GlobalData.

Maryland Nursing Workforce Study

Workforce Projections and Focus Groups

June 2022

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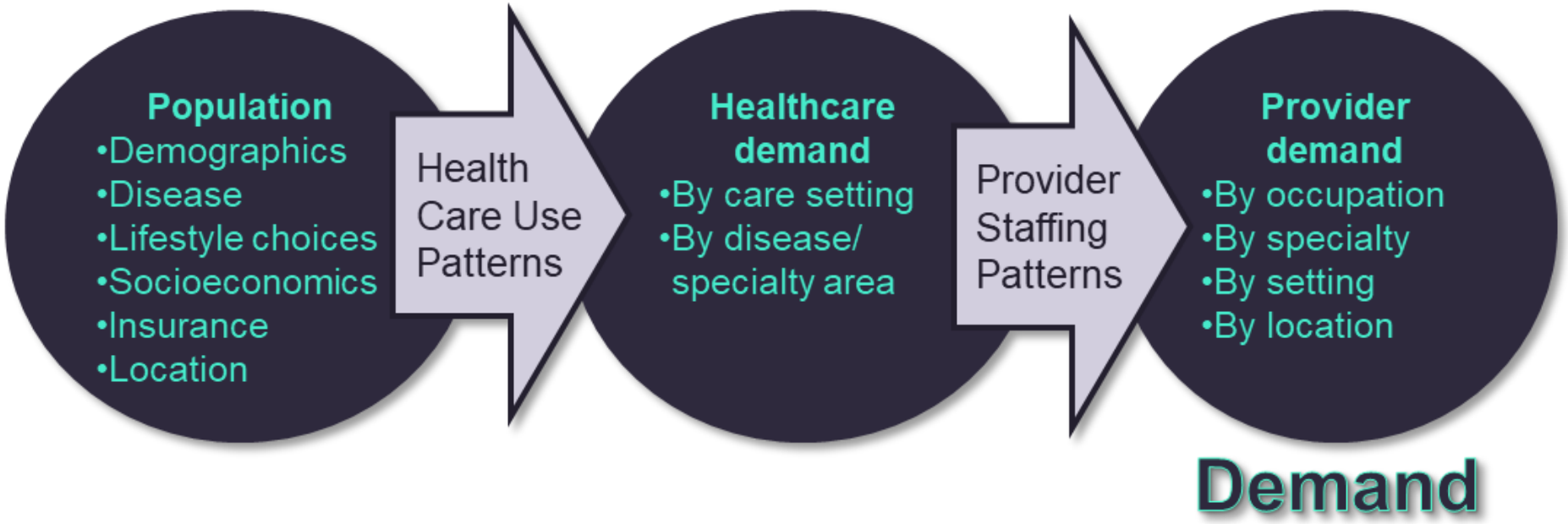
Study Goals and Activities

- Develop projections of supply and demand for registered nurses (RNs) and licensed practical/vocational nurses (LPNs) to inform policymakers regarding decisions that will help ensure an adequate supply of nurses to meet future demands
- Develop projections (2021 through 2035) under multiple scenarios, which could reflect
  - Supply side: Different assumptions about the number of nurses being trained
  - Supply side: Uncertainty about nurse retirement patterns, and implications of COVID and burnout
  - Demand side: Implications of a growing and aging population on demand for nursing services
  - Demand side: Policies or trends that might affect demand for nursing services
  - Demand side: Reduced barriers scenario
- Conduct focus groups with nurses to understand current state of the nurse workforce, and implications of COVID-19 pandemic and other factors on nurse supply adequacy
- Prepare report on the nurse workforce
  - Target audience: members of MD General Assembly, 2022 gubernatorial candidates, the general public

Demand Modeling

Overview of GlobalData Demand Modeling Framework



Healthcare Demand Microsimulation Model

- Starts with a representative sample of the population in each county in Maryland projected through 2035 (with current COVID correction)
- Then simulates demand for health care services based on demographics, health risk factors, disease prevalence, and socioeconomic characteristics of Maryland's population
- Projected demand for health care services is used to estimate demand for nurses under current staffing levels

Note: these projections are corrected for impacts of COVID realized through 2021.

Sources for Demand Modeling

Constructed population file

- 2020 American Community Survey (ACS)
- 2019-2020 (adults) 2014 (kids) Behavioral Risk Factor Surveillance System (BRFSS)
- 2018 CMS Minimum Nursing Home Dataset
- 2018 Medicare Beneficiary Survey (MCBS), subset for people in residential care facilities
- 2020 Census demographic counts by age, sex, and race/ethnicity by county
- CDC PLACES (2021) for county-level data on prevalence of chronic conditions, health risk factors
- Population Projections (2020-2035) from the Maryland Department of Planning
- CDC estimates of excess deaths from COVID-19
- Vital Statistics data on dip in birth rates associated with COVID-19 pandemic

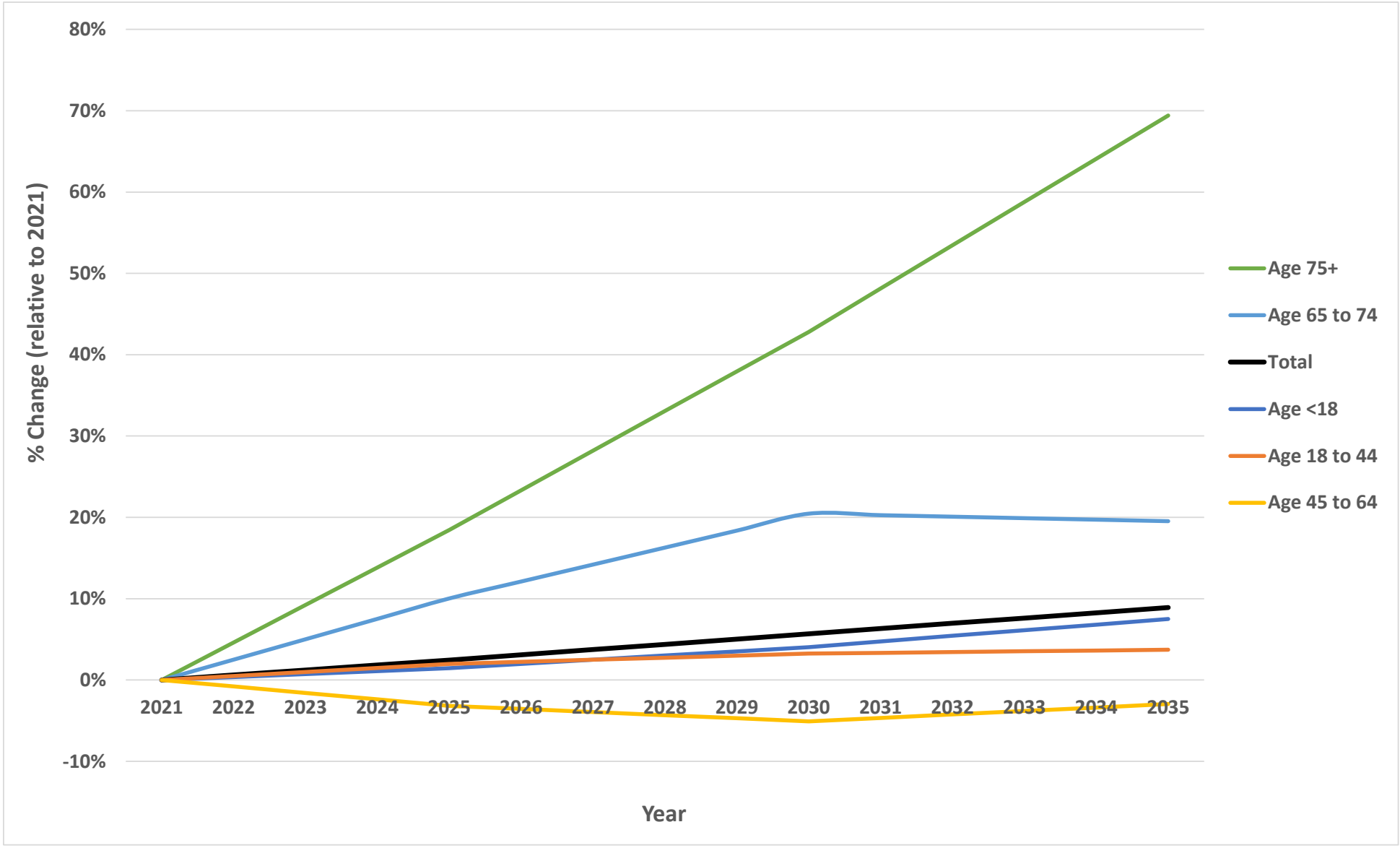
Healthcare use patterns

- Medical Expenditure Panel Survey (2015-2019)
- 2019 National Inpatient Sample
- 2019 & 2020 AHA inpatient days and emergency visits for MD hospitals: MD inpatient days and ED visits in 2019 approximately 7% and 6%, respectively, lower than predicted for the resident population of MD based on national patterns of care use

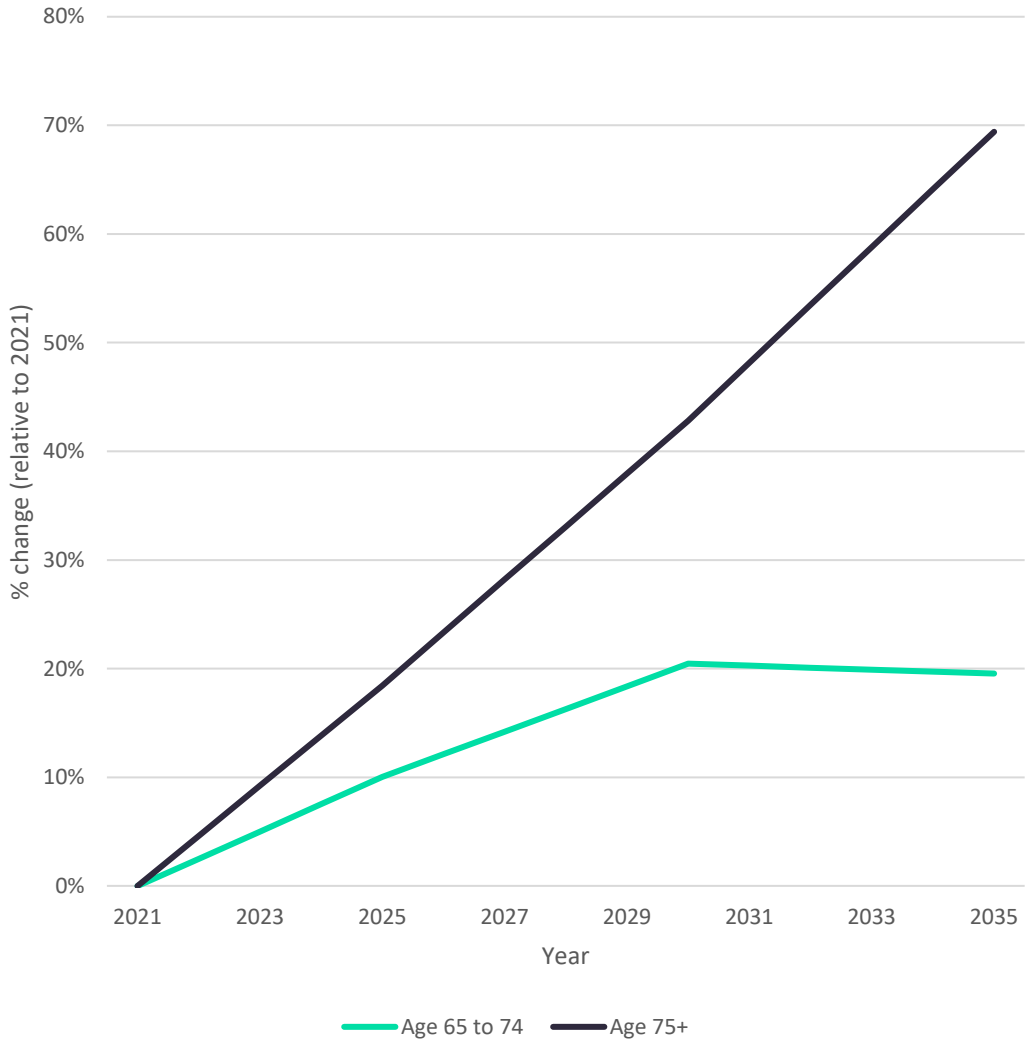
Nurse staffing patterns

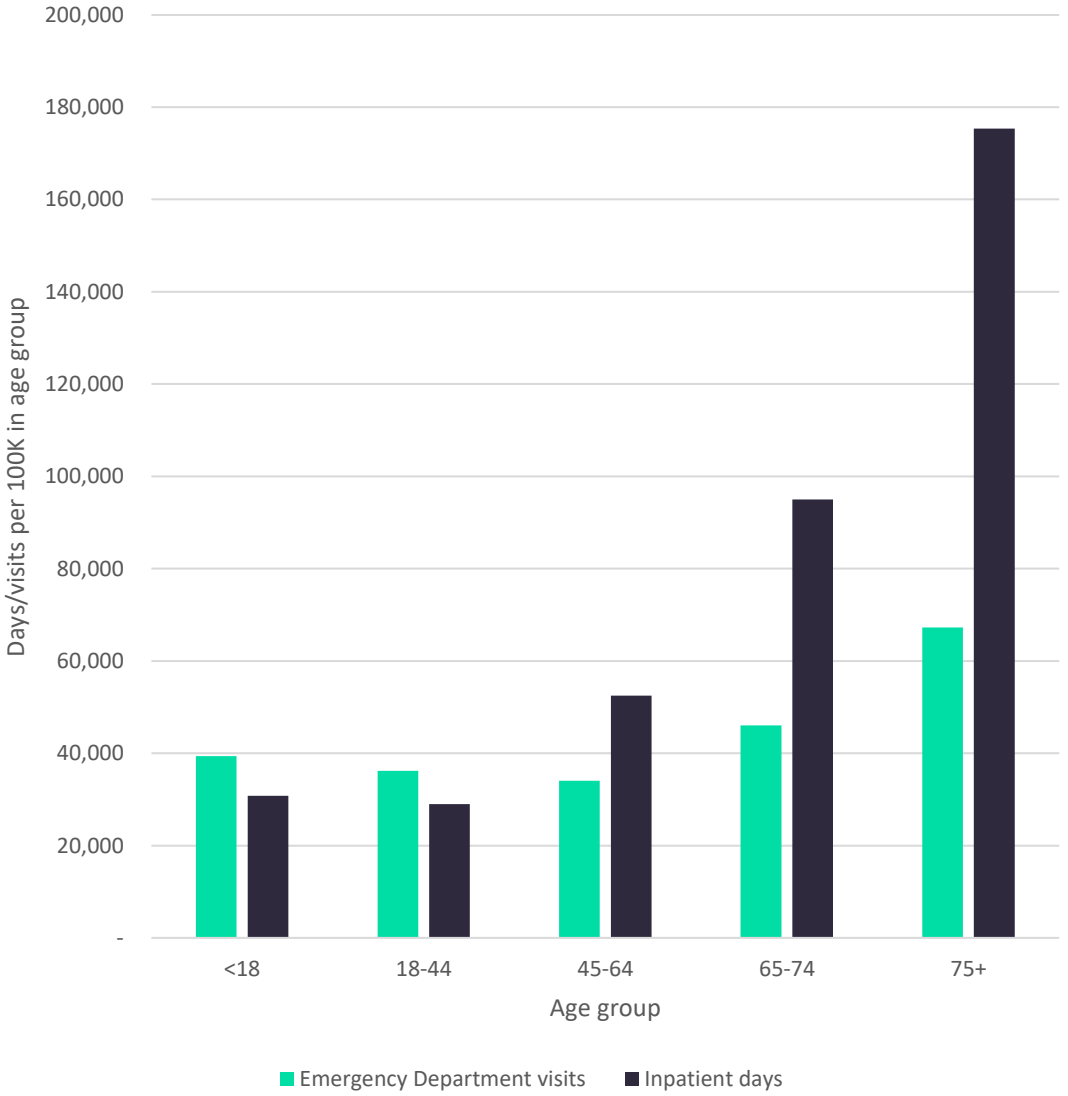
- National distribution of nurses by employment setting (2019 ACS)
- National estimates of FTE nurses per demand metric (e.g., per 1000 visits, per 1000 inpatient days) by employment setting

Maryland Population Projections by Age Group



Insight Regarding Increase in Healthcare Utilization





Disease and Health Risk Prevalence Among Maryland Adults: 2021 Estimated

	Prevalence Rate for Condition					Prevalence of People with History of Condition			Prevalence Rate for Risk Factor	
County	Arthritis	Asthma	Hypertension	Heart Disease	Diabetes	Cancer	Heart Attack	Stroke	Smoker	Obese
Allegany	31	10	39	8	13	8	11	4	19	37
Anne Arundel	25	9	33	5	10	7	4	3	15	32
Baltimore	26	10	36	6	11	7	4	3	15	33
Baltimore City	27	12	40	6	13	6	4	4	21	37
Calvert	27	9	33	6	11	8	5	3	16	37
Caroline	30	10	37	8	13	8	6	4	20	41
Carroll	26	9	33	6	10	8	5	3	14	31
Cecil	29	9	38	7	11	8	6	3	19	37
Charles	26	10	38	5	13	7	4	3	16	44
Dorchester	33	11	42	8	16	9	7	5	19	37
Frederick	24	9	31	5	10	7	4	3	12	30
Garrett	37	10	40	9	13	9	7	4	19	35
Harford	26	9	36	6	11	8	4	3	16	35
Howard	20	8	31	4	9	7	2	3	10	26
Kent	31	9	40	8	13	9	0	4	15	34
Montgomery	20	8	28	5	10	7	2	3	9	25
Prince George's	22	9	37	5	14	6	4	4	13	38
Queen Anne's	29	9	36	6	11	9	0	3	15	32
Somerset	30	11	43	8	14	7	0	5	22	43
St. Mary's	26	9	34	5	10	7	5	3	17	37
Talbot	31	9	38	8	13	10	5	4	13	32
Washington	31	10	38	7	12	8	7	4	18	39
Wicomico	27	10	38	7	12	7	4	4	18	37
Worcester	36	9	43	8	13	10	6	4	15	34

Source: CDC Places – https://chronicdata.cdc.gov/500-Cities-Places/PLACES-County-Data-GIS-Friendly-Format-2021-releas/i46a-9kgh

Maryland Demand for RNs by Setting (Status Quo scenario)

	2021 Demand*	2035 Demand*	Growth	% Growth
Office	3,360	3,800	440	13%
Outpatient	8,050	8,870	820	10%
Emergency	3,220	3,620	400	12%
Inpatient	26,900	32,380	5,480	20%
Home Health	3,070	4,230	1,160	38%
Nursing Home	1,210	1,820	610	50%
Residential Care	2,330	3,660	1,330	57%
School	1,760	1,870	110	6%
Public Health	2,400	2,610	210	9%
Academia	690	690	0	0%
Other	4,910	5,350	440	9%
Total FTEs	**57,900**	**68,900**	**11,000**	**19%**

* Based on national average level of care applied to Maryland's resident population.

Maryland Demand for LPNs by Setting (Status Quo scenario)

	2021 Demand*	2035 Demand*	Growth	% Growth
Office	1,290	1,460	170	13%
Outpatient	1,050	1,160	110	10%
Emergency	0	0	0	n/a
Inpatient	3,170	3,800	630	20%
Home Health	1,130	1,560	430	38%
Nursing Home	3,280	4,910	1,630	50%
Residential Care	810	1,270	460	57%
School	140	150	10	6%
Public Health	190	200	10	9%
Academia	40	40	0	0%
Other	1,600	1,750	150	9%
Total FTEs	**12,700**	**16,300**	**3,600**	**28%**

* Based on national average level of care applied to Maryland's resident population.

Demand Scenarios Modeled

Status Quo Scenario

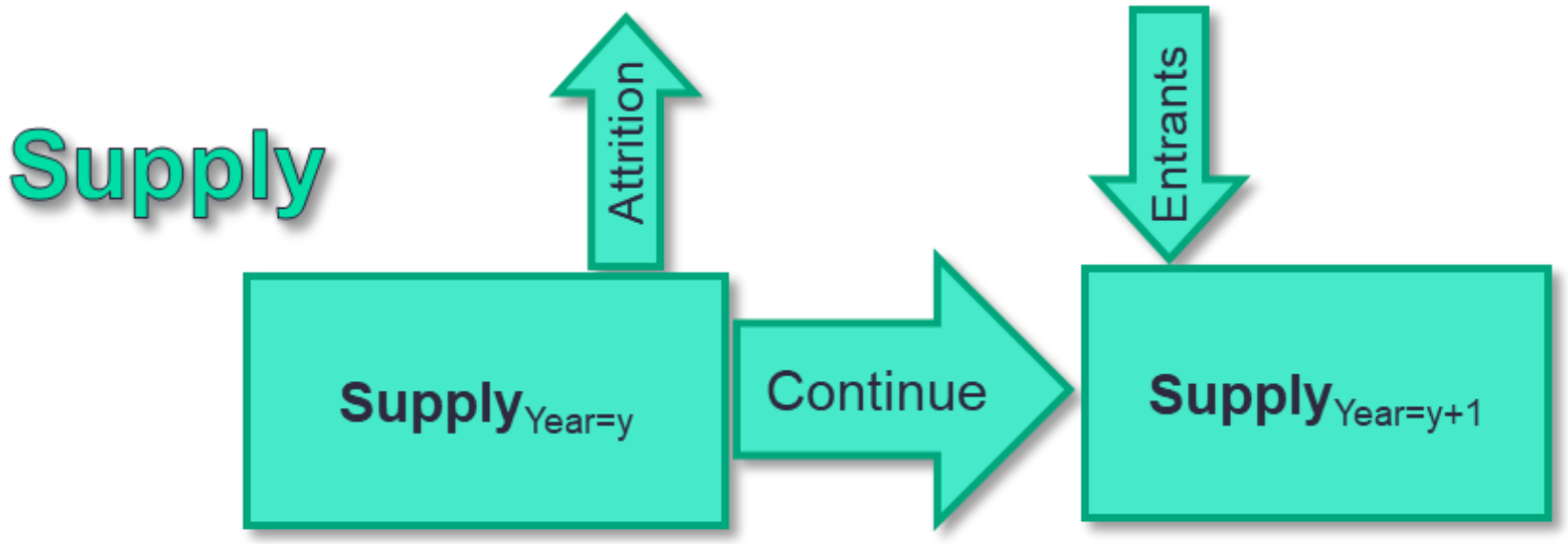
- Accounts for MD county-level population demographics, socioeconomics, health risk factors, and disease prevalence
- Projected into the future based on projected population growth and demographic shifting
- Projection of what could happen if current levels of health care use and delivery trends continue
    - Based on a national average level of care applied to Maryland's population
    - Need to consider any adjustments to account for unique characteristics of MD's healthcare system

Reduced Barriers scenario

- Assesses demand for nurses assuming
    - People residing in non-metro counties have care use patterns like their metro peers
    - Minority populations have care use patterns like their non-Hispanic white peers
    - Uninsured have similar care use patterns as their insured peers

Supply Modeling

Overview of GlobalData Supply Modeling Framework



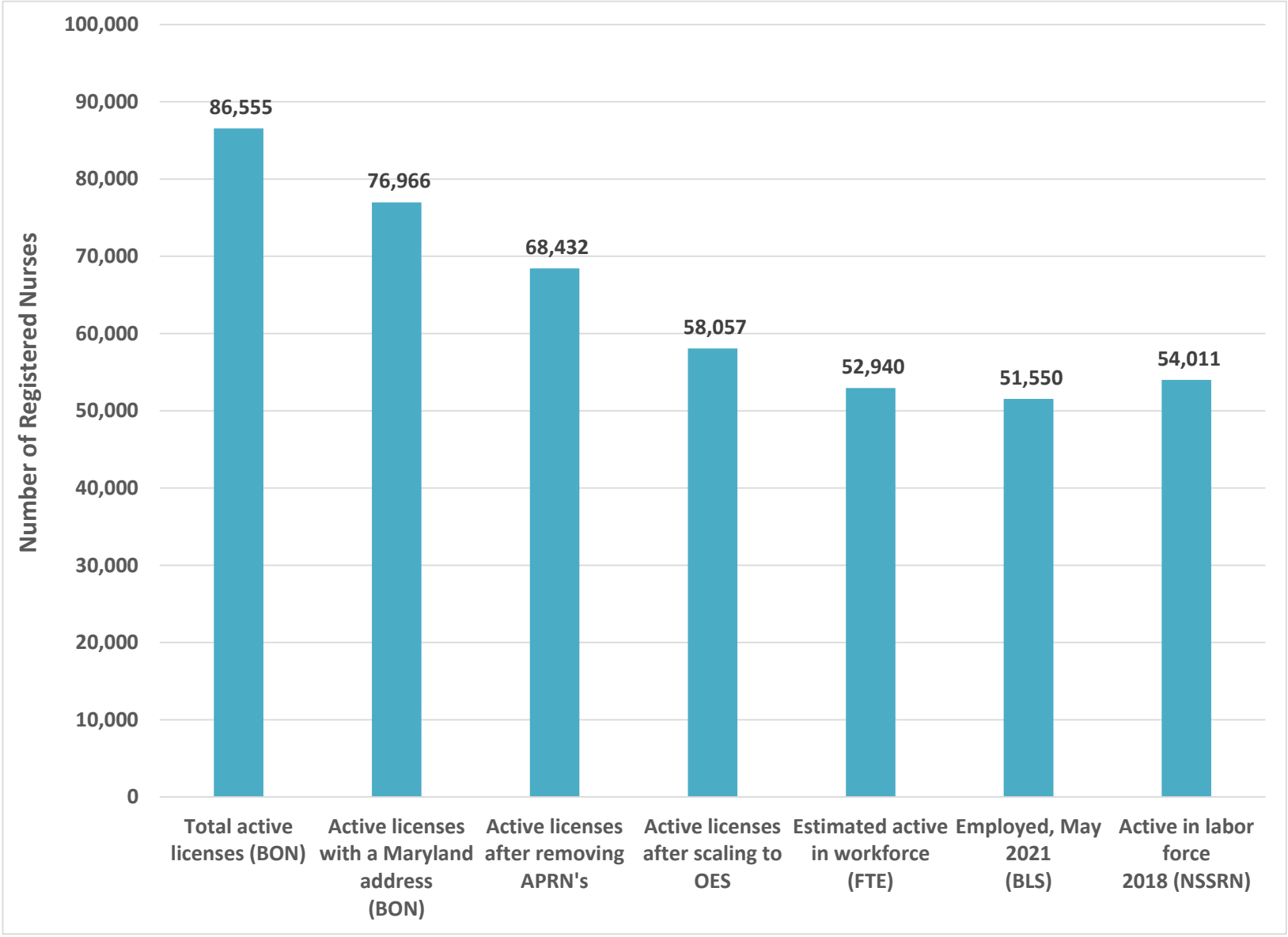
Health Workforce Supply Model

- Starts with
  - Bureau of Labor Statistics, Occupational Employment and Wage Statistics (May 2021) data for Maryland
  - Board of Nursing licensure data for nurses in Maryland (assigned demographics and active/non-active status probabilistically from ACS)
  - Estimate of the number of new nurses being trained annually at baseline
- Then simulates attrition from, and additions to, the workforce each year
  - Accounting for changes in work hours and retirement as the workforce ages

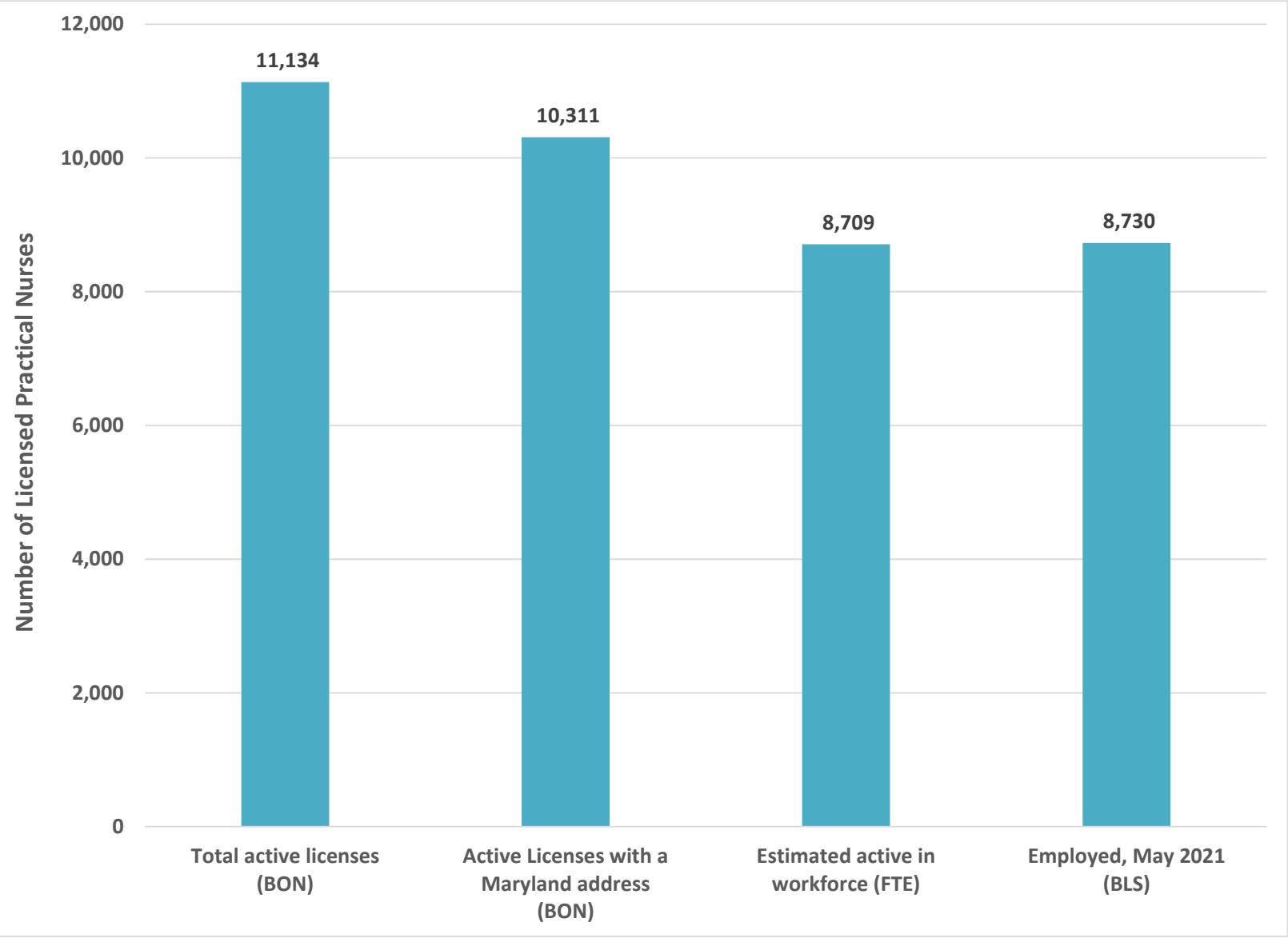
Starting Supply

- Supply (and demand) modeled as full time equivalent (FTE) nurses, where FTE defined as the national average hours worked per week for RNs (40.9) and for LPNs (37.7)
- Licensure files maintained by the Maryland Board of Nursing
    - RN licensure files
        - Active licenses, n= 86,555
        - Maryland address, n= 76,966
        - APRN's removed, n = 68,432
        - Scaled to OES, n = 58,057
        - FTE, adjusted for estimated probability in the workforce, n= 52,940
    - LPN licensure files
        - Active licenses, n= 11,134
        - Maryland address, n= 10,311
        - LPN does not also have an RN license
        - FTE, adjusted for estimated probability in the workforce, n= 8,709
        - OES indicates 8,730 jobs (including full time and part time) in May 2021
    - Other key data elements: Home county, year license issued
- Licensure files lack indicators of demographics, APRN status, workforce participation and employment county
    - We used 2018 National Sample Survey of Registered Nurses (NSSRN) and 2019 American Community Survey (ACS) to estimate demographics and probability of being employed in nursing
- Starting supply consists of de-identified record for each licensed RN and LPN in Maryland that includes assigned age, sex, home county, estimated probability active in nursing, estimated average weekly hours worked

Starting Supply: RNs



Starting Supply: LPNs

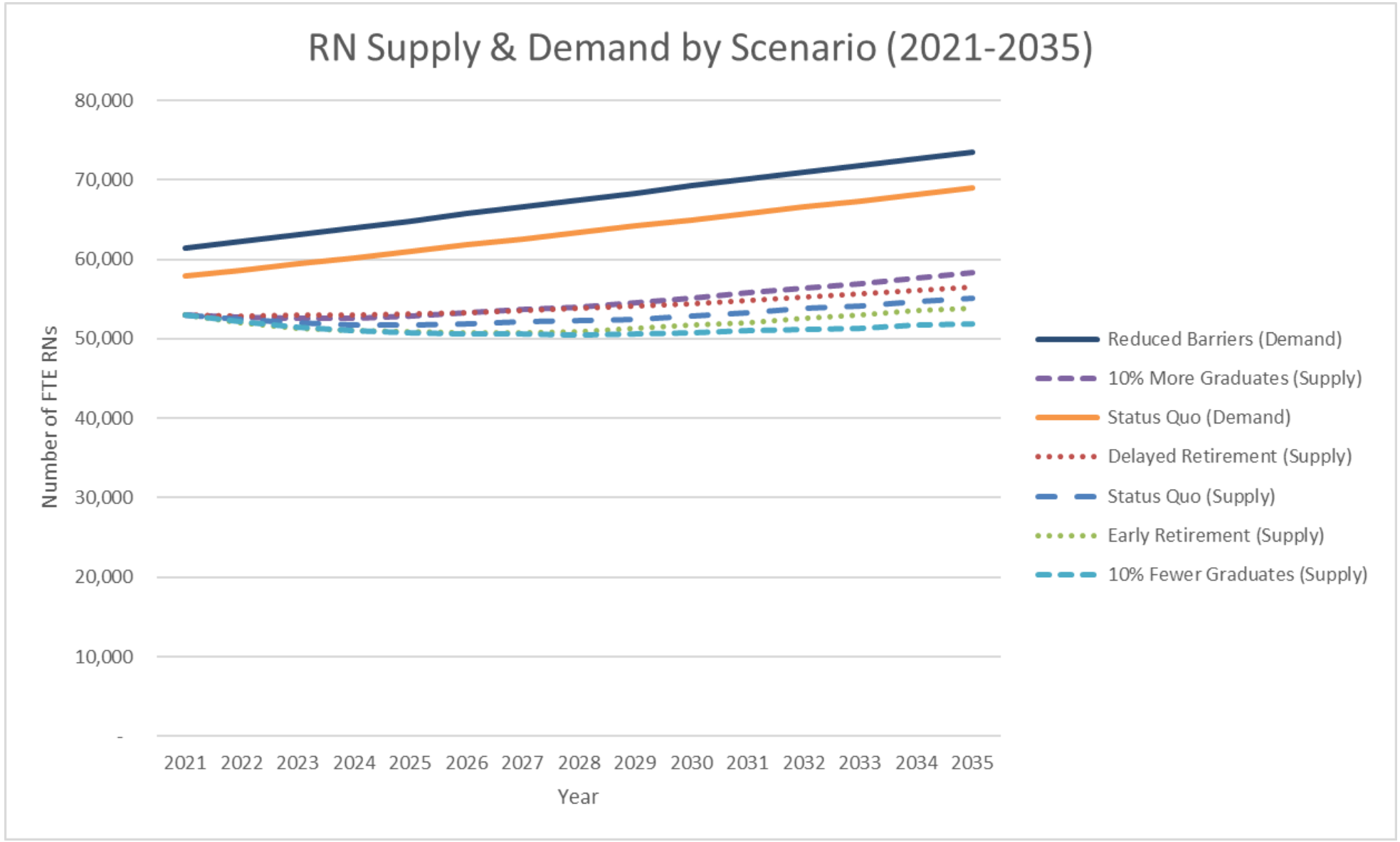


Supply Scenarios

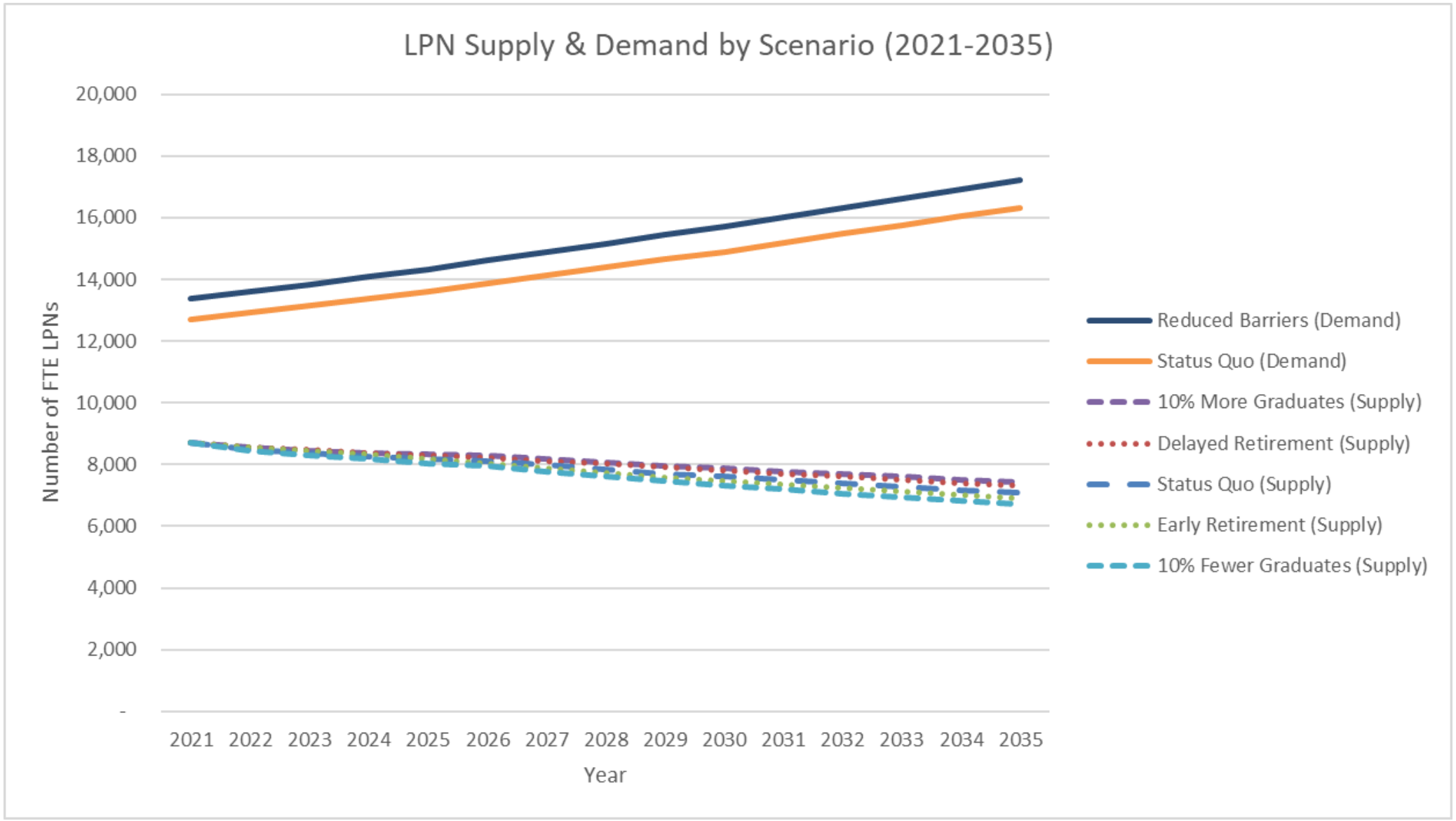
- Status Quo: model continuation of current number of new entrants, labor force participation patterns, retirement patterns, and cross-state migration patterns; accounts for changing demographics of nurse workforce
- Alternative scenarios:
    - 10% Increase in number of nurses being trained
    - 10% decrease in number of nurses being trained
    - 2 years early retirement (e.g., earlier retirement associated with burnout)
    - 2 years delayed retirement

Projections of Supply Adequacy

RN Supply and Demand Projections



LPN Supply and Demand Projections



Supply Adequacy

Registered Nurses

Year	SQ Demand v. SQ Supply	SQ Demand vs Early Retirement Supply	SQ Demand vs 10% More Graduates Supply	Reduced Barriers Demand vs SQ Supply
		Full Time Equivalents (shortfall)		
2021	(5,000)	(5,000)	(5,000)	(8,500)
2025	(9,200)	(10,100)	(8,200)	(13,000)
2030	(12,100)	(13,300)	(9,900)	(16,300)
2035	(13,800)	(15,000)	(10,600)	(18,400)
		Supply Percent Adequacy		
2021	91%	91%	91%	86%
2025	85%	83%	87%	80%
2030	81%	80%	85%	76%
2035	80%	78%	85%	75%

Licensed Practical Nurses

Year	SQ Demand v. SQ Supply	SQ Demand vs Early Retirement Supply	SQ Demand vs 10% More Graduates Supply	Reduced Barriers Demand vs SQ Supply
		Full Time Equivalents (shortfall)		
2021	(4,000)	(4,000)	(4,000)	(4,700)
2025	(5,400)	(5,400)	(5,300)	(6,100)
2030	(7,300)	(7,400)	(7,000)	(8,100)
2035	(9,200)	(9,400)	(8,900)	(10,100)
		Supply Percent Adequacy		
2021	69%	69%	69%	65%
2025	60%	60%	61%	57%
2030	51%	50%	53%	48%
2035	44%	42%	45%	41%

RN 2021 Supply Adequacy (100% = supply sufficient to provide national average level of care to resident population)

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RN 2035 Supply Adequacy (100% = supply sufficient to provide national average level of care to resident population)

LPN 2021 Supply Adequacy (100% = supply sufficient to provide national average level of care to resident population)

LPN 2035 Supply Adequacy (100% = supply sufficient to provide national average level of care to resident population)

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Focus Group Summary

Focus Group Main Themes

- Market conditions (pre-dating, and made worse by, COVID)
  - Nurse understaffing, nurses overworked, burning out
  - Shortages in other occupations lead to nurses drawing blood, performing administrative tasks such as insurance approvals, etc., intensifying nurses being overworked
  - Wage inequity (pay compression, differential of staff nurse vs travel nurse pay) and other policies not optimized for retention encourage higher turnover of experienced nurses
  - LPNs not used efficiently (overworked nurses had no time to train them to help during COVID)
- Generational differences
  - More emphasis on work-life balance among younger nurses
  - Nurse education offering less in-person training, more encouragement to seek leadership roles
- COVID impact
  - Retirements
  - COVID spikes -> increased use of travel nurses
  - Increased need for child and elder care -> decreased supply of nurses as well as increased need for flexibility -> increased attractiveness of travel nurse or less demanding setting
  - Fewer new entrants as “hero” effect wore off and social media posts emphasized danger and drudgery
  - COVID precluded hands-on training -> less prepared new nurses and more failed orientations
  - More telehealth -> more nurses moving to remote before getting experience bedside

Focus Group Sub-Themes in More Depth

- Shortages/overworked nurses
  - Shortages -> overworked nurses -> worry about care quality -> burnout -> turnover -> worse shortages
  - Overworked nurses have no time to mentor -> less prepared new nurses -> lower retention -> increased shortage
  - Insufficiently trained new nurses incentivized to move quickly to outpatient and other positions with less stress -> increasing inequity of wages -> increased turnover among experienced staff
  - Resilience programs not utilized because of stigma around counseling/mental health issues, doesn't address actual problem
- Increased use of travel nurses
  - More use of travel nurses -> higher travel nurse wages -> more nurses leaving staff positions to travel -> increased demand for travel nurses
  - Increased use of travel nurses -> increased travel nurse wages -> increases inequality of wages -> higher turnover, especially among experienced staff
  - Increased use of travel nurses -> fewer nurses with institutional knowledge -> more stress with respect to patient care quality -> burnout -> increased turnover -> worse shortages
- Educational and career expectation changes
  - Less in-person training -> more failed orientations -> fewer new entrants, less experienced staff
  - More leadership training -> managers with little bedside experience -> patient safety and burnout issues, as well as increased pay equity issues -> staff turnover
  - Younger generation has only known shortages and plenty of positions open to job hop up the ladder -> increased shortage of bedside staff, fewer experienced mentors, and increased wage inequality

Conclusions

Data and Research Recommendations

Board of Nursing licensure data of limited use for assessing supply adequacy

- No information on labor force participation status
- Address information is primarily home residence (no information on work location)
- BON limited in what personal data they are available to share—particularly, nurse age which could be useful for supply modeling

Recommendations for the Board of Nursing

- Add a questionnaire as part of the license renewal process (as it done for physicians in MD), asking a limited number of questions about their current role/employment status, work location, average hours worked per week, and intentions to leave the workforce over the next few years
- Create a research file that removes identifying information (e.g., patient name and street address) but adds other information (e.g., county, age, gender) plus information from the above questionnaire

Conclusions

- Growing shortfall of RNs
  - 2021: Estimated 5,000 FTEs (supply sufficient to meet about 91% of demand)
  - 2035: Projected 13,800 FTEs (supply sufficient to meet about 80% of demand)
- Growing shortfall of LPNs
  - 2021: Estimated 4,000 FTEs (supply sufficient to meet about 69% of demand)
  - 2035: Projected 9,200 FTEs (supply sufficient to meet about 44% of demand)
- Substantial variation across Maryland counties in supply adequacy, but exact numbers could only be computed with better data on where nurses work
- The current shortfall is contributing to
  - Staffing constraints with implications for patient safety, nurse burnout, and turnover
  - Flight of nurses from intense care settings to ambulatory and less intense settings
- Demand particularly strong for experienced nurses
- Shortfall of LPNs and other health occupations can exacerbate RN shortage by placing additional demands on the RN workforce
- Challenges with the training pipeline—including many nurses not prepared for bedside care, and lack of experienced nurses to mentor

Study findings are supportive of MHA draft recommendations goals to improve training, retention, and efficient use of nurses.