

# An Introduction to HRSA's Web-based Nursing Model

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# Nursing Model Overview

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# Presentation Outline

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- Background
- Supply Model
- Begin Live Demo
- Demand Model



# Health Workforce Simulation Model

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- More than 30 health professions are included in the model
- Integrated Microsimulation Model
  - Models individual behaviors rather than group behaviors (e.g., stock-and-flow models)
  - More flexible
- Web-based nursing model only includes RNs and LPNs
  - NPs are modeled with physicians and PAs
- For more information visit the National Center for Health Workforce Analysis website:
  - <http://bhpr.hrsa.gov/healthworkforce/index.html>



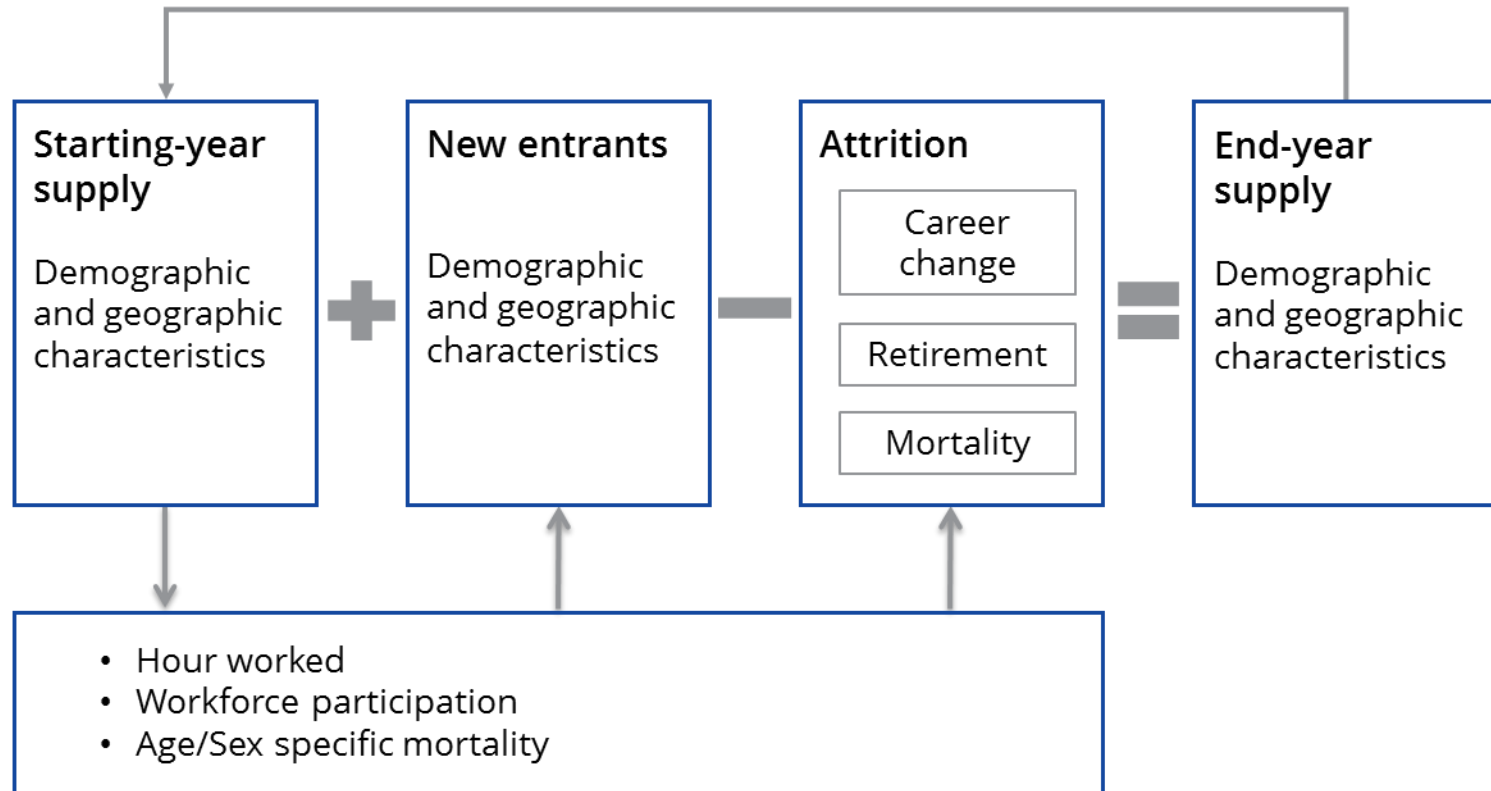
# Nursing Supply Model

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- Characteristics of the current nursing workforce
  - Individual-level database
  - Demographic and geographic characteristics
- Characteristics of new entrants into the workforce
  - Individual-level database
  - Demographic and geographic characteristics
- Equations predicting workforce participation
  - Hours worked
- Equations predicting attrition workforce attrition
  - Career change
  - Retirement
  - Mortality



# Nursing Supply Model



# Starting-year Supply

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- Web-based Model
  - Model users can upload their data using a template
- Minimum Requirements
  - Individual-level database
  - Age, Gender
  - Highest nursing education level
- HRSA Modeling Approach, 2014
  - The American Community Survey (ACS) was used to develop starting supply files for each state
    - Recognizing that many states have better supply data



# Template for Uploading Data

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State	Age	Sex	AssociateDegree	BachelorDegree	MasterDegree	LPN	RN
New York	56	F	0	1	0		1
New York	41	M	1	0	0		1
New York	43	F	0	1	0		1

or as seen in a text editor...

State,Age,Sex,AssociateDegree,BachelorDegree,MasterDegree,LPN,RN

New York,56,F,0,1,0,,1

New York,41,M,1,0,0,,1

New York,43,F,0,1,0,,1





# New Entrants into the Workforce

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- Web-based Model
  - Model users can adjust the number of new entrants
- HRSA Modeling Approach, 2014
  - New entrants for each state are based on number of 1<sup>st</sup> time NCLEX exam takers
    - Assumes individuals stay in the state where they take the exam



# Workforce Participation

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- Web-based Model
  - Model users may adjust the total number of hours worked and what an FTE equals
- HRSA Approach, 2014
  - Workforce participation based on average rate by nurse type, age, and gender
    - Focuses on nurses <50
  - Hours worked patterns based on regression analysis using ACS data



# Attrition

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- Web-based Model
  - Model users can run scenarios assuming shifts in retirement rates (retire earlier or later relative to current retirement patterns)
- HRSA Modeling Approach, 2014
  - Due to data limitations used national retirement patterns for all workers by education level
    - Some college
    - Baccalaureate degree
    - Graduate degree
  - Focuses on nurse age 50+



# Web-based Nursing Model

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- Model users can adjust each of the four major components of the supply Model
  - Starting-year supply
  - New entrants
  - Workforce participation
  - Attrition/Separation
- Demand projections are preloaded and cannot be adjusted
  - 10 settings (e.g., Hospital-Inpatient, provider office, home health etc.)
- Nursing Model Website
  - <https://desam-prod.hrsa.gov/NursingModel/>



# Nursing Demand Model

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- Characteristics of current population
  - Individual-level database that is representative of population
  - Demographic, socioeconomic characteristics, and health risk factors
- Equations predicting health care utilization patterns
- Current staffing patterns by setting that translate demand for services into demand for nursing FTEs



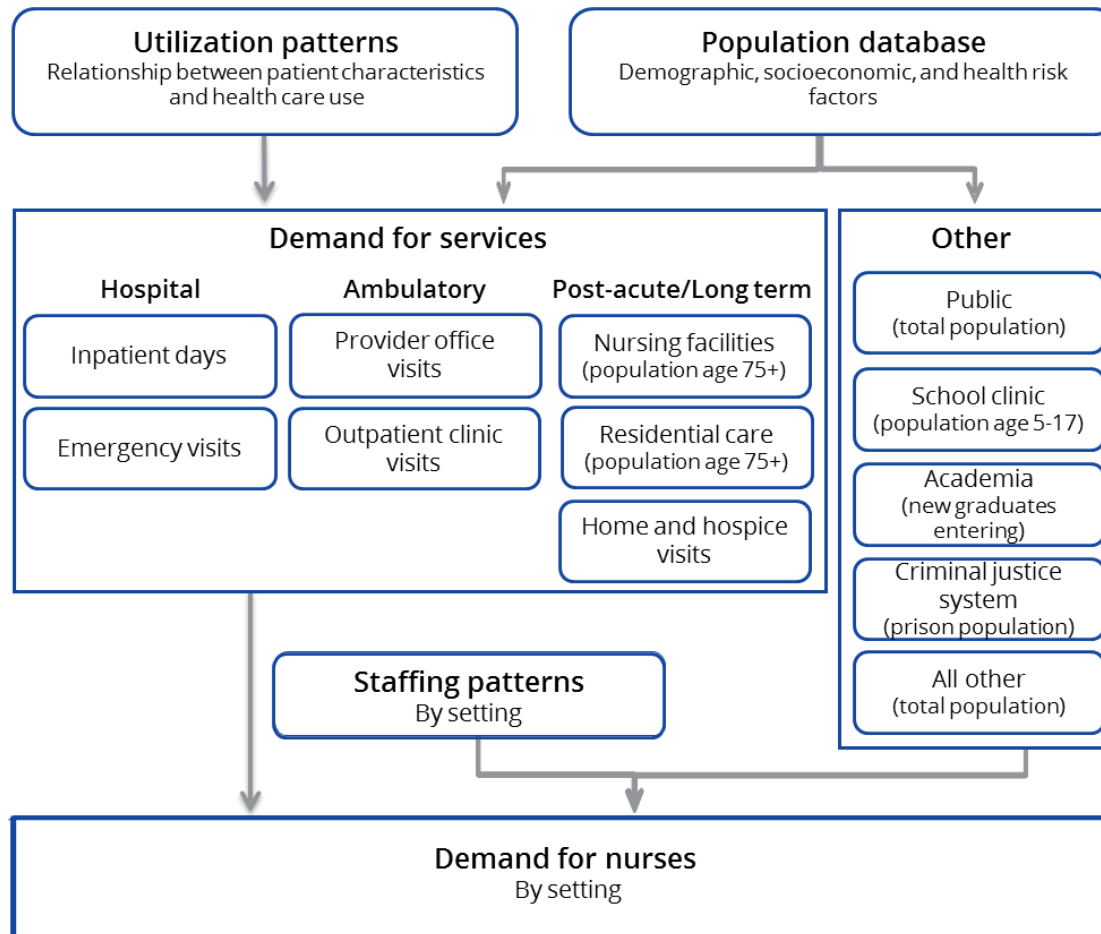
# Current Population Database

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- Demographic and Socioeconomic Characteristics
  - Age, sex, race/ethnicity, household income, and insurance (e.g., private, public non-Medicare, Medicare, uninsured)
- Risk Factors and Chronic Conditions
  - Obese/overweight, smoking status, hypertension, high cholesterol, coronary heart disease, diabetes, history of stroke, history of cancer, asthma, and arthritis
- Other
  - In managed care plan and reside in metropolitan area
- Key Data Sources
  - Behavioral Risk Factor Surveillance System (BRFSS)
  - ACS



# Nursing Demand Model



# Technical Assistance

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# Nursing Model Demo Slides

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*Just in case the live demo doesn't workout...*



**Please enter your email and password**

Email \*

Password \*

[Register](#)   [Forgot your password?](#)

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## Welcome to the Nursing Health Workforce Model!

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## Welcome to the Nursing Supply Model!

Since you have not uploaded your data, this is for training and education purpose only!


Run Reports Email Reports

  
Status Quo Scenario

  
Low Graduate Scenario

  
High Graduate Scenario

  
Early Retirement Scenario

  
Delayed Retirement Scenario

  
User Scenario

It may take several minutes to get the results if you choose Run Reports. Optionally you can select Email Reports to have report sent to you by email.

select year of data 2012

Browse... Upload

Data File Sample

1	State	Age	Sex	AssociateDegree	BachelorDegree	MasterDegree	LPN	RN
2	New York	61	F	1	0	0		1
3	New York	48	F	0	1	0		1
4	New York	39	F	0	1	0		1
5	New York	61	F	1	0	0		1
6	New York	62	F	1	0	0		1
7	New York	60	F	1	0	0		1
8	New York	34	F	1	0	0		1
9	New York	47	F	0	1	0		1
10	New York	47	F	0	1	0		1
11	New York	46	F	1	0	0		1
12	New York	52	F	0	1	0		1
13	New York	60	M	1	0	0		1
14	New York	67	F	0	0	1		1

User scenario

Name	Status Quo	Description	Status Quo
Hours per FTE (RN)	35.77	Hours per FTE (LPN)	34.99
Simulation Period (Years)	13		
Chg In Retirement Age	0	Avg. Hours Modifier In %	0
Add LPNs Per Year	64000	Yearly % Change	0
Add AD Level RNs Per Year	87700	Yearly % Change	0
Add BA Level RNs Per Year	62500	Yearly % Change	0

Run Scenario



User scenario			
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Add BA Level RNs Per Year	62500	Yearly % Change	0

Run Scenario



Simulation has been started. This might take several minutes to complete. Please stand by.

Cancel

## Nursing Supply Model - Status Quo Scenario



Show Scenario Results



National Overview



State Overview



National Year Drill-Down



compare to Demand

**Nurse Projections by State**

State: USA

change
Export

RN projected nurse supply by year						
Year	Headcount	Active	New Entrants	Separations	Hours Worked	FTE
2012	2,732,305	2,636,274	0	0	0	0
2013	2,827,340	2,728,381	149,943	55,165	97,508,007	2,725,972
2014	2,918,333	2,816,619	149,912	59,207	100,581,441	2,811,894
2015	3,006,137	2,901,418	149,916	62,396	103,520,871	2,894,070
2016	3,089,962	2,982,308	149,905	66,375	106,314,509	2,972,170
2017	3,169,816	3,059,091	149,926	70,346	108,956,250	3,046,023
2018	3,246,566	3,132,609	149,924	73,450	111,477,426	3,116,506
2019	3,319,746	3,202,769	149,902	77,020	113,883,998	3,183,785
2020	3,389,326	3,269,191	149,917	80,620	116,164,524	3,247,541
2021	3,456,568	3,333,512	149,935	82,958	118,371,759	3,309,247
2022	3,519,849	3,394,050	149,896	86,919	120,437,847	3,367,007
2023	3,581,303	3,452,553	149,909	88,746	122,436,733	3,422,889
2024	3,639,922	3,508,818	149,939	91,581	124,377,943	3,477,158
2025	3,696,568	3,562,866	149,926	93,554	126,261,315	3,529,810

LPN projected nurse supply by year						
Year	Headcount	Active	New Entrants	Separations	Hours Worked	FTE
2012	696,086	656,997	0	0	0	0

Scenario Parameters	
Scenario:	Status Quo
FTE Avg. Hours Worked (RN):	35.77
FTE Avg. Hours Worked (LPN):	34.99
Base Year:	2012
Retirement change (years):	0
Avg. hours modifier (factor):	1
Simulation Period:	13
LPNs added in 1st year:	64000
AD level RNs added in 1st year:	87700
BA level RNs added in 1st year:	62500
Scenario Description:	Status Quo



## Nursing Projection Models - Charts

 Show Scenario Results  
 National Overview  
 States Overview  
 National Year Drill-Down  
 compare to Demand

### Scenario Parameters

Scenario:

FTE Avg. Hours Worked (RN):

FTE Avg. Hours Worked (LPN):

Base Year:

Retirement change (years):

Avg. hours modifier (factor):

Simulation Period:

LPNs added in 1st year:

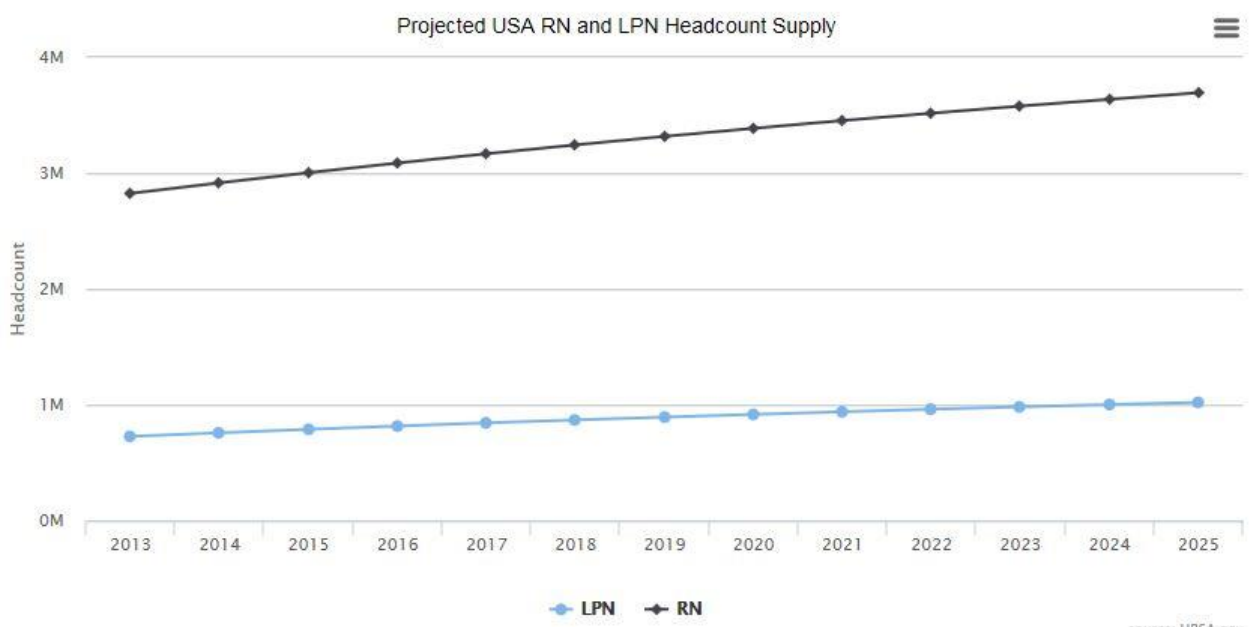
AD level RNs added in 1st year:

BA level RNs added in 1st year:

Scenario Description:

### National Overview

Headcount



Show Scenario Results | National Overview | States Overview | National Year Drill-Down | Compare to Demand

Retirement change (years):  
Avg. hours modifier (factor):  
Simulation Period:  
LPNs added in 1st year:  
AD level RNs added in 1st year:  
BA level RNs added in 1st year:  
Scenario Description:

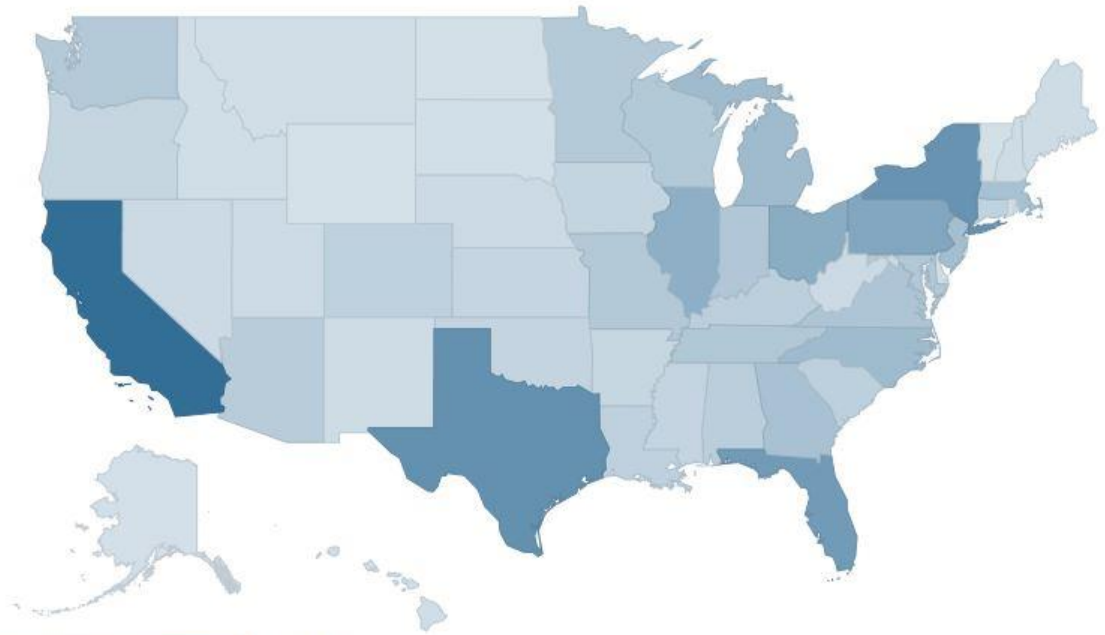
### Total Projected Headcount By State For 2013

show ratio per 100K population

2013 Change Next Year

Headcount Change

#### RNs



1,720 273,120

#### LPNs

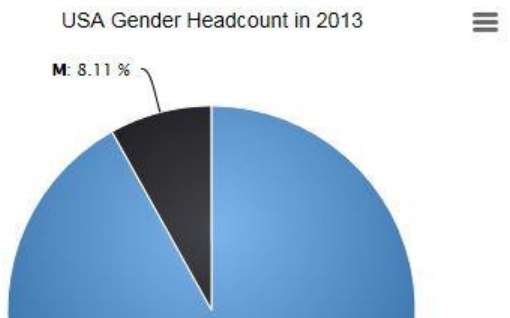
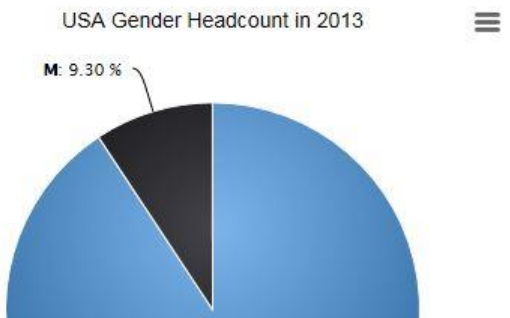
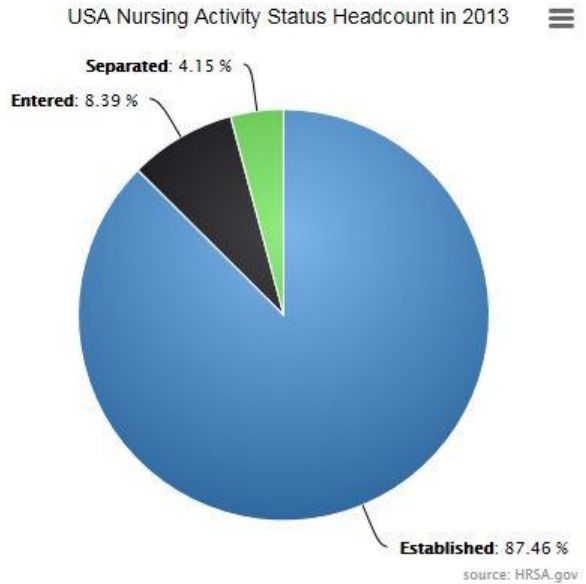
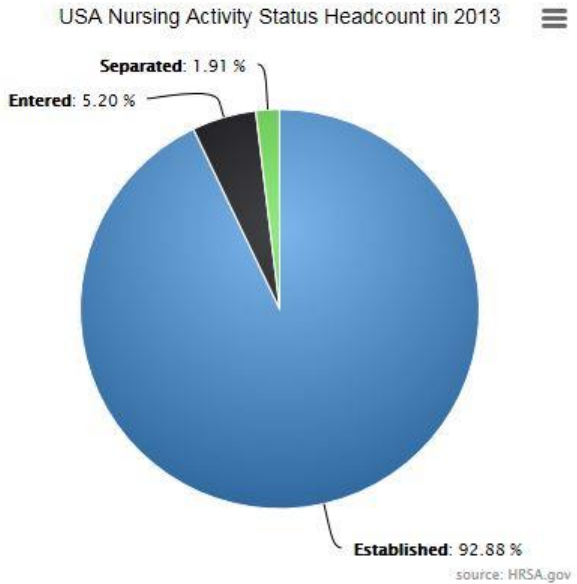
Navigation buttons: Show Scenario Results, National Overview, States Overview, National Year Drill-Down, compare to Demand

**FTE Avg. Hours Worked (RN):**  
**FTE Avg. Hours Worked (LPN):**  
**Base Year:**  
**Retirement change (years):**  
**Avg. hours modifier (factor):**  
**Simulation Period:**  
**LPNs added in 1st year:**  
**AD level RNs added in 1st year:**  
**BA level RNs added in 1st year:**  
**Scenario Description:**

**Year Drill-Down for USA in 2013**

Headcount | 2013 | USA | Change | Next Year

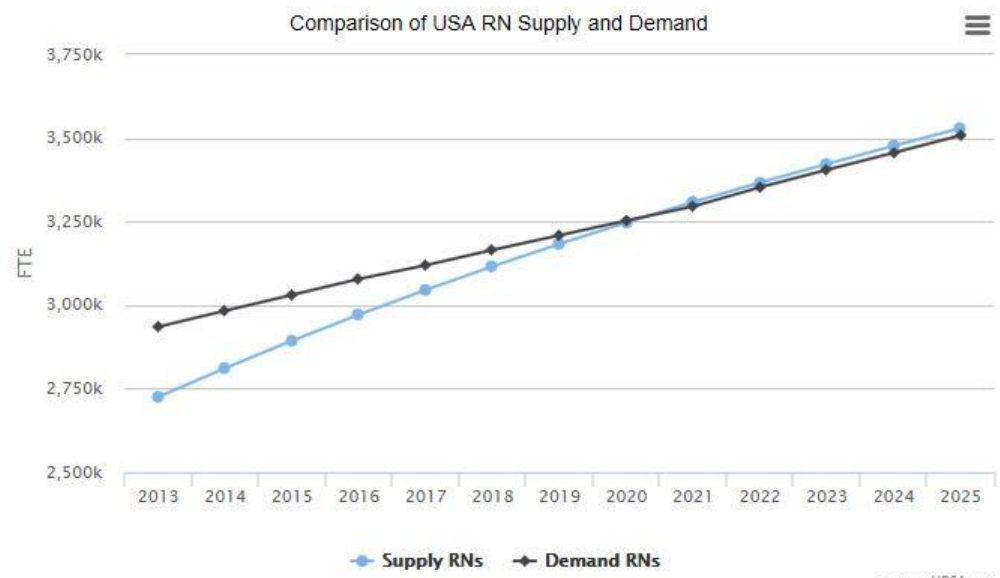
**RNs** | **LPNs**



Navigation buttons: Show Scenario Results, National Overview, State Overview, National Year Drill-Down, compare to Demand

Nurse Projections by State

State: USA  
 Equalize  
change



source: HRSA.gov



## Welcome to the Nursing Health Workforce Model!

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Supply Model

  
Demand Model

## Nursing Projections

settings

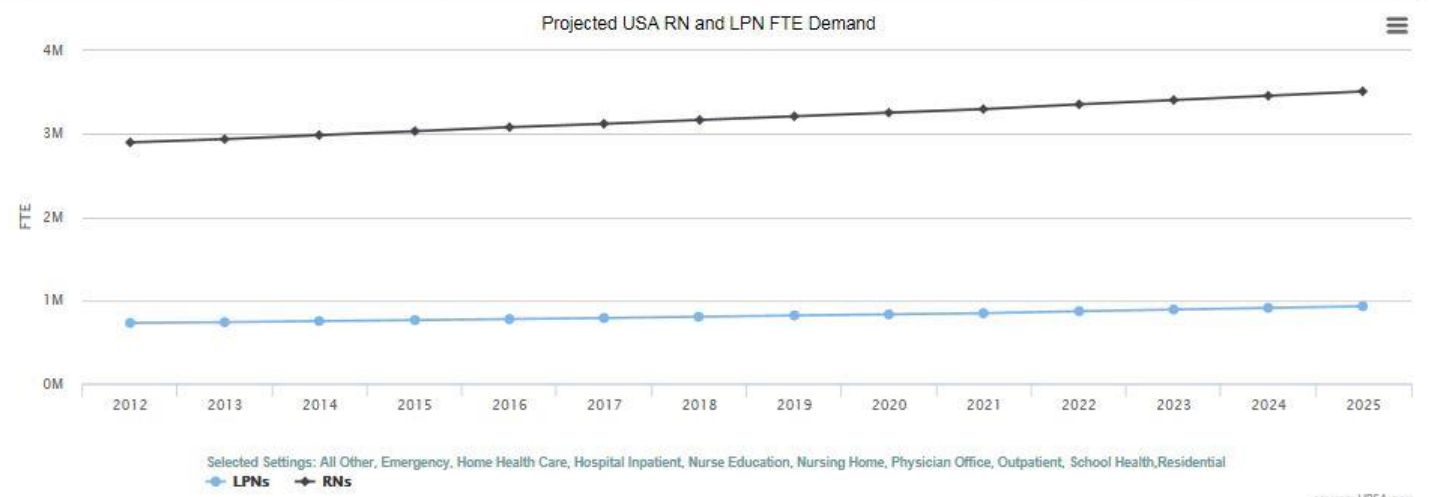
State: USA Status Quo

All Other
  Emergency
  Home Health Care
  Inpatient
  Nurse Education
  Nursing Home
  Office
  Outpatient
  Residential
  School Health

change Export

### FTE Demand

Profession	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
RN	2,896,540	2,935,750	2,983,750	3,031,090	3,078,690	3,119,860	3,165,720	3,209,350	3,253,340	3,296,080	3,353,050	3,405,190	3,456,410	3,508,490
LPN	729,950	740,080	751,920	764,180	776,900	789,500	805,200	819,300	833,370	846,960	870,210	890,640	910,440	930,460



### Relative Growth

Profession	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
RN	0.00 %	1.35 %	3.01 %	4.65 %	6.29 %	7.71 %	9.29 %	10.80 %	12.32 %	13.79 %	15.76 %	17.56 %	19.33 %	21.13 %
LPN	0.00 %	1.39 %	3.01 %	4.69 %	6.43 %	8.16 %	10.31 %	12.24 %	14.17 %	16.03 %	19.21 %	22.01 %	24.73 %	27.47 %

Projected USA RN and LPN Relative Growth

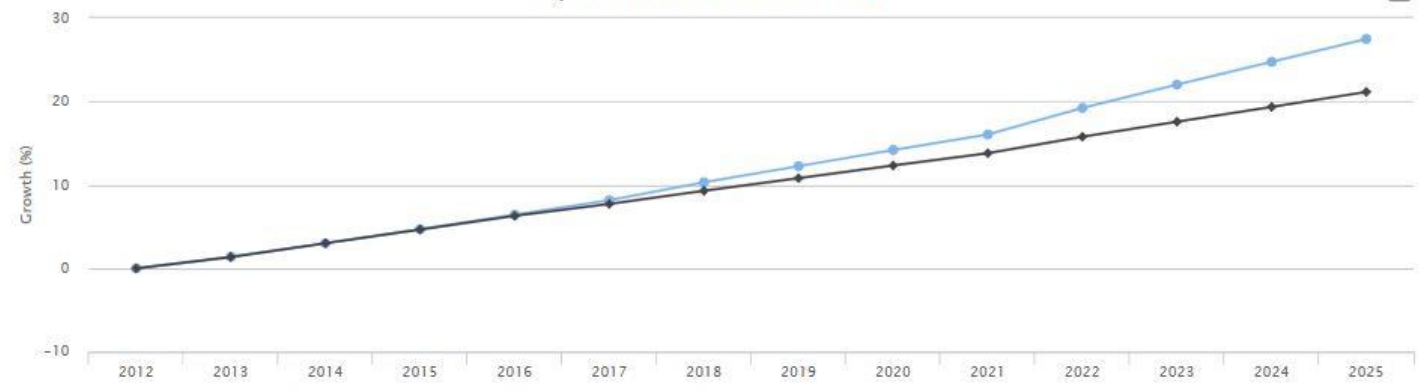


source: HRSA.gov

### Relative Growth

Profession	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
RN	0.00 %	1.35 %	3.01 %	4.65 %	6.29 %	7.71 %	9.29 %	10.80 %	12.32 %	13.79 %	15.76 %	17.56 %	19.33 %	21.13 %
LPN	0.00 %	1.39 %	3.01 %	4.69 %	6.43 %	8.16 %	10.31 %	12.24 %	14.17 %	16.03 %	19.21 %	22.01 %	24.73 %	27.47 %

Projected USA RN and LPN Relative Growth



Selected Settings: All Other, Emergency, Home Health Care, Hospital Inpatient, Nurse Education, Nursing Home, Physician Office, Outpatient, School Health, Residential  
 ◆ LPNs ◆ RNs

source: HRSA.gov

ADD US DATA TO CHART

### RN FTE Demand By Care Setting

Care Setting	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Hospitals	1,911,720	1,941,600	1,977,690	2,012,580	2,047,400	2,076,950	2,108,600	2,139,250	2,170,230	2,200,280	2,237,000	2,271,080	2,304,750	2,339,210
Inpatient	1,610,480	1,637,440	1,670,140	1,701,570	1,732,950	1,759,480	1,788,110	1,815,750	1,843,680	1,870,730	1,904,480	1,935,660	1,966,440	1,998,000
Outpatient	115,860	117,170	118,920	120,730	122,510	123,850	125,190	126,520	127,870	129,170	130,480	131,750	133,020	134,290
Emergency	185,380	186,990	188,630	190,290	191,950	193,620	195,300	196,980	198,690	200,370	202,040	203,670	205,300	206,920
Provider Office	214,340	216,490	221,130	225,920	230,640	232,920	235,190	237,460	239,770	242,040	244,300	246,510	248,700	250,900
Nursing Facilities	153,520	156,120	158,750	161,740	165,050	169,270	175,340	180,460	185,530	190,390	201,020	210,040	218,700	227,430
Residential Care	49,240	50,070	50,920	51,880	52,940	54,290	56,240	57,880	59,510	61,070	64,480	67,370	70,150	72,950
Home Health	179,590	181,490	183,340	185,210	187,030	188,870	190,740	192,510	194,200	195,890	197,550	199,170	200,790	202,400
School Health	55,030	54,990	55,030	54,960	54,900	54,880	55,000	55,220	55,580	55,940	56,280	56,660	57,030	57,380
Nurse Education	89,790	89,790	89,790	89,790	89,790	89,790	89,790	89,790	89,790	89,790	89,790	89,790	89,790	89,790
All Other	243,310	245,200	247,100	249,010	250,940	252,870	254,820	256,770	258,720	260,670	262,620	264,570	266,500	268,420
<b>Total</b>	<b>2,896,540</b>	<b>2,935,750</b>	<b>2,983,750</b>	<b>3,031,090</b>	<b>3,078,690</b>	<b>3,119,860</b>	<b>3,165,720</b>	<b>3,209,350</b>	<b>3,253,340</b>	<b>3,296,080</b>	<b>3,353,050</b>	<b>3,405,190</b>	<b>3,456,410</b>	<b>3,508,490</b>

### LPN FTE Demand By Care Setting