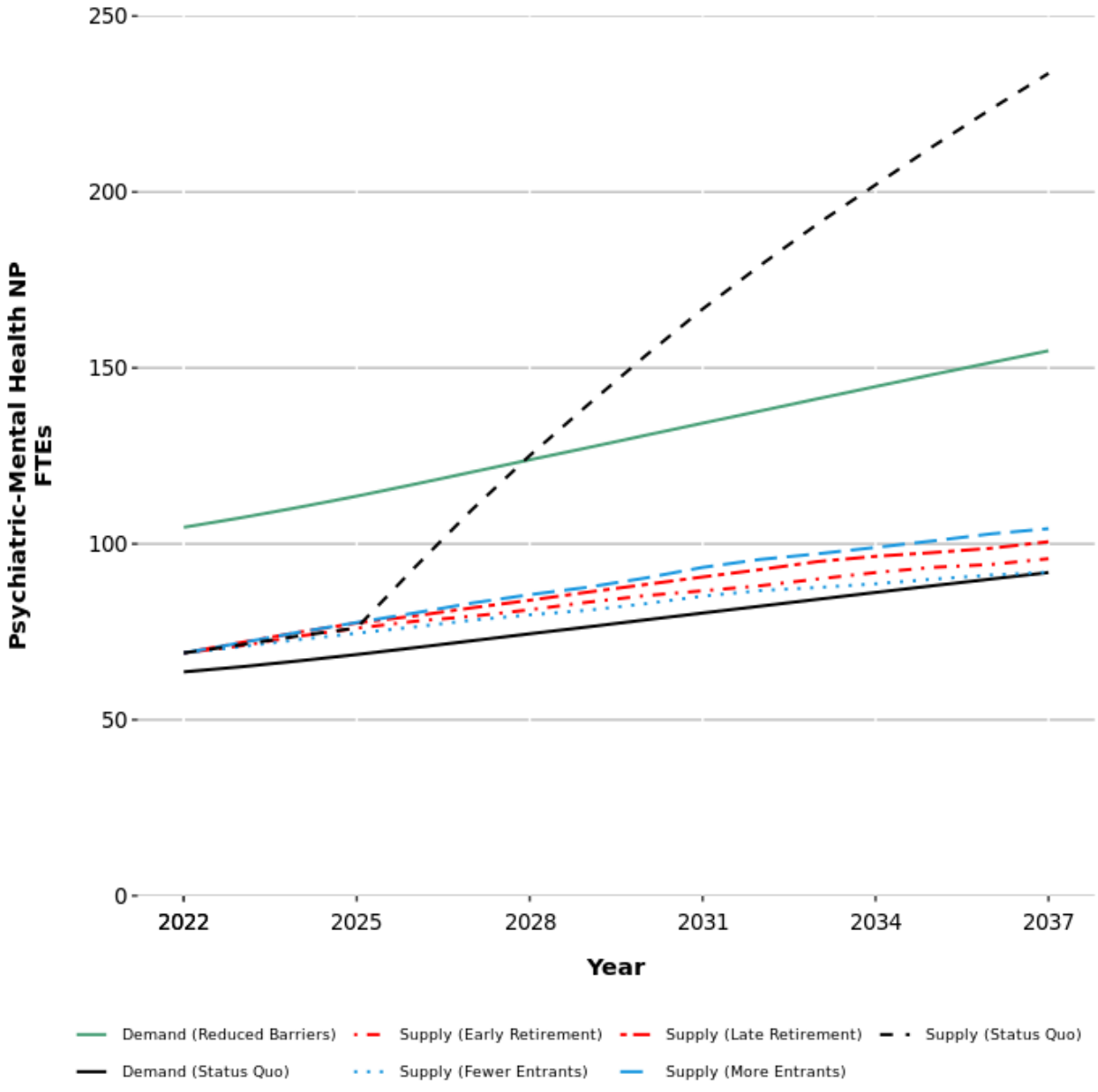


Exhibit 31: State of Hawai‘i Psychiatric-Mental Health NP Adequacy Summary Table, Without Expansion

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	69	64	5	108%
2037	98	92	7	107%

Exhibit 32: State of Hawai‘i Psychiatric-Mental Heath NP Adequacy Summary Table, Expansion Scenario

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	69	64	5	108%
2037	234	92	142	254%

The psychiatric-mental health NP supply projections include assumptions about increases to psychiatric-mental health NP training in nurse education programs in the state of Hawai‘i. Over the projection period, psychiatric-mental health NP supply is expected to grow by 238.7% (an average of 15.9% per year) a total of 165 psychiatric-mental health NPs under the *Expansion scenario*. In contrast, psychiatric-mental health NP supply is expected to grow by 42.7% (an average of 2.8% per year) a total of 29 psychiatric-mental health NP FTEs without the expansion. Population demand for psychiatric-mental health NP services under the demand *Status Quo scenario* is projected to increase by 44.4% (3.0% per year) for a total of 28 psychiatric-mental health NP FTEs over this period. By 2037, under the supply *Expansion scenario*, adequacy is expected to reach 254%, driven by the increased training slots, compared to an adequacy of 107% under the supply *Status Quo scenario* without the expansion. This suggests that the expanded supply of psychiatric-mental health NPs will more than meet the growing demand. The expanding supply of NPs provides hope for alleviating physician shortages in psychiatry. Adult psychiatry is currently short 42% and child and adolescent psychiatry are short 45% according to the Hawai‘i Physician Workforce Report, 2023.[20]

The data emphasizes the ongoing reliance on NPs to help meet the increasing demand for psychiatric-mental health care.

Exhibit 33: State of Hawai‘i Women’s Health NP Supply & Demand Projections, 2022 – 2037

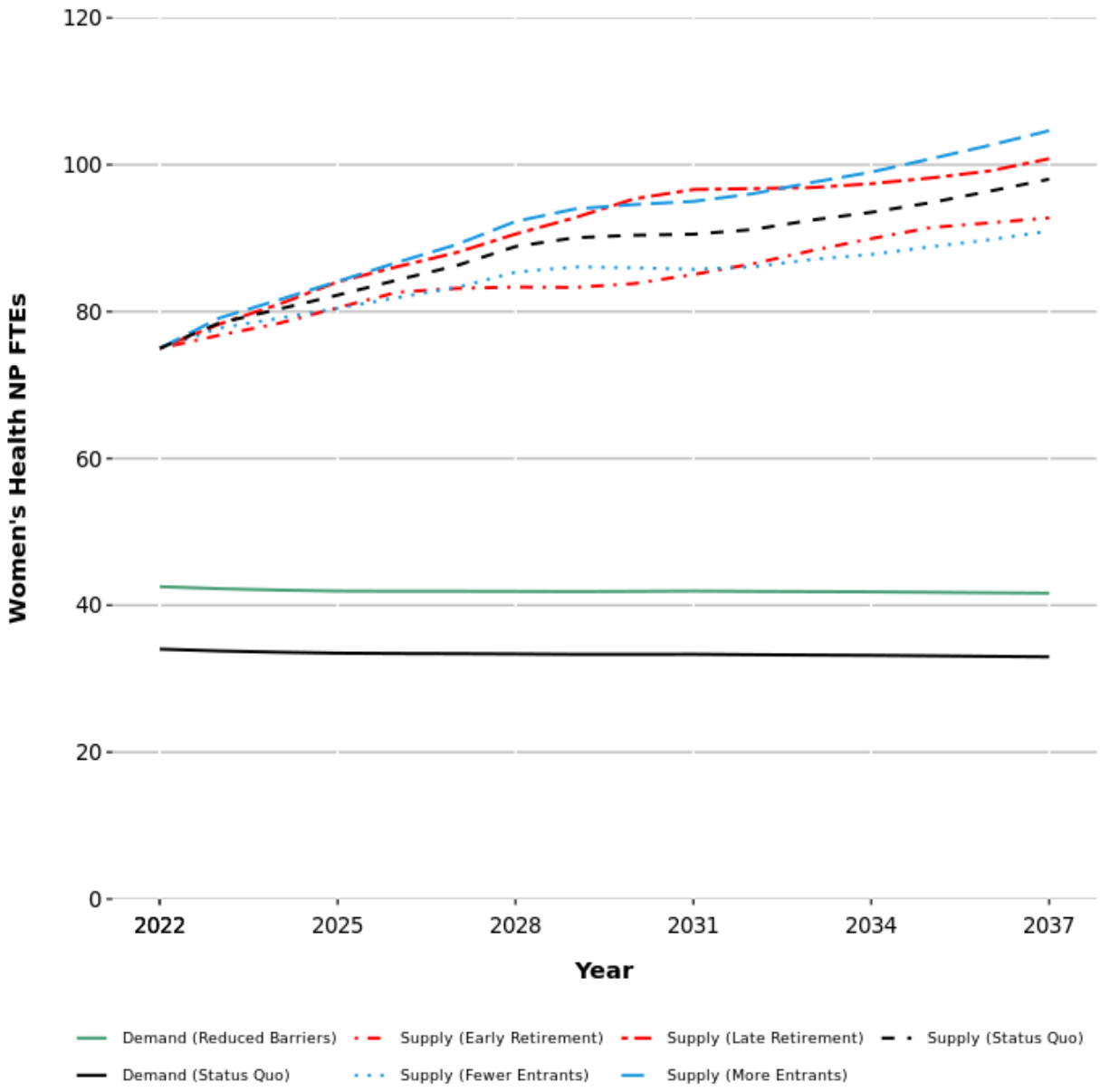


Exhibit 34: State of Hawai‘i Women’s Health NP Adequacy Summary Table

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	75	34	41	221%
2037	98	33	65	297%

Women’s health NPs show a significant increase in adequacy from 220% in 2022 to 297% in 2037, reflecting rapid growth in supply compared to relatively constant growth in demand. The oversupply of women's health NPs may be an opportunity. If more women have access to care from a women’s health NP it may help to offset the gap in access to care created by a shortage of primary care physicians.[20,23] NP specialties included in this category are maternal-child/ obstetrics and women’s health.

Exhibit 35: State of Hawai‘i Other NP Supply & Demand Projections, 2022 - 2037

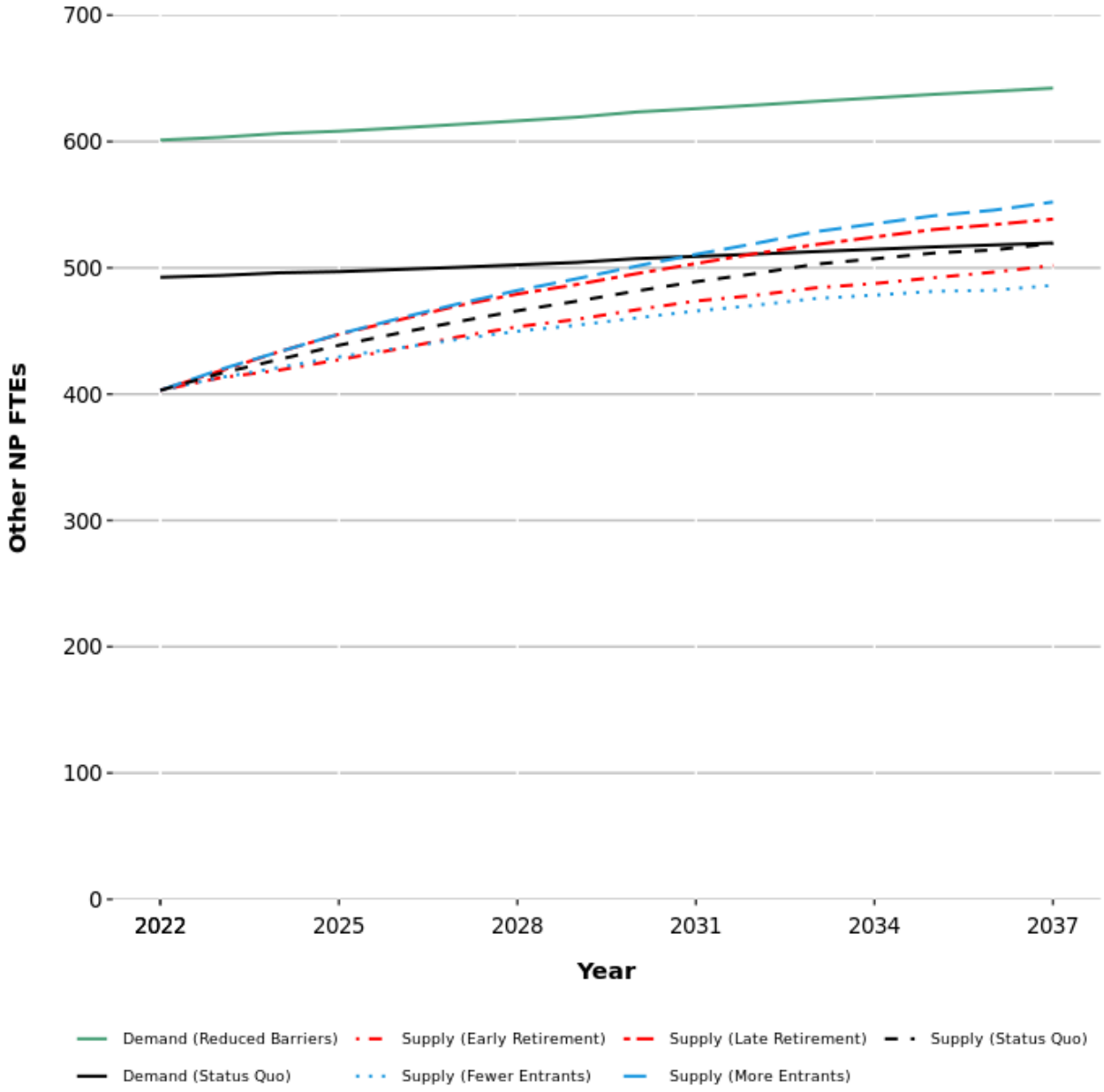


Exhibit 36: State of Hawai‘i Other NP Adequacy Summary Table

Year	Supply (Status Quo)	Demand (Status Quo)	Supply -Demand Difference	Adequacy (%)
2022	403	492	-89	82%
2037	519	520	-1	100%

Other NPs shows an improvement in the adequacy from 82% in 2022 to be in equilibrium at 100% by 2037, reflecting robust growth in supply and demand over the projection period.[iii] This is driven by a strong growth in supply to meet the growing demand. NP specialties included in this category are cardiology, gastroenterology, hematology/oncology, infectious diseases, nephrology, pulmonology, neurology, long term care, other and school health.

[iii] Note: Long-Term care NPs are reported together with Other NP category since they are a small specialty and individual results based on small sample sizes are not meaningful.

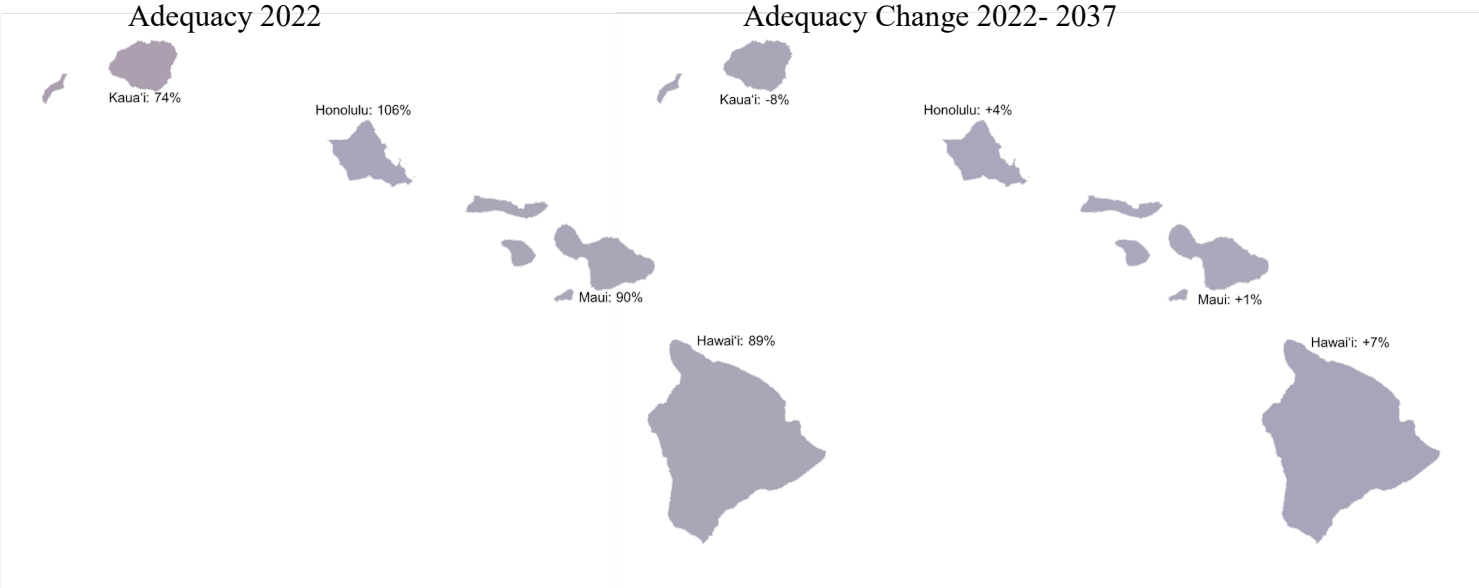
County Adequacy Gap Analysis

The county adequacy gap analysis is a crucial tool for identifying imbalances in the distribution of healthcare workers and pinpointing areas in need of intervention or investment. By assessing the ratio of supply to demand across counties, policymakers can evaluate how well the healthcare workforce meets the needs of different areas. Tracking changes in these ratios over time also provides insights into how adequacy levels might shift, offering valuable projections for future workforce requirements.

When interpreting county-level data, the adequacy ratio reflects the current workforce sufficiency in a given county at a specific time, helping to pinpoint where disparities exist. On the other hand, the adequacy change values show trends in workforce supply and demand, allowing for better forecasting of future challenges. Adequacy values are colored on a gradient from dark blue to dark red with grey indicating 100% adequacy in the middle. The greater the adequacy value is above 100%, the darker blue the county appears. The further below 100% adequacy a county appears the darker red the county appears. Adequacy change values are colored using the same blue to red gradient with the middle set to 0% to reflect how much a county is changing in the positive or negative direction over time. The greater the positive value is, the darker blue the county will appear. The more negative the value is, the more negative the county will appear. Comparing two county maps for any given occupation gives a complete view—showing counties that are currently underserved and unlikely to improve, as well as counties that, despite current shortages, are on track for growth. To the extent that a county is over supplied while surrounding counties are under supplied, this is an indicator that the population in an undersupplied county is needing to travel to an oversupplied county to receive care. This analysis may allow policy makers to improve strategic planning, identifying areas where efforts are most needed or may have the most significant impact.

Overall Comparisons

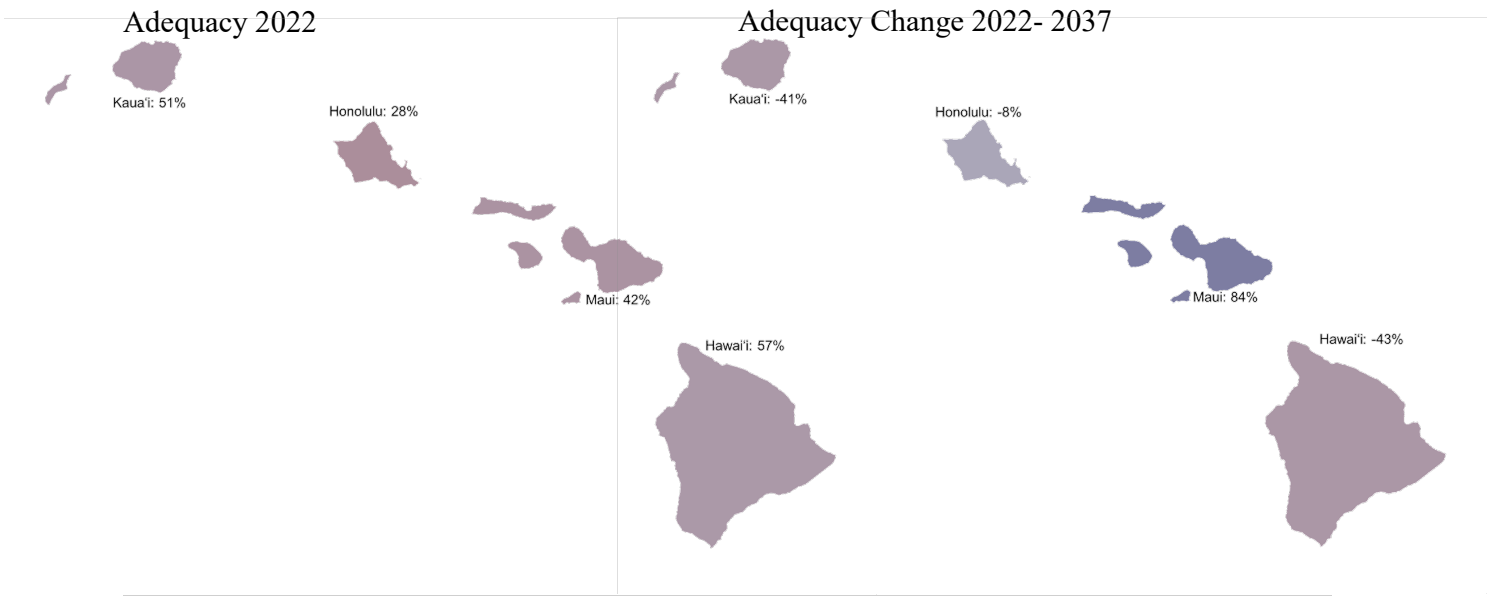
Exhibit 37: State of Hawai‘i RN Supply Adequacy and Adequacy Change by County



Map	Hawai`i	Honolulu	Kaua‘i	Maui
Adequacy 2022	89%	106%	74%	90%
Adequacy Change 2022-2037	+7%	+4%	-8%	+1%

RN Adequacy varies slightly by county across the state with Kaua‘i having the lowest adequacy ratio at 74% and Honolulu at 106%. Looking at the adequacy change over the projection horizon. Minimal change is expected however adequacy is also expected to decrease the most in Kaua‘i county where the most improvement is needed. The county of Hawai‘i is expected to see the most improvement in adequacy with growth of +7 percentage points yet the county of Honolulu will still maintain the largest adequacy ratio over time. The lack of color variation in the RN set of maps indicates that the RN workforce is currently distributed relatively evenly across the state in relation to estimated population demand. Also there is little variation in how RNs are distributed in relation to population growth as it is expected to occur over time.

Exhibit 38: State of Hawai‘i LPN Supply Adequacy and Change by County

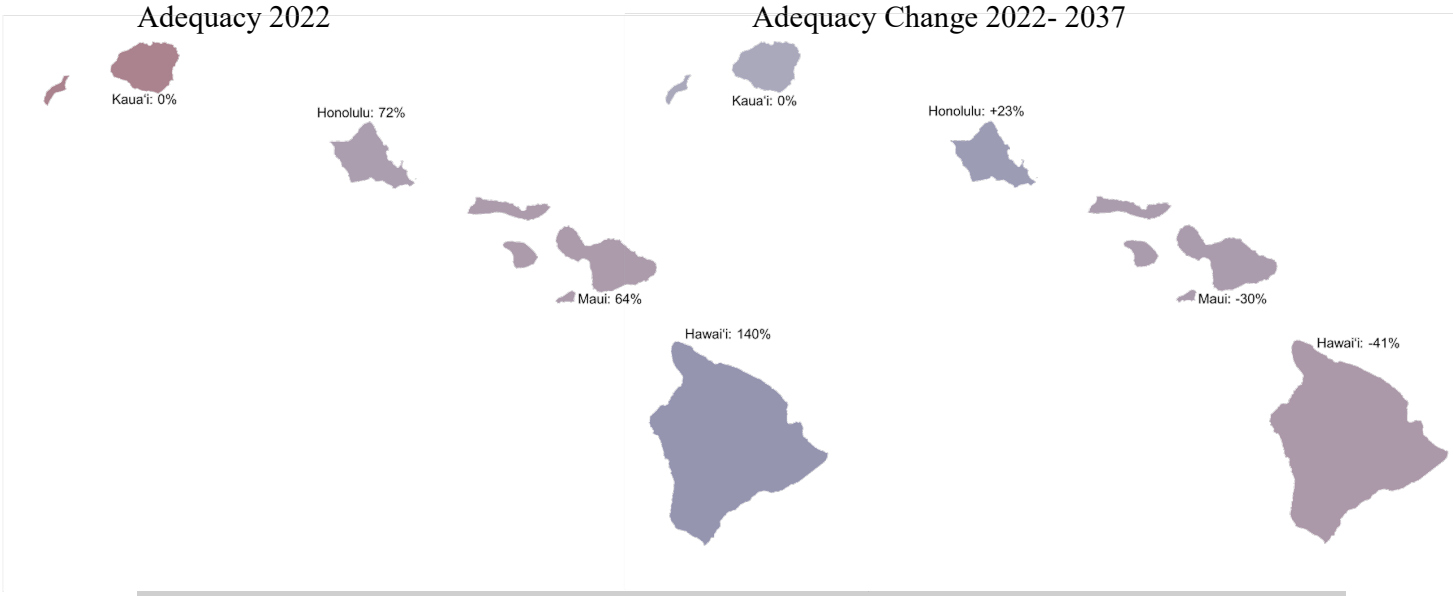


Map	Hawai`i	Honolulu	Kaua‘i	Maui
Adequacy 2022	57%	28%	51%	42%
Adequacy Change 2022-2037	-43%	-8%	-41%	+84%

LPN adequacy is low across the state. The county of Honolulu has a severely lower adequacy ratio than the rest of the counties in the state at 28% in the base year. Over time, adequacy ratios in the counties of Hawai‘i and Kaua‘i are projected to decline significantly (-43 and -41 percentage points

respectively). Adequacy in the county of Honolulu is projected to decline much less over time in comparison. Conversely, the county of Maui which is currently at 42% adequacy is projected to see significant growth in LPN adequacy, improving by +84 percentage points over the projection period. This will bring the county of Maui to 126% adequacy by 2037. Other counties will still be below 100% adequacy.

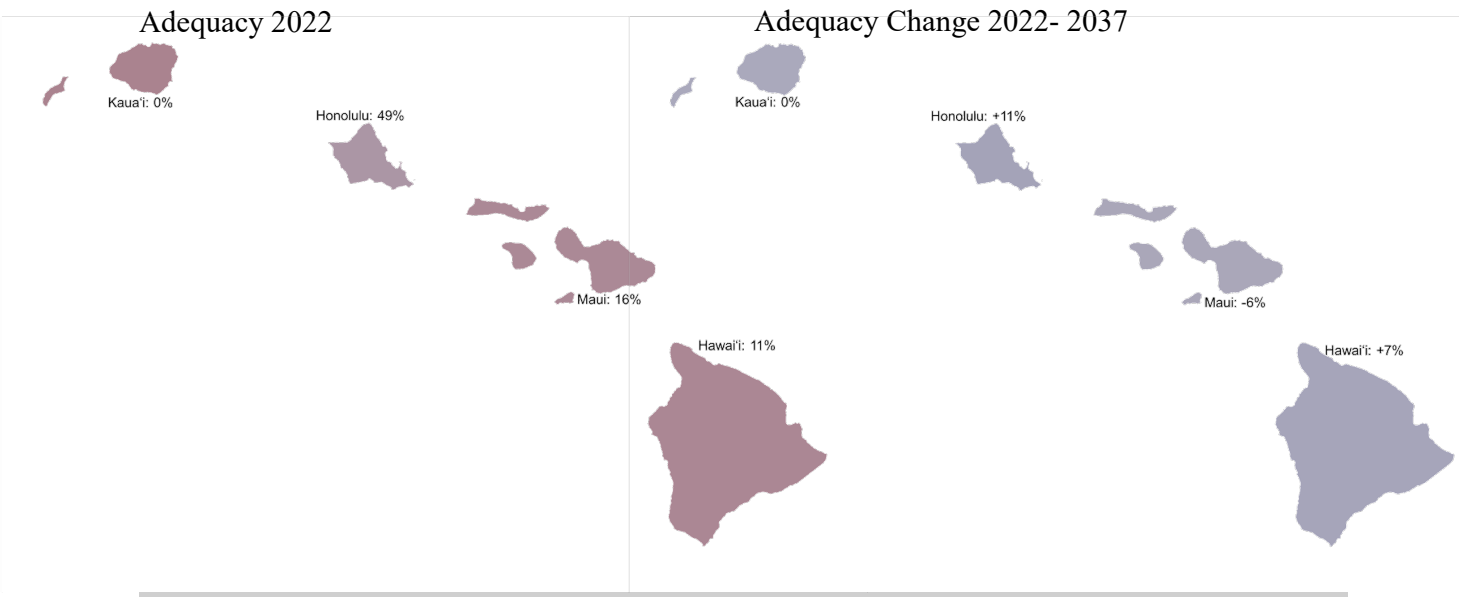
Exhibit 39: State of Hawai‘i CNM Supply Adequacy and Change by County



Map	Hawai`i	Honolulu	Kaua‘i	Maui
Adequacy 2022	140%	72%	0%	64%
Adequacy Change 2022-2037	-41%	+23%	0%	-30%

CNM adequacy is maldistributed across the state with a 140% adequacy concentration of CNMs in the county of Hawai‘i but adequacy under 100% in Honolulu and Maui and no supply in the county of Kaua‘i. Moderate declines in adequacy are expected over the projection period in the counties of Hawai‘i and Maui with improvements anticipated in adequacy in the county of Honolulu.

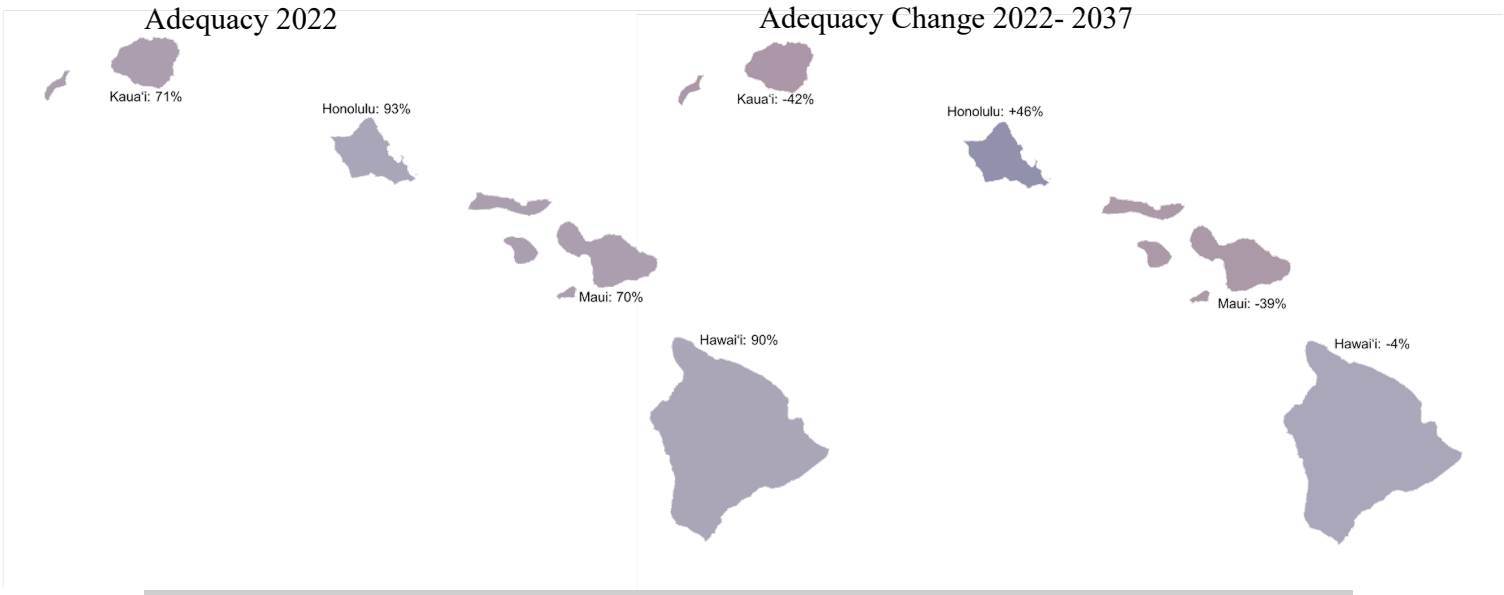
Exhibit 40: State of Hawai‘i CRNA Supply Adequacy and Change by County



Map	Hawai`i	Honolulu	Kaua‘i	Maui
Adequacy 2022	11%	49%	0%	16%
Adequacy Change 2022-2037	+7%	+11%	0%	-6%

Except for the county of Honolulu at 49% adequacy, the rest of the state experiences severely low adequacy for CRNAs. The supply of CRNAs is projected to improve for the counties of Honolulu and Hawai‘i only slightly over time (+11 and +7 percentage points respectively). The county of Maui is projected to lose -6 percentage points.

Exhibit 41: State of Hawai‘i Total NP Supply Adequacy and Change by County

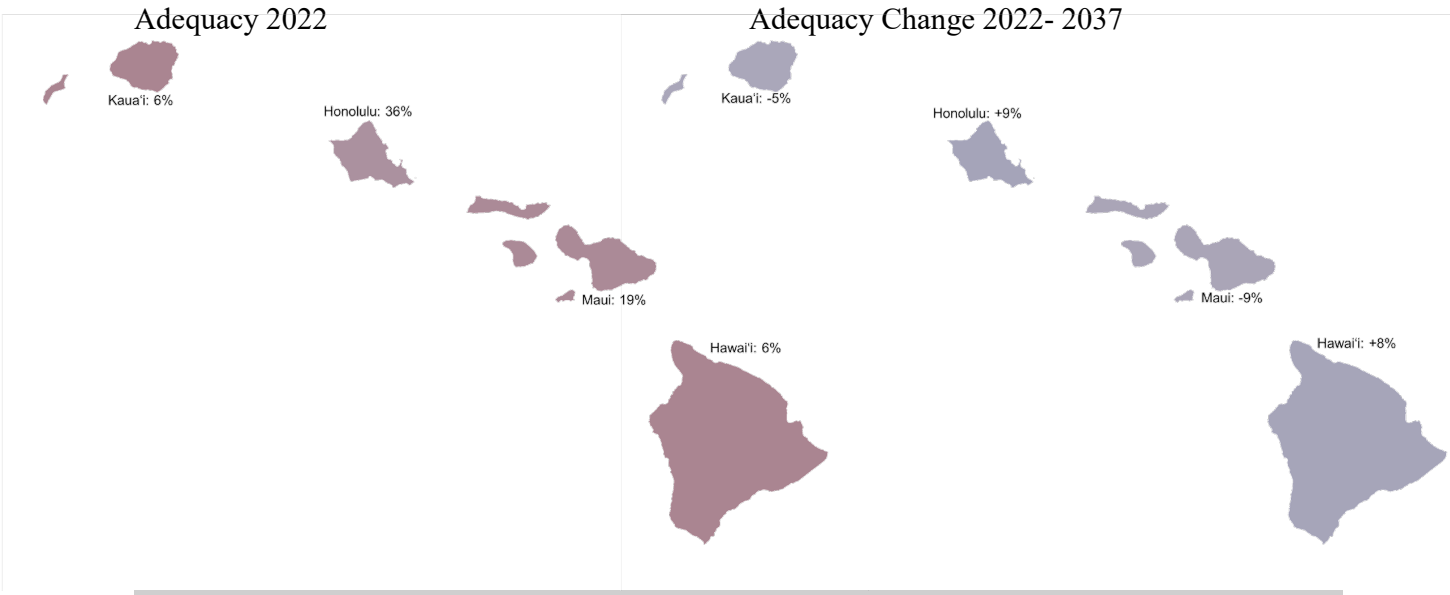


Map	Hawai`i	Honolulu	Kaua‘i	Maui
Adequacy 2022	90%	93%	71%	70%
Adequacy Change 2022-2037	-4%	+46%	-42%	-39%

NPs overall are more concentrated in the counties of Hawai‘i and Honolulu. Looking at how the workforce is expected to change over time in relation to population demand, the county of Hawai‘i is expected to see minimal change. Whereas the county of Honolulu is expected to see an increase of +46 percentage points. The counties of Kaua‘i and Maui where adequacy is already lower, are expected to decline even further with a loss of -42 and -39 percentage points respectively.

NP Comparisons by Specialty Category

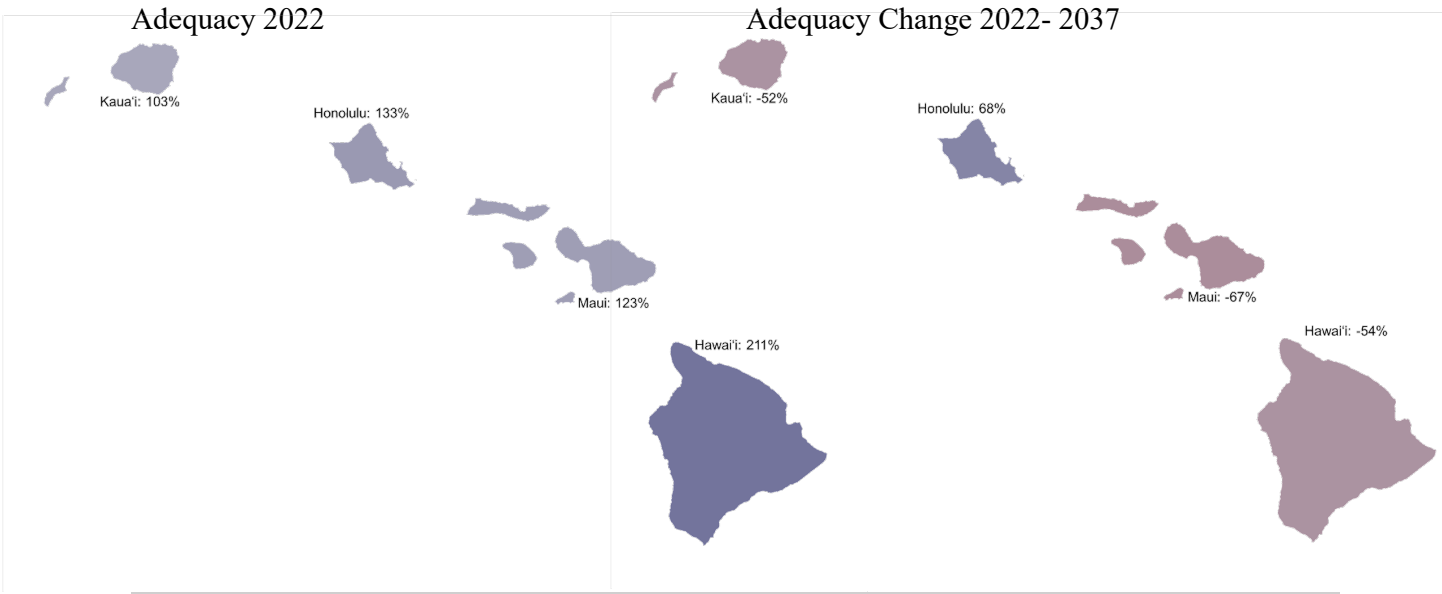
Exhibit 42: State of Hawai‘i Acute Care NP Supply Adequacy and Change by County



Map	Hawai`i	Honolulu	Kaua‘i	Maui
Adequacy 2022	6%	36%	6%	19%
Adequacy Change 2022-2037	+8%	+9%	-5%	-9%

Acute care NP adequacy is low across the state ranging from a high of 36% adequacy in the county of Honolulu to 6% on the low end in the counties of Hawai‘i and Kaua‘i. Adequacy is expected to improve over time in the county of Hawai‘i and the county of Honolulu (+8 and +9 percentage points respectively) while Kaua‘i and Maui counties are expected to decline in adequacy over time (-5 and -9 percentage points respectively).

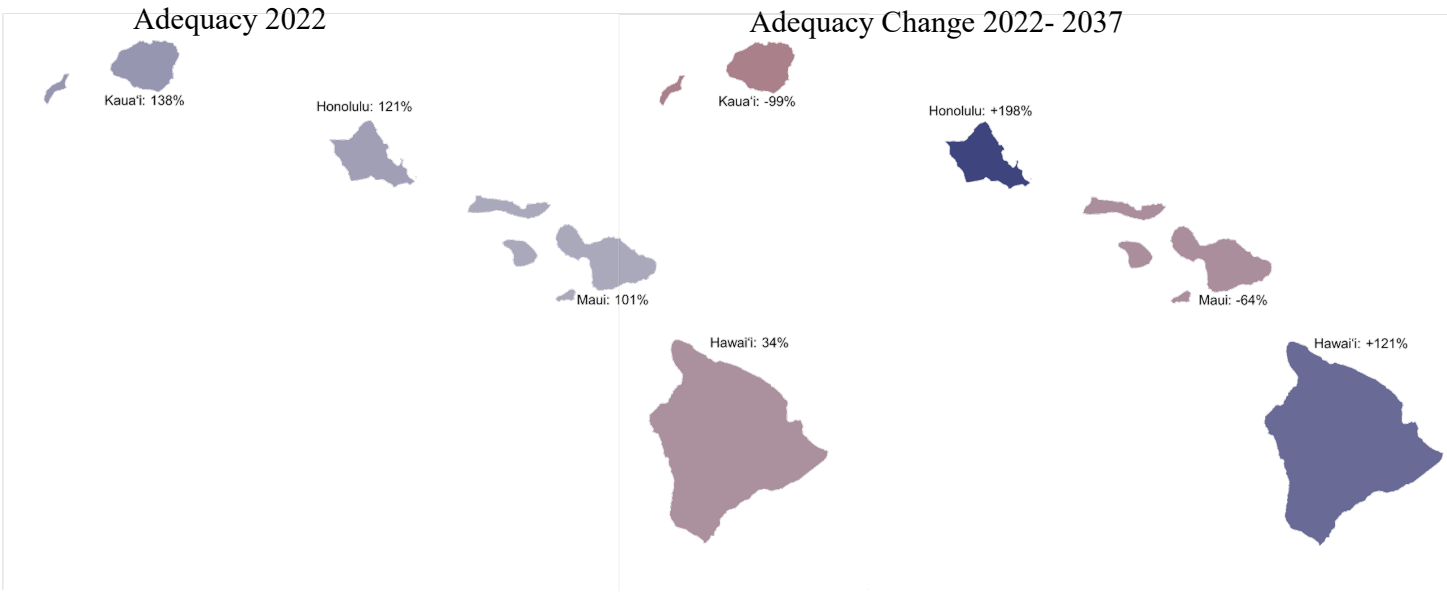
Exhibit 43: State of Hawai‘i Primary Care NP Supply Adequacy and Change by County



Map	Hawai`i	Honolulu	Kaua‘i	Maui
Adequacy 2022	211%	133%	103%	123%
Adequacy Change 2022-2037	-54%	+68%	-52%	-67%

While primary care NPs are currently at high adequacy levels across all counties in Hawai‘i, two factors must be considered to interpret this information in context. The first is that published estimates from the Hawai‘i Physician Workforce Report 2023[20], show primary care physician shortages across all counties in the state in 2022 (Hawai‘i county at 12%, Honolulu county at 7%, Kaua‘i county at 11% and Maui county at 33%). The second is that primary care NP adequacy is projected to drop by more than -50 percentage points in three counties while adequacy in the county of Honolulu alone is projected to increase by +68 percentage points. This will create a higher concentration of primary care NPs in one area of the state while the rest of the state declines in adequacy.

Exhibit 44: State of Hawai‘i Psychiatric-Mental Health NP Supply Adequacy and Change

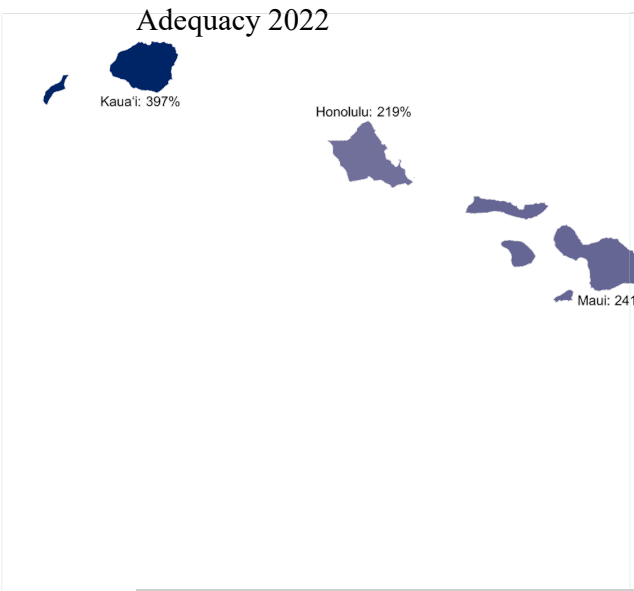


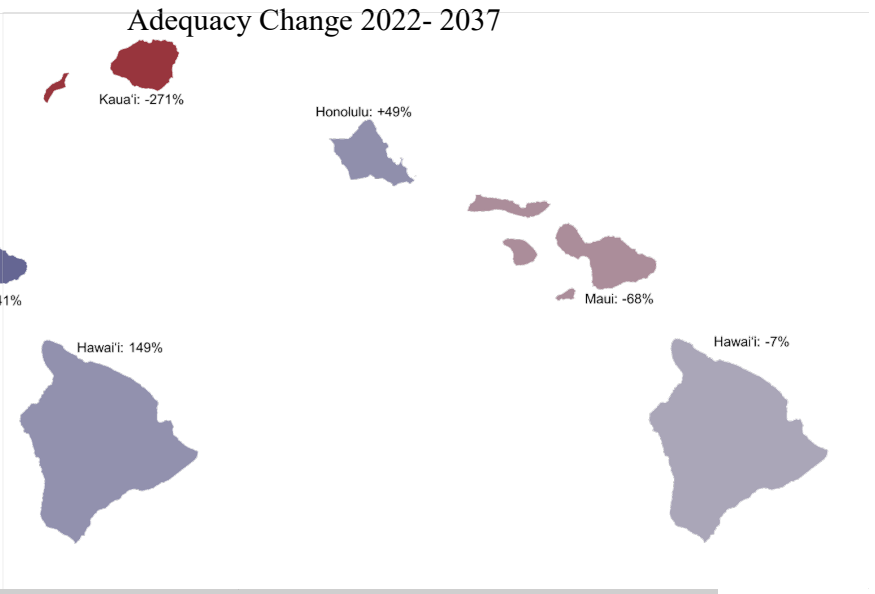
by County

Map	Hawai`i	Honolulu	Kaua‘i	Maui
Adequacy 2022	34%	121%	138%	101%
Adequacy Change 2022-2037	+121%	+198%	-99%	-64%

Psychiatry NP adequacy varies by county and is projected to see significant change over the projection period. The county of Kaua‘i has the highest adequacy in the base year at 138%, however it is projected to lose -99 percentage points over time. A decline in adequacy is also anticipated for the county of Maui (-64 percentage points). Adequacy in the counties of Hawai‘i and Honolulu are expected to increase over the projection period. While strong growth in this specialty is expected due to training program expansion, uneven adequacy by county indicates issues with maldistribution of this workforce in relation to population needs across the state.

Exhibit 45: State of Hawai‘i Women’s Health NP Supply Adequacy by County

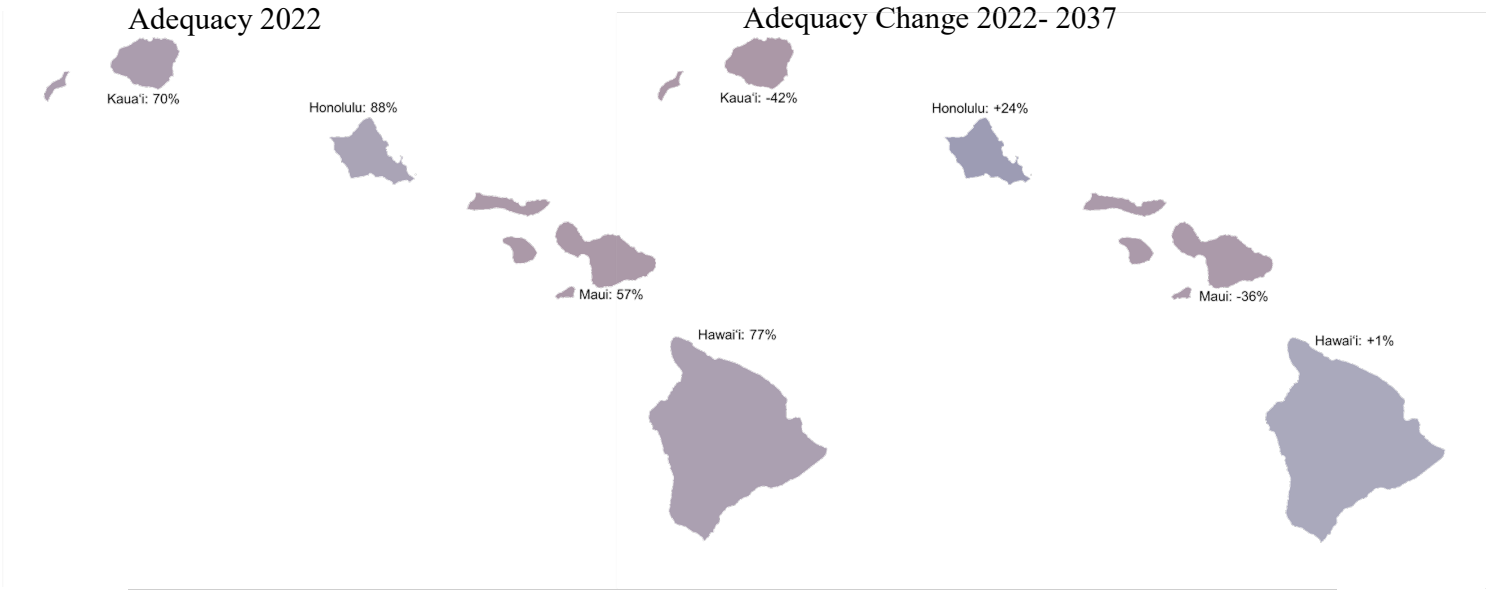




Map	Hawai`i	Honolulu	Kaua'i	Maui
Adequacy 2022	149%	219%	397%	241%
Adequacy Change 2022-2037	-7%	+49%	-271%	-68%

Women’s Health NPs have a high adequacy ratio in each county in the base year of the projection. However, adequacy is anticipated to improve over time only in the county of Honolulu (+49 percentage points). Adequacy is projected to decline in the other three counties. However, assuming historical attrition rates to retirement or out-migration from the state continue, all counties will maintain adequacy ratios over 100%. This is an indicator that the state is well prepared to support individuals seeking women’s health services.

Exhibit 46: State of Hawai‘i Other NP Supply Adequacy by County



Map	Hawai`i	Honolulu	Kaua'i	Maui
Adequacy 2022	77%	88%	70%	57%
Adequacy Change 2022-2037	-4%	+46%	-42%	-39%

NPs working in specialties in the Other category have adequacy ratios below 100% in all counties. With the exception of the county of Honolulu, which is expected to see a +46 percentage point increase in adequacy, all other counties across the state are expected to see declines in adequacy over time.

Summary of Focus Groups

Hawai‘i faces unique challenges in delivering healthcare services due to its small size and geographic isolation. The state's island structure, combined with economies of scale, economies of scope and the high costs of transportation, often results in healthcare facilities being concentrated in more central areas. This can make it harder for people living on more remote islands or in rural areas to access care. Additionally, Hawai‘i's natural amenities and limited housing supply drive up living costs, which, without corresponding growth in local job opportunities, leads some residents to move to the continental U.S. in search of more affordable living and better economic prospects. These factors can create significant barriers to both healthcare access and overall economic stability, especially for those in isolated areas.[24,25]

GlobalData conducted focus group interviews, with nurses working in different settings, administrators, and educators to provide a qualitative perspective on the unique challenges and potential solutions for Hawai‘i's nursing workforce. The interviews were structured in two sections. The first part of the interview explained data sources and assumptions used to model and project nursing supply and demand from 2022-2037, incorporating factors like attrition, new entrants, and demographic shifts. The goal of this section was to provide stakeholders a general understanding of the modeling framework, gather their thoughts and feedback as well as provide clarifications on any questions they had about the model assumptions, data sources, etc.

In the second part, participants offered insights into current workforce challenges, such as how they are dealing with shortages across various roles and geographic areas. Discussions also covered organizational adaptations to workforce challenges, and potential solutions involving policy changes, innovative staffing models, and educational improvements.

The following summarizes the key trends and the current state of the Hawai‘i Nursing Workforce based on the views of interview participants.

- **Current state of Hawai‘i Nursing Workforce**

The current state of Hawai‘i’s nursing workforce is complex and characterized by a number of interconnected factors. There is a general consensus that the state faces challenges in recruiting and retaining nurses, particularly in specialized roles and rural areas. While there is debate over whether there is a true nursing shortage in the state, there is agreement that shortages exist in certain areas. Insights from interview participants are as follows:

  - The shortage of experienced nurses is a significant concern. While there is a steady stream of new nursing graduates, many healthcare facilities prefer to hire experienced nurses, creating a bottleneck for new graduates and potentially leading to out-migration. Some stakeholders believe that there is a hiring shortage due to hospitals' reluctance to invest in training new graduates.
  - The shortage is particularly acute in certain specialties, such as behavioral health, childhood or adolescent behavioral health, long-term care, mental health, and public health.
  - Rural areas and neighbor islands face more significant challenges in recruiting and retaining nurses due to factors like limited job opportunities, housing costs, and lower pay.

- The lack of a teaching hospital in Hawai‘i is cited as a major contributing factor to the workforce challenges, impacting clinical training opportunities and potentially leading to the out-migration of nurses seeking specialized training.
- Retention is a key issue. Factors such as burnout, low morale, lack of appreciation, and competitive salaries on the mainland contribute to nurses leaving the profession or seeking employment outside of Hawai‘i.

- **Shortages in Specific Roles and Specialties: A Closer Look**

Interview participants reveal a nuanced picture of Hawai‘i's nursing workforce, with varying levels of shortage depending on the specific role or specialty.

- LPN shortages are a major concern. Multiple participants emphasize a significant shortage of LPNs in Hawai‘i. This shortage is particularly acute in long-term care facilities. One participant even suggested that the state has been trying to move away from employing LPNs, though this may be specific to magnet hospitals.
- RN shortages are less severe but still present, especially for experienced nurses. The participants generally agree that the shortage of RNs is not as severe as the LPN shortage. However, there is a critical lack of experienced RNs. Hospitals often prioritize hiring experienced nurses, making it challenging for new graduates to find employment and potentially contributing to their out-migration. Certain RN specialties, such as behavioral health, childhood or adolescent behavioral health, intensive care, emergency department, and obstetrics, also face significant staffing challenges.
- APRN shortages are less prominent but exist in specific areas. Interview participants suggest that the shortage of APRNs is less pronounced compared to RNs and LPNs. However, shortages exist in certain APRN specialties, notably mental health and outpatient services.

The sources provide specific examples of the impact of nursing shortages:

- Limited capacity in behavioral health services: The shortage of specialized nurses often results in the closure of beds and limited access to crucial mental health services.
- Difficulties in discharging patients to long-term care: Shortages in long-term care facilities create backlogs in hospitals, impacting their ability to provide care.
- Challenges in providing dialysis care: Hawai‘i has a high incidence of end-stage renal disease, and the shortage of specialized nurses leads to extended dialysis hours and potential delays in care.

- **Factors Contributing to Nursing Shortage**

- **Limited Clinical Training Opportunities**: The lack of a teaching hospital in Hawai‘i restricts the number of clinical training spots available for nursing students. One interviewee, indicated that their program has limited capacity solely because of the limited number of clinical training spots. The shortage of clinical training opportunities may lead to qualified students being denied admission to nursing programs and potentially drives graduates to seek employment outside of Hawai‘i.
- **High Cost of Living**: The high cost of living in Hawai‘i, especially the cost of housing, is a significant obstacle to attracting and retaining nurses. Nurses often struggle to make a living

wage and may take on multiple jobs or leave the islands to find better paying positions. Rural areas and neighbor islands are particularly impacted, as salaries often do not match the higher cost of living.

- **Competition from Mainland Healthcare Facilities**: Mainland hospitals and healthcare facilities often offer higher salaries and more attractive benefits packages than those available in Hawai‘i. This competition can lure experienced nurses away from Hawai‘i and make it challenging to recruit new nurses to the state.
- **Burnout and Low Morale**: Demanding workloads, chronic staffing shortages, and a perceived lack of appreciation can lead to burnout and attrition among nurses. Nurses may experience increased workloads due to the lack of support staff, such as Certified Nursing Assistants (CNAs). This burnout can drive nurses to leave the profession or seek employment in less stressful environments.
- **Limited Residency Opportunities**: Residency programs are essential for providing new graduates with the necessary experience and skills to transition into specialty areas. However, the limited number of residency slots in Hawai‘i creates a bottleneck for new graduates, forcing some to seek employment on the mainland. This limited access to residency programs further exacerbates the shortage of experienced nurses in the state.

Overall, the interviews also highlight a preference among some healthcare facilities for hiring experienced nurses over new graduates, further contributing to the workforce challenges. For example, some of the hospitals may be reluctant to hire new graduates because of their union contracts, which may require them to give priority to internal candidates when filling specialized positions. This practice further limits opportunities for new graduates to gain experience in specialized areas. This preference creates a challenging cycle where new graduates struggle to gain the necessary experience to secure desired positions.

- **How have organizations adapted to current or historical nursing workforce shortages**

  - **Hiring New Graduates**: While there is a preference for experienced nurses, some hospitals in Hawai‘i, particularly larger ones, are willing to hire new graduates. The participants do not provide specific examples of hospitals, but they do indicate that some organizations are hiring new graduates, even without requiring them to participate in a residency program. This approach may be a response to the immediate need for nurses and the difficulty in recruiting experienced nurses from other states. This strategy, however, may contribute to the shortage of experienced nurses in the long term.
  - **Nurse Residency Programs**: The prevalence of nurse residency programs, particularly in larger hospitals, suggests an attempt to equip new graduates with specialized skills. These programs can help to bridge the experience gap and prepare new nurses for specific roles, such as ICU, ED, and OB. However, the limited number of residency slots can create a bottleneck, pushing some new graduates to seek employment on the mainland. This dynamic highlights the challenges organizations face in balancing the need for experienced nurses with the development of a future workforce.
  - **Focus on Retention**: Recognizing the high cost of living and competition from mainland facilities, some organizations are prioritizing retention strategies. While participants do not detail these strategies, they could include offering competitive salaries and benefits, improving working conditions, and addressing factors that contribute to burnout. One participant emphasized the need for organizations to "value" nurses and attend to their concerns. Another notes the effectiveness of converting contract travel nurses to full-time

positions as a retention strategy. These insights suggest that organizations are acknowledging the importance of retaining existing staff to mitigate the impact of shortages.

- **Potential for Technological Solutions**: The interviews point to the potential for emerging technologies, such as AI and virtual nursing, to help address workforce shortages by streamlining tasks and improving efficiency. However, these solutions are still in the early stages of development and their long-term impact remains uncertain. This suggests a potential area for future adaptation, as organizations explore ways to leverage technology to optimize their workforce.

- **Addressing long-term sustainability of the nursing workforce**
  - Participants emphasize that stabilizing the nursing workforce involves better incorporating LPNs and APRNs to address nursing workforce demands as well as some general considerations for the long-term sustainability of the nursing workforce.

For LPNs:

- **Expanding LPN Programs and Creating Career Ladders**: Participants emphasized that the LPN shortage is significantly impacting various healthcare settings, particularly long-term care facilities. One participant suggests expanding LPN programs to increase the number of graduates and offering career ladder opportunities for those who wish to advance to the RN level. This strategy could enhance the LPN workforce while providing a pathway for upward mobility.
- **Utilizing LPNs as a Steppingstone to RN Licensure**: Recognizing the increasing demand for LPNs and the pipeline to RN roles, some organizations are using LPN positions as a stepping-stone for individuals to progress within nursing. This approach benefits both the organization and the individual, providing a pathway for career advancement and addressing immediate staffing needs.
- **Expanding LPN Roles in Community-Based Settings**: The shift toward community-based care models creates opportunities to utilize LPNs in home health, geriatric care, and other settings. By incorporating LPNs into these evolving models, organizations could potentially alleviate some workforce pressures while expanding access to care.

For APRNs:

- **Expanding APRN Utilization**: Participants reported feeling like APRNs are not being fully utilized in Hawai‘i. Encouraging greater utilization of APRNs in various healthcare settings could help address workforce demands by leveraging their advanced skills and knowledge.
- **Advocating for Policy Changes**: One key policy change that could support the increased utilization of APRNs is addressing the Medicare fee schedule, which currently limits reimbursement for their services compared to physicians. Advocating for changes to this policy could incentivize the employment and utilization of APRNs, potentially alleviating some workforce pressures.
- **Promoting Team-Based Care Models**: The importance of team-based care models that include APRNs as integral members could be effective. By embracing these models, organizations can optimize the skills of APRNs and create a more collaborative and efficient healthcare environment.

General Considerations

- **Addressing Nursing Faculty Shortage**: The underpayment of nursing faculty is identified as a significant barrier to expanding nursing education programs, which impacts the supply of all types of nurses but specifically for nurse types that are already dealing with significant shortages. Addressing this issue through policy changes or other initiatives could be crucial to ensuring a sufficient pipeline of qualified nurses.
- **Prioritizing Retention Strategies**: Regardless of their level of education, retaining existing nurses is essential to addressing workforce demands. Organizations can implement strategies like competitive salaries and benefits, improved working conditions, and opportunities for professional development to enhance job satisfaction and reduce turnover.

- **Emerging Trends and Innovations to Address Nursing Shortages**

Participants report several emerging trends and innovations with the potential to address the nursing shortage issues in the future.

Technological Solutions

- AI and Virtual Nursing: Multiple Participants identify AI as a potential solution to alleviate nursing workload and enhance efficiency. This could involve AI scribes to assist with documentation, reducing administrative burden, and allowing nurses more time for patient care. Virtual nursing is also mentioned as a potential area of exploration. The virtual care models could be used to train new graduates while also utilizing their skills.
- Bedside Care Technology Innovation: The need for innovation in bedside care technology to improve efficiency and allow nurses to practice at their full scope is also highlighted. They point out that nurses currently spend a significant amount of time on tasks that could potentially be automated or streamlined through technology.
- Interoperable Systems: The lack of interoperability between different systems is highlighted as a challenge that hinders efficient care delivery. Improved interoperability could potentially streamline workflows and reduce the time nurses spend on administrative tasks.

Shifting Care Models

- Hospital at Home: One participant points to the trend of "hospital at home" as a potential shift in care delivery that could impact nursing demand. This model involves providing hospital-level care in patients' homes, potentially requiring nurses with specialized skills in home health and technology.
- Home Hubs: Another participant mentions the concept of "home hubs," where care is coordinated and delivered in patients' homes, potentially involving nurses in training family members to provide care. This shift could potentially reduce the demand for nurses in traditional settings while increasing the need for nurses with expertise in home health and patient education.

Addressing Workforce Pipeline Challenges

- Transition to Practice Programs: The transition to practice programs, such as nurse residency programs, in helping new graduates gain experience and specialize in specific areas. These programs are seen as crucial for retaining locally trained nurses and addressing the shortage of experienced nurses.

- Career Ladders for LPNs: Recognizing the shortage of LPNs, several interviewees suggest expanding LPN programs and creating career ladders that allow them to advance to the RN level. This could enhance the LPN workforce while providing a pathway for upward mobility.

Policy and Regulatory Changes

- Medicare Fee Schedule Reform: Changes to the Medicare fee schedule, which currently limits reimbursement for services provided by APRNs compared to physicians. Reforming this policy could incentivize the employment and utilization of APRNs, potentially alleviating some workforce pressures.
- Loan Forgiveness and Financial Incentives: Several interviewees suggest financial incentives, such as loan forgiveness programs and tax breaks, as potential solutions to attract and retain nurses, particularly in underserved areas.

While these emerging trends and innovations offer promising avenues for addressing nursing shortages, the sources also acknowledge potential challenges and the need for careful consideration of their implementation. For example, the use of AI in healthcare raises questions about privacy and the potential displacement of human workers. Shifting care models like "hospital at home" may require significant investment in technology and infrastructure. Furthermore, policy and regulatory changes can be complex and may face resistance from various stakeholders.

Overall, the interviews underscore the need for a multi-faceted approach that involves technological advancements, innovative care delivery models, strategies to strengthen the workforce pipeline, and supportive policy and regulatory environments. Addressing nursing shortages requires a collaborative effort among healthcare organizations, policymakers, and educators to create a sustainable and equitable healthcare system.

Discussion

This section delves into the implications of projected workforce trends for RNs and LPNs in the state of Hawai‘i, spanning 2022 to 2037. By examining the key findings, county-level variations, and broader workforce dynamics, the analysis provides critical insights into the adequacy of the nursing supply to meet future healthcare demands. These projections highlight both promising developments, such as steady RN growth, and challenges, including significant LPN shortages and imbalances in APRN growth by county. The findings serve as a foundation for exploring policy interventions and strategies to ensure an equitable and sufficient nursing workforce statewide.

Key Findings and Implications

This report presents a detailed analysis of healthcare workforce supply and demand projections for Hawai‘i from 2022 to 2037, with a focus on RNs, LPNs and APRNS, including NPs, CNMs and CRNAs. The trends in the essential components of the nursing workforce are described in this section.

RN Workforce:

- **Adequate Supply Projected:** The RN workforce is projected to experience steady growth, at a pace faster than population growth and demand for RN services. The adequacy ratio, representing the balance between supply and demand, is projected to increase to around **103%**, indicating near equilibrium between the number of RNs available and the demand for their services.
- **Growth Driven by New Entrants:** This projected adequacy is attributed to the continuous influx of new RN graduates entering the Hawai‘i workforce. The study assumes a constant number of new entrants each year, based on recent licensing data. This assumption plays a significant role in maintaining a balanced supply-demand dynamic.
- **Sub-State Variations Exist:** While overall state RN adequacy is projected to be stable, county-level disparities exist. The adequacy is expected to remain relatively stable with slight improvements in the counties Honolulu, Hawai‘i, and Maui with some decline in the county of Kaua‘i by 2037.

LPN Workforce:

- **Significant Shortages Projected:** In contrast to the RN workforce, the LPN workforce faces a challenge to growth in the desired direction**,** characterized by declining supply and rising demand. The adequacy ratio is projected to plunge from 34% in 2022 to 31% by 2037, signaling a substantial shortage of LPNs relative to the projected need for their services.
- **Declining Supply a Key Factor:** This projected shortage is primarily driven by a shrinking LPN workforce. The study highlights that retirements among LPNs are expected to consistently outpace the number of new graduates entering the field, leading to an overall decline in the number of practicing LPNs. This decline may cause increasing pressure on RNs to fill roles typically provided by the LPN workforce.

- **Widespread County-Level Declines:** The adequacy is expected to decline significantly across all the counties in the state of Hawai‘i except for Maui where the adequacy ratio increases robustly from 42% in 2022 to 126% in 2037.

APRN Workforce:

- **Projected Growth Across Roles:** The APRN workforce is expected to grow steadily over the projection horizon. The adequacy ratio for the overall NP workforce is projected to increase from 89% in 2022 to 114% by 2037, indicating a growing surplus. However, while the adequacy ratios for CNMs and CRNAs are also improving, CRNAs are still expected to face shortages compared to demand by 2037. This ongoing imbalance is driven by a supply-demand gap that begins in the initial years and persists throughout the projection period, despite the steady growth in supply.
- **County-Level Disparities Persist:** The overall growth in adequacy ratio is driven by strong growth and growing surplus of the APRN workforce in primarily Honolulu County while the other counties show a decline in adequacy over time.
- **Growing Role in Healthcare Delivery:** APRNs are expected to play an increasingly critical role in addressing workforce gaps, particularly as physician shortages become more pronounced in some specialties.

Policy Implications:
These findings highlight the urgent need for targeted policy interventions to tackle the impending shortage of LPNs in Hawai‘i. Potential strategies could include:

- **Increasing the LPN Workforce:** This significant shortfall could be addressed by expanding LPN training programs, offering financial incentives to students, and promoting the profession as a viable and rewarding career option.
- **Retaining Existing LPNs in the Workforce:** Enhancing working conditions, offering competitive salaries and benefits, and providing professional development opportunities could help retain experienced LPNs in the workforce.
- **Exploring Innovative Models of Care:** Implementing innovative care delivery models, such as task-shifting, could optimize the roles of both RNs and LPNs to address workforce gaps.
- **Addressing cost of living:** The report makes a case for addressing the high cost of living in Hawai‘i to better attract and retain healthcare workers.
- **Addressing county-level disparities:** County adequacy analysis can be used to direct workforce planning to meet local needs.

Overall, this report provides a comprehensive assessment of the future of Hawai‘i’s nursing workforce, highlighting the need for proactive measures to ensure an adequate supply of nurses to meet the healthcare demands of the state's growing and aging population. Failure to address these challenges could have significant consequences for the quality and accessibility of healthcare in Hawai‘i.

Study Strengths and Limitations

The study approach and data utilized in the analysis offer several strengths. The microsimulation models that produce supply and demand projections have been refined over more than 10 years and are well-documented in peer-reviewed journals and presented at national conferences. These models have earned the trust of various stakeholders, including federal and state governments, hospitals, healthcare associations, and other key players in the healthcare system.

Whenever possible, Hawai‘i-specific data are incorporated into the models. For supply modeling, licensure counts from the Professional & Vocational Licensing Division of the Department of Commerce and Consumer Affairs is used to establish the starting counts for each license type. Survey data from HSCN was used to provide details about the base supply of healthcare workers and the number and characteristics of new workforce entrants. For demand modeling, Hawai‘i-specific data on population demographics, disease prevalence, health behaviors, and socioeconomic factors are included. This helps to provide a more accurate picture of the healthcare needs and workforce demands by county, as well as projections of future population characteristics.

The model produces supply and demand projections at the county level, which allows for sub-state analysis of the adequacy of projected health workforce supply. Interviews conducted with hospital administrators, nurses and educators in Hawai‘i provide insights into the dynamics driving the workforce shortages as well as possible ways these may be addressed.

However, modeling and projecting into the future involve simplifying assumptions and data limitations that preclude perfect precision in forecasting. Even with careful optimization of models, data, and study approach employed, the results must be interpreted within the context of necessary limitations. Study limitations reflect both data gaps and uncertainty of care use and delivery patterns, as well as how health professionals career decisions might change in the future. Key limitations are the following:

National data are used to fill gaps in Hawai‘i-specific data. National data sources employed in supply modeling include the ACS and NSSRN datasets, which are used to provide information on retirement, and migration patterns. National data sources are used for demand modeling to provide information regarding population healthcare use patterns as well as nurse staffing patterns. To the extent that the Hawai‘i population uses services at a different rate than the national average or Hawai‘i providers staff health workers at levels different from the national average, error may be introduced into Hawai‘i health workforce supply and demand projections. To a certain extent this was addressed by adjusting demand for hospital-based services based on actual discharge data from Hawai‘i.

Known limitations in national data sets used to model supply and demand precluded the ability to model demand for CNSs[26]. It is common for CNSs to also be certified as NPs making it difficult to determine who is solely a CNS. Calculating the number of CNSs in each state from national surveys that include CNSs such as the NSSRN is challenging because the CNS workforce is small. Projection modeling of the APRN workforce at the federal level assumes that CNSs are part of the NP workforce.

Projections do not account for county-level differences in staffing and service delivery. Results are presented by counties within Hawai‘i, though data limitations necessitated modeling healthcare

use and delivery patterns for the state as a whole. To the extent that care utilization and delivery and/or staffing patterns vary within the state, county projections may be impacted. In general, the state-level workforce projections tend to be more accurate than sub-state-level projections.

Demand projections model the continuation of baseline levels of healthcare use and delivery patterns. Projections into the future do not capture shifts in factors such as technological innovations, national or state-level health policies, patient preferences, or payer or provider policies that change the way care is consumed or delivered. These patterns will continue to evolve over time, but in ways that cannot be known at the time of the modeling. For example, if the pandemic has accelerated the trend of shifting hospital care from inpatient to outpatient settings, any staffing implications due to this acceleration would not be accounted for in the projections reported here. Similarly, increased use of telemedicine services, more rigorous discharge planning and other changes to the way care is delivered due to the pandemic may not factor into the projections.

The numbers of new entrants entering the health workforce annually are assumed to be constant over the projection period. The *Status Quo* supply scenario models the implications if the number of individuals entering the workforce remains constant over time. The scenario does not allow for market forces that help correct surpluses and shortages over time. Rather, this scenario helps inform policies to increase the education pipeline of new entrants being trained. If Hawai‘i’s nursing shortage becomes too severe relative to national levels, the increased job opportunities could increase the net inflow of nurses to Hawai’i from other states. The opposite is true if Hawai‘i trains more nurses than the national average. Additionally, the *Status Quo* supply scenario was rerun with an expansion scenario for a few occupations to incorporate assumptions about increased slots in the nurse training programs.

Despite these limitations, the workforce projections presented offer best estimates given the information available. Understanding current and future adequacy trends by county can inform workforce planning, as well as highlight career opportunities for people considering health professions as a career. Workforce modeling aids in determining whether existing workforce programs and policies are producing a sufficient supply of clinicians to provide patients with access to high quality care. Considering the limitations described and an ever-changing healthcare system, workforce projections should be updated periodically to use the most current data and to determine course corrections needed to arrive at established targets created by policy makers and healthcare leaders across the state.

References

1. Dall TM, Reynolds R, Chakrabarti R, et al. The Physiatry Workforce in 2019 and Beyond Part 2: Modeling Results. *Am J Phys Med Rehabil*. Published online December 3, 2020. doi:10.1097/PHM.0000000000001659

2. Association of American Medical Colleges. *The Complexities of Physician Supply and Demand: Projections From 2019 to 2034*. AAMC; 2021. Accessed October 4, 2022. https://www.aamc.org/media/54681/download

3. Iacobucci W, Dall T, Chakrabarti R, Reynolds R, Jones K. *Florida Nurse Workforce Projections: 2019 to 2035*. Florida Hospital Association and the Safety Net Hospital Alliance of Florida; 2021. Accessed March 31, 2022. https://www.fha.org/uploads/1/3/4/0/134061722/ihs_florida_nurse_workforce_report.pdf

4. Surdu S, Dall TM, Langelier M, Forte GJ, Chakrabarti R, Reynolds RL. The Pediatric Dental Workforce in 2016 and Beyond. *J Am Dent Assoc*. 2019;150(7):609-617.e5. doi:10.1016/j.adaj.2019.02.025

5. Health Resources & Services Administration. *Technical Documentation for HRSA's Health Workforce Simulation Model*. Department of Health and Human Services; 2023. Accessed July 10, 2023. https://bhw.hrsa.gov/data-research/projecting-health-workforce-supply-demand/technical-documentation/

6. U.S. Census Bureau. Accessing PUMS Data: 2021 American Community Survey Public Use Microdata Sample File. September 27, 2022. Accessed November 10, 2022. https://www.census.gov/programs-surveys/acs/microdata/access.html

7. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System (BRFSS). 2024. Accessed January 23, 2024. https://www.cdc.gov/brfss/index.html

8. Centers for Medicare and Medicaid Services. Medicare Current Beneficiary Survey (MCBS). 2024. Accessed January 23, 2024. https://www.cms.gov/research-statistics-data-and-systems/research/mcbs

9. Centers for Disease Control and Prevention. PLACES: Local Data for Better Health. April 2022. Accessed May 18, 2022. https://www.cdc.gov/places/

10. *County Population by Characteristics: 2022*. U.S. Census Bureau Accessed November 1, 2023. https://www.census.gov/data/tables/time-series/demo/popest/2020s-counties-detail.html

11. *S&P Global Economic Data*. S&P Global Accessed November 22, 2023. https://www.spglobal.com/marketintelligence/en/mi/products/global-economic-data-forecast-data-lake.html

12. NSI Nursing Solutions, Inc. *2023 NSI National Health Care Retention & RN Staffing Report*. NSI Nursing Solutions, Inc.; 2023. Accessed September 6, 2023.

https://www.nsinursingsolutions.com/Documents/Library/NSI_National_Health_Care_Retention_Report.pdf

13. American Association of Colleges of Nursing. AACN Fact Sheet: Nursing Faculty Shortage. AACN Research Brief. October 2022. Accessed September 6, 2023. https://www.aacnnursing.org/Portals/0/PDFs/Fact-Sheets/Faculty-Shortage-Factsheet.pdf

14. Oliveira, Carrie M, PhD. *Hawai'i State Nurse Education Capacity Report, Academic Year 2022-2023.* Hawai'i State Center for Nursing; 2024. Accessed February 13, 2024. https://www.hawaiicenterfornursing.org/wp-content/uploads/2024/10/2022-2023_EdCap_StatewideReport_vFinal.pdf

15. *Laulima Data Alliance, 2022 & 2023*. Hospital billing data, Analyzed by Hawai'i Department of Health and provided to research team

16. Supporting Health Equity in Native Hawaiian Communities. *Cent Dis Control Prev*. Published online May 2024. Accessed January 16, 2025. https://blogs.cdc.gov/safehealthcare/supporting-health-equity-in-native-hawaiian-communities/

17. Pirkle CM, Saiki KN, Yamauchi J, Irvin LH. Advancing Health Equity in Hawai'i: Critical Reflections on COVID-19, Chronic Conditions, and Health Disparities. *Hawaii J Health Soc Welf*. (October, 2021).

18. *Healthy Hawai'i Strategic Plan 2030*. Hawai'i State Department of Health; 2022. Accessed January 27, 2025. https://hhsp.hawaii.gov/assets/pdf/Coordinated%20HHSP_FINAL_WEB.pdf

19. *Hawai'i State Center for Nursing*.; 2024. https://www.hawaiicenterfornursing.org/wp-content/uploads/2024/04/2023HawaiiNursingWorkforceSupply

20. *Hawai'i Physician Workforce Report*.; 2023. Accessed January 27, 2025. https://ahec.hawaii.edu/_docs/2024-physician-workforce-report.pdf

21. *State of the Primary Care Workforce*. National Center for Health Workforce Analysis; 2024. Accessed January 27, 2025. https://bhw.hrsa.gov/sites/default/files/bureau-health-workforce/state-of-the-primary-care-workforce-report-2024.pdf

22. *Five Health Care Trends to Watch in 2023*. American Association of Nurse Practitioners Accessed January 27, 2025. https://www.aanp.org/news-feed/five-health-care-trends-to-watch-in-2023

23. *How Nurse Practitioners Can Affect Women's Health in Rural America*. Women's Healthcare; 2020. Accessed January 27, 2025. https://www.npwomenshealthcare.com/wp-content/uploads/2019/12/FEB_2020_WH-Policy-1.pdf

24. *How Does Hawai'i's Economic Geography Affect Its Healthcare Industry*. The Economic Research Organization. University of Hawai'i; 2024. Accessed January 27, 2025. https://uhero.hawaii.edu/how-does-hawaiis-economic-geography-affect-its-healthcare-industry/

25. Bond-Smith S. Diversifying Hawai'i's Specialized Economy: A Spatial Economic Perspective. *Econ Dev Q*. 2024;38(1):40-59.

26. Reed SM, Arbet J, Staubli L. Clinical Nurse Specialists in the United States Registered With a National Provider Identifier. *Clin Nurse Spec*. 2021;35(3):119-128. doi:10.1097/NUR.0000000000000592

Appendix: Additional Tables

Exhibit 47: State of Hawai‘i RN Supply & Demand Projections, 2022 - 2037

Year	Supply (Status Quo)	Supply (Late Retirement)	Supply (Early Retirement)	Supply (More Entrants)	Supply (Fewer Entrants)	Demand (Status Quo)	Demand (Reduced Barriers)
2022	13,092	13,092	13,092	13,092	13,092	13,058	14,489
2023	13,257	13,323	13,178	13,345	13,169	13,075	14,517
2024	13,386	13,490	13,286	13,556	13,216	13,108	14,562
2025	13,541	13,645	13,420	13,788	13,297	13,143	14,610
2026	13,672	13,796	13,502	13,989	13,357	13,185	14,663
2027	13,812	13,932	13,548	14,173	13,411	13,229	14,722
2028	13,909	14,047	13,597	14,309	13,428	13,282	14,786
2029	13,979	14,163	13,650	14,417	13,423	13,331	14,849
2030	14,047	14,233	13,704	14,520	13,422	13,397	14,930
2031	14,117	14,283	13,728	14,627	13,430	13,439	14,984
2032	14,176	14,333	13,726	14,721	13,431	13,496	15,055
2033	14,209	14,382	13,725	14,784	13,406	13,557	15,130
2034	14,217	14,421	13,704	14,823	13,361	13,611	15,197
2035	14,222	14,434	13,708	14,856	13,314	13,667	15,266
2036	14,221	14,439	13,708	14,883	13,262	13,712	15,322
2037	14,228	14,429	13,699	14,920	13,223	13,758	15,381

Exhibit 48: State of Hawai‘i LPN Supply & Demand Projections, by Scenario

Year	Supply (Status Quo)	Supply (Late Retirement)	Supply (Early Retirement)	Supply (More Entrants)	Supply (Fewer Entrants)	Demand (Status Quo)	Demand (Reduced Barriers)
2022	965	965	965	965	965	2,810	3,082
2023	980	980	974	988	971	2,816	3,090
2024	986	994	974	1,003	970	2,823	3,099
2025	991	1,003	976	1,015	968	2,837	3,116
2026	991	1,004	974	1,021	962	2,845	3,127
2027	990	1,005	966	1,025	956	2,856	3,140
2028	984	1,000	958	1,024	946	2,869	3,156
2029	979	1,000	951	1,023	936	2,883	3,172
2030	973	996	944	1,021	926	2,898	3,189
2031	966	990	941	1,018	916	2,904	3,199
2032	961	984	939	1,017	908	2,923	3,220
2033	955	973	932	1,012	899	2,944	3,244
2034	949	964	927	1,009	891	2,962	3,265
2035	938	955	916	1,001	879	2,981	3,286
2036	930	947	909	995	867	2,994	3,301
2037	921	941	903	988	856	3,008	3,318

Exhibit 49: State of Hawai‘i CNM Supply & Demand Projections, 2022 - 2037

Year	Supply (Status Quo)	Supply (Late Retirement)	Supply (Early Retirement)	Supply (More Entrants)	Supply (Fewer Entrants)	Demand (Status Quo)	Demand (Reduced Barriers)
2022	37	37	37	37	37	48	60
2023	39	39	38	39	38	48	60
2024	40	40	37	40	39	47	59
2025	40	42	37	41	39	47	59
2026	40	42	37	41	39	47	59
2027	40	43	38	42	39	47	59
2028	41	44	40	43	39	47	59
2029	42	44	40	44	40	47	59
2030	43	45	41	46	41	47	59
2031	44	46	42	47	41	47	59
2032	45	47	43	48	42	47	59
2033	46	48	44	49	43	47	59
2034	47	49	45	50	44	47	59
2035	48	50	47	52	44	47	59
2036	49	51	48	53	45	47	59
2037	50	51	48	54	46	47	59

Exhibit 50: State of Hawai‘i CRNA Supply & Demand Projections, by Scenario

Year	Supply (Status Quo)	Supply (Late Retirement)	Supply (Early Retirement)	Supply (More Entrants)	Supply (Fewer Entrants)	Demand (Status Quo)	Demand (Reduced Barriers)
2022	80	80	80	80	80	218	289
2023	82	82	79	82	81	218	290
2024	82	84	79	83	81	218	290
2025	83	86	81	84	81	218	291
2026	83	86	81	85	81	219	292
2027	85	88	82	87	82	219	293
2028	86	88	82	89	82	220	294
2029	87	90	83	90	83	221	296
2030	88	91	84	91	84	221	297
2031	89	92	85	93	85	222	298
2032	89	92	86	94	85	222	299
2033	90	94	87	95	86	223	300
2034	90	94	87	96	85	223	301
2035	91	94	87	97	86	223	302
2036	92	95	87	98	86	224	303
2037	92	95	87	98	86	224	304

Exhibit 51: State of Hawai‘i Total NP Supply Projections, by Scenario

Year	Supply (Status Quo)	Supply (Late Retirement)	Supply (Early Retirement)	Supply (More Entrants)	Supply (Fewer Entrants)	Demand (Status Quo)	Demand (Reduced Barriers)
2022	1,118	1,118	1,118	1,118	1,118	1,258	1,487
2023	1,145	1,158	1,139	1,140	1,158	1,261	1,493
2024	1,170	1,195	1,158	1,161	1,195	1,266	1,500
2025	1,194	1,229	1,179	1,182	1,232	1,269	1,505
2026	1,231	1,258	1,199	1,200	1,265	1,274	1,513
2027	1,265	1,287	1,220	1,218	1,296	1,280	1,522
2028	1,298	1,312	1,237	1,234	1,325	1,286	1,530
2029	1,326	1,333	1,252	1,246	1,349	1,292	1,539
2030	1,352	1,357	1,271	1,258	1,372	1,300	1,550
2031	1,381	1,379	1,293	1273	1,399	1,305	1,559
2032	1,407	1,398	1,311	1,287	1,423	1,311	1,567
2033	1,435	1,418	1,330	1,302	1,449	1,318	1,577
2034	1,459	1,436	1,346	1,313	1,471	1,324	1,585
2035	1,483	1,454	1,364	1,326	1,493	1,329	1,594
2036	1,503	1,468	1,378	1,334	1,511	1,335	1,602
2037	1,527	1,486	1,393	1,347	1,533	1,340	1,610

Exhibit 52: State of Hawai‘i Primary Care NP Supply & Demand Projections, by Scenario

Year	Supply (Status Quo)	Supply (Late Retirement)	Supply (Early Retirement)	Supply (More Entrants)	Supply (Fewer Entrants)	Demand (Status Quo)	Demand (Reduced Barriers)
2022	480	480	480	480	480	341	359
2023	489	495	485	493	486	342	359
2024	500	508	491	507	493	342	360
2025	511	519	499	521	500	343	360
2026	521	531	506	535	507	344	361
2027	530	542	513	547	514	345	362
2028	538	551	520	557	519	346	363
2029	545	560	526	567	523	347	364
2030	552	569	534	577	528	349	365
2031	562	578	545	589	535	350	366
2032	570	587	554	599	542	351	367
2033	579	595	562	611	548	352	368
2034	588	605	571	622	555	354	370
2035	596	613	579	632	561	355	371
2036	603	620	587	641	566	356	372
2037	611	629	594	651	571	357	373

Exhibit 53: State of Hawai‘i Acute Care NP Supply & Demand Projections, by Scenario

Year	Supply (Status Quo)	Supply (Late Retirement)	Supply (Early Retirement)	Supply (More Entrants)	Supply (Fewer Entrants)	Demand (Status Quo)	Demand (Reduced Barriers)
2022	91	91	91	91	91	327	380
2023	94	95	93	95	93	327	380
2024	97	98	95	98	95	327	381
2025	99	101	96	101	97	327	382
2026	100	103	97	103	98	328	383
2027	102	105	99	105	99	329	384
2028	104	107	100	108	100	330	386
2029	105	108	100	109	101	331	387
2030	105	109	101	110	101	332	389
2031	106	110	102	111	101	333	390
2032	107	111	104	113	102	334	392
2033	109	112	105	115	103	335	393
2034	110	113	106	116	104	336	395
2035	111	115	108	118	105	337	396
2036	112	116	108	119	105	337	397
2037	114	117	109	121	107	338	398

Exhibit 54: State of Hawai‘i Psychiatric-Mental Health NP Supply & Demand Projections, by Scenario

Year	Supply (Status Quo)	Supply (Late Retirement)	Supply (Early Retirement)	Supply (More Entrants)	Supply (Fewer Entrants)	Demand (Status Quo)	Demand (Reduced Barriers)
2022	69	69	69	69	69	64	105
2023	71	72	71	72	71	65	107
2024	74	75	74	75	73	67	110
2025	76	78	76	78	75	69	114
2026	93	80	78	80	76	70	117
2027	110	82	79	83	78	72	120
2028	125	84	81	86	80	74	124
2029	139	86	83	88	81	76	127
2030	153	88	85	90	83	78	131
2031	167	91	87	93	85	80	134
2032	179	93	88	96	87	82	138
2033	191	95	90	97	88	84	141
2034	202	96	92	99	89	86	145
2035	213	98	93	101	90	88	148
2036	224	99	94	103	91	90	152
2037	234	101	96	104	92	92	155

Exhibit 55: State of Hawai‘i Women’s Health NP Supply & Demand Projections, by Scenario

Year	Supply (Status Quo)	Supply (Late Retirement)	Supply (Early Retirement)	Supply (More Entrants)	Supply (Fewer Entrants)	Demand (Status Quo)	Demand (Reduced Barriers)
2022	75	75	75	75	75	34	43
2023	78	78	77	79	78	34	42
2024	80	81	78	82	79	34	42
2025	82	84	81	84	80	33	42
2026	84	86	83	87	82	33	42
2027	86	88	83	89	83	33	42
2028	89	91	83	92	85	33	42
2029	90	93	83	94	86	33	42
2030	90	95	84	95	86	33	42
2031	91	97	85	95	86	33	42
2032	91	97	87	96	86	33	42
2033	92	97	88	98	87	33	42
2034	94	97	90	99	88	33	42
2035	95	98	91	101	89	33	42
2036	96	99	92	103	90	33	42
2037	98	101	93	105	91	33	42

Exhibit 56: State of Hawai‘i Other NP Supply & Demand Projections, by Scenario

Year	Supply (Expansion)	Supply (Late Retirement)	Supply (Early Retirement)	Supply (More Entrants)	Supply (Fewer Entrants)	Demand (Status Quo)	Demand (Reduced Barriers)
2022	403	403	403	403	403	492	601
2023	416	418	413	419	413	494	603
2024	427	434	419	434	421	496	606
2025	439	447	427	448	429	497	608
2026	448	459	436	460	436	499	611
2027	457	470	445	471	443	500	614
2028	466	479	453	482	450	502	616
2029	474	487	459	491	455	504	619
2030	482	495	467	501	460	507	623
2031	489	503	474	511	466	509	626
2032	495	511	478	519	470	511	629
2033	503	518	484	529	476	513	632
2034	507	524	488	535	478	515	635
2035	512	530	492	541	481	517	637
2036	514	534	497	546	482	518	640
2037	519	539	502	552	486	520	642

Exhibit 57: State of Hawai‘i RN Annual Starting FTE, New Entrants and Retirements, 2023 - 2037

Year	Start Count FTE	End Count FTE	Retire Count FTE	New Count FTE	New Count % of Start Count	Retire Count % of Start Count
2023	13,092.0	13,256.9	- 797.7	955.2	7.3%	-6.1%
2024	13,256.9	13,385.7	-828.1	955.1	7.2%	-6.2%
2025	13,385.7	13,541.3	-800.7	955.4	7.1%	-6.0%
2026	13,541.3	13,671.9	-823.6	955.2	7.1%	-6.1%
2027	13,671.9	13,790.2	-835.8	955.1	7.0%	-6.1%
2028	13,790.2	13,868.2	-879.8	955.2	6.9%	-6.4%
2029	13,868.2	13,920.1	-902.8	955.1	6.9%	-6.5%
2030	13,920.1	13,970.6	-902.6	955.2	6.9%	-6.5%
2031	13,970.6	14,027.7	-895.0	955.4	6.8%	-6.4%
2032	14,027.7	14,073.5	-904.3	955.2	6.8%	-6.4%
2033	14,073.5	14,094.0	-925.5	955.3	6.8%	-6.6%
2034	14,094.0	14,090.9	-950.5	955.1	6.8%	-6.7%
2035	14,090.9	14,084.3	-948.3	955.2	6.8%	-6.7%
2036	14,084.3	14,069.6	-958.6	955.0	6.8%	-6.8%
2037	14,069.6	14,067.9	-941.3	955.0	6.8%	-6.7%

Exhibit 58: State of Hawai‘i LPN Annual Starting FTE, New Entrants and Retirements, 2023 - 2037

Year	Start Count FTE	End Count FTE	Retire Count FTE	New Count FTE	New Count % of Start Count	Retire Count % of Start Count
2023	965.0	979.7	-85.6	97.5	10.1%	-8.9%
2024	979.7	986.2	-92.5	97.5	10%	-9.4%
2025	986.2	991.0	-93.0	97.5	9.9%	-9.4%
2026	991.0	990.6	-94.7	97.6	9.8%	-9.6%
2027	990.6	990.3	-96.0	97.5	9.8%	-9.7%
2028	990.3	984.4	-99.1	97.6	9.9%	-10%
2029	984.4	979.3	-103.3	97.5	9.9%	-10.5%
2030	979.3	972.5	-103.1	97.5	10%	-10.5%
2031	972.5	966.0	-104.5	97.6	10%	-10.7%
2032	966.0	961.4	-103.3	97.5	10.1%	-10.7%
2033	961.4	955.5	-102.0	97.6	10.2%	-10.6%
2034	955.5	948.6	-103.9	97.5	10.2%	-10.9%
2035	948.6	938.4	-105.5	97.6	10.3%	-11.1%
2036	938.4	930.3	-104.2	97.5	10.4%	-11.1%
2037	930.3	921.5	-107.3	97.5	10.5%	-11.5%

Exhibit 59: State of Hawai‘i CNM Annual Starting FTE, New Entrants and Retirements, 2023 - 2037

Year	Start Count FTE	End Count FTE	Retire Count FTE	New Count FTE	New Count % of Start Count	Retire Count % of Start Count
2023	37.0	38.6	-2.5	4	10.8%	-6.8%
2024	38.6	39.7	-2.7	4	10.4%	-7%
2025	39.7	39.9	-3.8	4	10.1%	-9.6%
2026	39.9	40.0	-3.7	4	10%	-9.3%
2027	40.0	40.3	-3.8	4	10%	-9.5%
2028	40.3	41.2	-3.4	4	9.9%	-8.4%
2029	41.2	42.1	-3.3	4	9.7%	-8%
2030	42.1	43.1	-3.2	4	9.5%	-7.6%
2031	43.1	44.1	-2.9	4	9.3%	-6.7%
2032	44.1	44.9	-3.3	4	9.1%	-7.5%
2033	44.9	45.7	-3.3	4	8.9%	-7.3%
2034	45.7	47.0	-2.8	4	8.8%	-6.1%
2035	47.0	47.7	-3.4	4	8.5%	-7.2%
2036	47.7	49.1	-2.8	4	8.4%	-5.9%
2037	49.1	49.7	-3.1	4	8.1%	-6.3%

Exhibit 60: State of Hawai‘i CRNA Annual Starting FTE, New Entrants and Retirements, 2023 - 2037

Year	Start Count FTE	End Count FTE	Retire Count FTE	New Count FTE	New Count % of Start Count	Retire Count % of Start Count
2023	80.0	81.7	-5.2	6.9	8.6%	-6.5%
2024	81.7	82.0	-6.7	6.9	8.4%	-8.2%
2025	82.0	82.6	-6.4	6.9	8.4%	-7.8%
2026	82.6	83.1	-6.5	6.9	8.4%	-7.9%
2027	83.1	84.9	-5.3	6.9	8.3%	-6.4%
2028	84.9	85.6	-6.0	6.9	8.1%	-7.1%
2029	85.6	86.7	-5.8	6.9	8.1%	-6.8%
2030	86.7	87.6	-6.2	6.9	8%	-7.2%
2031	87.6	88.8	-5.5	6.9	7.9%	-6.3%
2032	88.8	89.4	-6.1	6.9	7.8%	-6.9%
2033	89.4	90.4	-5.9	6.9	7.7%	-6.6%
2034	90.4	90.5	-6.5	6.9	7.6%	-7.2%
2035	90.5	91.2	-6.0	6.9	7.6%	-6.6%
2036	91.2	92.2	-6.0	6.9	7.6%	-6.6%
2037	92.2	92.2	-6.8	6.9	7.5%	-7.4%

Exhibit 61: State of Hawai‘i Total NP Annual Starting FTE, New Entrants and Retirements, 2023 - 2037

Year	Start Count FTE	End Count FTE	Retire Count FTE	New Count FTE	New Count % of Start Count	Retire Count % of Start Count
2023	1,118.0	1,149.4	-64.9	94.5	8.5%	-5.8%
2024	1,149.4	1,178.5	-67.5	94.5	8.2%	-5.9%
2025	1,178.5	1,206.9	-67.5	94.5	8.0%	-5.7%
2026	1,206.9	1,232.2	-70.0	94.5	7.8%	-5.8%
2027	1,232.2	1,256.2	-70.0	94.4	7.7%	-5.7%
2028	1,256.2	1,279.3	-71.5	94.6	7.5%	-5.7%
2029	1,279.3	1,297.6	-74.6	94.5	7.4%	-5.8%
2030	1,297.6	1,316.1	-75.8	94.5	7.3%	-5.8%
2031	1,316.1	1,336.5	-74.5	94.5	7.2%	-5.7%
2032	1,336.5	1,355.2	-75.9	94.5	7.1%	-5.7%
2033	1,355.2	1,375.9	-73.8	94.4	7.0%	-5.4%
2034	1,375.9	1,392.2	-78.9	94.4	6.9%	-5.7%
2035	1,392.2	1,409.8	-78.0	94.4	6.8%	-5.6%
2036	1,409.8	1,423.0	-79.7	94.4	6.7%	-5.7%
2037	1,423.0	1,440.2	-79.1	94.4	6.6%	-5.6%

Exhibit 62: State of Hawai‘i Primary Care NP Annual Starting FTE, New Entrants and Retirements, 2023 - 2037

Year	Start Count FTE	End Count FTE	Retire Count FTE	New Count FTE	New Count % of Start Count	Retire Count % of Start Count
2023	480.0	489.3	-31.2	39.6	8.2%	-6.5%
2024	489.3	500.1	-29.5	39.5	8.1%	-6%
2025	500.1	510.7	-30.1	39.6	7.9%	-6%
2026	510.7	520.8	-30.4	39.6	7.8%	-6%
2027	520.8	529.9	-30.5	39.5	7.6%	-5.9%
2028	529.9	537.7	-32.0	39.6	7.5%	-6%
2029	537.7	544.8	-32.1	39.6	7.4%	-6%
2030	544.8	552.4	-31.9	39.6	7.3%	-5.9%
2031	552.4	561.7	-31.1	39.6	7.2%	-5.6%
2032	561.7	570.2	-31.3	39.6	7.1%	-5.6%
2033	570.2	579.3	-30.2	39.6	6.9%	-5.3%
2034	579.3	588.2	-31.3	39.5	6.8%	-5.4%
2035	588.2	596.3	-32.1	39.6	6.7%	-5.5%
2036	596.3	603.0	-32.3	39.6	6.6%	-5.4%
2037	603.0	610.8	-32.3	39.5	6.6%	-5.4%

Exhibit 63: State of Hawai'i Acute Care NP Annual Starting FTE, New Entrants and Retirements, 2023 - 2037

Year	Start Count FTE	End Count FTE	Retire Count FTE	New Count FTE	New Count % of Start Count	Retire Count % of Start Count
2023	91.0	94.1	-4.8	7.8	8.6%	-5.3%
2024	94.1	96.7	-5.2	7.8	8.3%	-5.5%
2025	96.7	99.2	-4.9	7.8	8.1%	-5.1%
2026	99.2	100.5	-6.1	7.8	7.9%	-6.1%
2027	100.5	101.9	-6.7	7.8	7.8%	-6.7%
2028	101.9	103.9	-5.9	7.8	7.7%	-5.8%
2029	103.9	104.7	-7.1	7.8	7.5%	-6.8%
2030	104.7	105.0	-7.4	7.8	7.4%	-7.1%
2031	105.0	105.8	-6.9	7.8	7.4%	-6.6%
2032	105.8	107.2	-6.6	7.8	7.4%	-6.2%
2033	107.2	108.6	-6.4	7.8	7.3%	-6%
2034	108.6	109.5	-6.7	7.8	7.2%	-6.2%
2035	109.5	111.3	-6.3	7.8	7.1%	-5.8%
2036	111.3	112.2	-6.9	7.8	7%	-6.2%
2037	112.2	113.7	-6.4	7.8	7%	-5.7%

Exhibit 64: State of Hawai‘i Psychiatric-Mental Health NP Annual Starting FTE, New Entrants and Retirements, 2023 - 2037

Year	Start Count FTE	End Count FTE	Retire Count FTE	New Count FTE	New Count % of Start Count	Retire Count % of Start Count
2023	69.0	71.3	-3.6	5.9	8.6%	-5.2%
2024	71.3	73.9	-3.4	5.9	8.3%	-4.8%
2025	73.9	76.1	-4.1	6.0	8.1%	-5.5%
2026	76.1	78.4	-3.7	6.0	7.9%	-4.9%
2027	78.4	80.9	-3.6	5.9	7.5%	-4.6%
2028	80.9	82.8	-3.8	5.9	7.3%	-4.7%
2029	82.8	84.5	-4.4	6.0	7.2%	-5.3%
2030	84.5	86.7	-3.9	5.9	7%	-4.6%
2031	86.7	89.5	-3.4	5.9	6.8%	-3.9%
2032	89.5	91.3	-4.2	6.0	6.7%	-4.7%
2033	91.3	92.7	-4.4	5.9	6.5%	-4.8%
2034	92.7	93.9	-4.9	5.9	6.4%	-5.3%
2035	93.9	95.7	-4.2	5.9	6.3%	-4.5%
2036	95.7	97.3	-4.2	6.0	6.3%	-4.4%
2037	97.3	98.4	-4.8	5.9	6.1%	-4.9%

Exhibit 65: State of Hawai‘i Women’s Health NP Annual Starting FTE, New Entrants and Retirements, 2023 - 2037

Year	Start Count FTE	End Count FTE	Retire Count FTE	New Count FTE	New Count % of Start Count	Retire Count % of Start Count
2023	75.0	78.4	-3.4	6.9	9.2%	-4.5%
2024	78.4	80.3	-5.0	6.9	8.8%	-6.4%
2025	80.3	82.2	-4.7	6.9	8.6%	-5.9%
2026	82.2	84.3	-4.5	6.9	8.4%	-5.5%
2027	84.3	86.2	-4.4	6.9	8.2%	-5.2%
2028	86.2	88.9	-4.2	6.9	8%	-4.9%
2029	88.9	90.1	-5.7	6.9	7.8%	-6.4%
2030	90.1	90.4	-6.8	6.9	7.7%	-7.5%
2031	90.4	90.5	-6.8	6.9	7.6%	-7.5%
2032	90.5	91.2	-6.4	6.9	7.6%	-7.1%
2033	91.2	92.5	-5.6	6.9	7.6%	-6.1%
2034	92.5	93.5	-5.9	6.9	7.5%	-6.4%
2035	93.5	94.8	-5.6	6.9	7.4%	-6%
2036	94.8	96.4	-4.9	6.8	7.2%	-5.2%
2037	96.4	98.0	-5.6	6.9	7.2%	-5.8%

Exhibit 66: State of Hawai'i Other NP Annual Starting FTE, New Entrants and Retirements, 2023 - 2037

Year	Start Count FTE	End Count FTE	Retire Count FTE	New Count FTE	New Count % of Start Count	Retire Count % of Start Count
2023	400.0	412.6	-21.7	33.4	8.3%	-5.4%
2024	412.6	423.0	-24.3	33.3	8.1%	-5.9%
2025	423.0	433.5	-23.4	33.4	7.9%	-5.5%
2026	433.5	442.6	-24.8	33.3	7.7%	-5.7%
2027	442.6	451.0	-24.5	33.3	7.5%	-5.5%
2028	451.0	459.2	-25.2	33.4	7.4%	-5.6%
2029	459.2	466.2	-24.8	33.3	7.3%	-5.4%
2030	466.2	473.9	-25.3	33.3	7.1%	-5.4%
2031	473.9	480.7	-25.8	33.4	7%	-5.4%
2032	480.7	486.6	-26.9	33.3	6.9%	-5.6%
2033	486.6	493.5	-26.9	33.3	6.8%	-5.5%
2034	493.5	497.4	-29.5	33.3	6.7%	-6%
2035	497.4	501.4	-29.4	33.3	6.7%	-5.9%
2036	501.4	503.7	-30.5	33.3	6.6%	-6.1%
2037	503.7	508.4	-29.5	33.3	6.6%	-5.9%