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Agenda Item 8a:

Nursing Workforce: Modeling Updates and County-Level Findings

Facilitator: Jaclyn Moriel, Senior Data Analyst, Health Workforce Development, HCAI

Objectives for today

Recap supply & demand methodology

Recap statewide & regional findings

Discuss commuting adjustment methodology

Share county level findings

Q/A

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HCAI has developed a data-driven statewide strategy to address gaps in California's workforce

Purpose

*Support the State to understand and equitably solve the supply/demand gaps in **behavioral health** and **nursing** services & better serve Californians*

Approach

Supply, demand & pipeline modeling: Modeling tools enable a **granular** (by role & geography) **and quantitative view** of current state workforce shortages and projected future needs (shortages & training supply). Model outputs can be used by many departments, agencies and actors to guide their decision making.

Strategic planning: A **data-driven** strategy that identifies **innovative and tested best practices** to resolve persistent workforce gaps and inequities, and creates **tailored intervention bundles** to target specific challenge and opportunities

Stakeholder engagement: Significant stakeholder consultation and **collaboration with experts inside and outside of government, including health workers;** ongoing validation and refinement of our strategy, shaped by evidence and experience

Recall | We assessed 8 nursing roles, in 5 distinct groups

Role groups

Registered Nurses (RN)
- Registered Nurse (RN)
- Public Health Nurse (PHN)
- Clinical Nurse Specialist (CNS)

Midwives
- Certified Nurse Midwife (CNM)
- Licensed Midwife (LM)

Standalone roles

- Nurse Anesthetist (NA)
- Nurse Practitioner (NP)
- Licensed Vocational Nurse (LVN)

Recall | Summary of approach for current state calculations

Supply

Use licensing data and care delivery trends by role to calculate supply

- Calculate total active, licensed supply in CA
- Deduplicate by removing non-primary licenses
- Convert into provider FTE

Nurse Demand

Use capacity & utilization rates or provider to population ratios depending on role and setting to calculate demand

- Calculate capacity & utilization rates or provider : patient ratios
- Convert into provider FTE required
- Sum demand in all settings

Behavioral Health Demand

Separately calculate inpatient met & unmet demand and outpatient met & unmet demand. Sum for total BH demand

Inpatient

- In-patient psych capacity & utilization
- In-patient met demand
- In-patient unmet demand (ideal BH:pop ratio – actuals)

Outpatient

- Total BH providers
- In-patient met demand
- Outpatient met demand
- BH incidence and treatment rates from survey data
- Provider:pop ratio for treated outpatient demand
- Outpatient unmet demand

Summary of approach for future state calculations

Forecasting is performed differently for each role based on ***availability*** of data and data ***quality***

Role	Forecasting approach	Rationale
Registered Nurse	Stock and flow model	RNs have rich input data available enabling us to create a comprehensive forecast model
Vocational Nurse, PHN, NP, Nurse Anesthetist, CNS, Midwives, PMHNP	Machine Learning forecast	Have supply data for historical years but limited data availability of input features

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What about County level results?

The “Commuting Problem”

- The percent of the workforce commuting across a regional border is small, but the percent commuting across a county border is much higher
- This is particularly apparent in urban areas with high commuting rates and/or a high cost of living (e.g. Greater Bay area)
- We received stakeholder feedback that county level data would only be meaningful if we could account for this migration somehow
- RDC leveraged our unique access to workforce survey data and licensure data to create a solution that accounts for both regional and county level migration

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Methodology for Commuting Adjustments

Objective

Our goal was to develop a way to account for the nursing workforce living in one county but working in another. By better representing supply based on practice location, false precision in county level supply is greatly reduced.

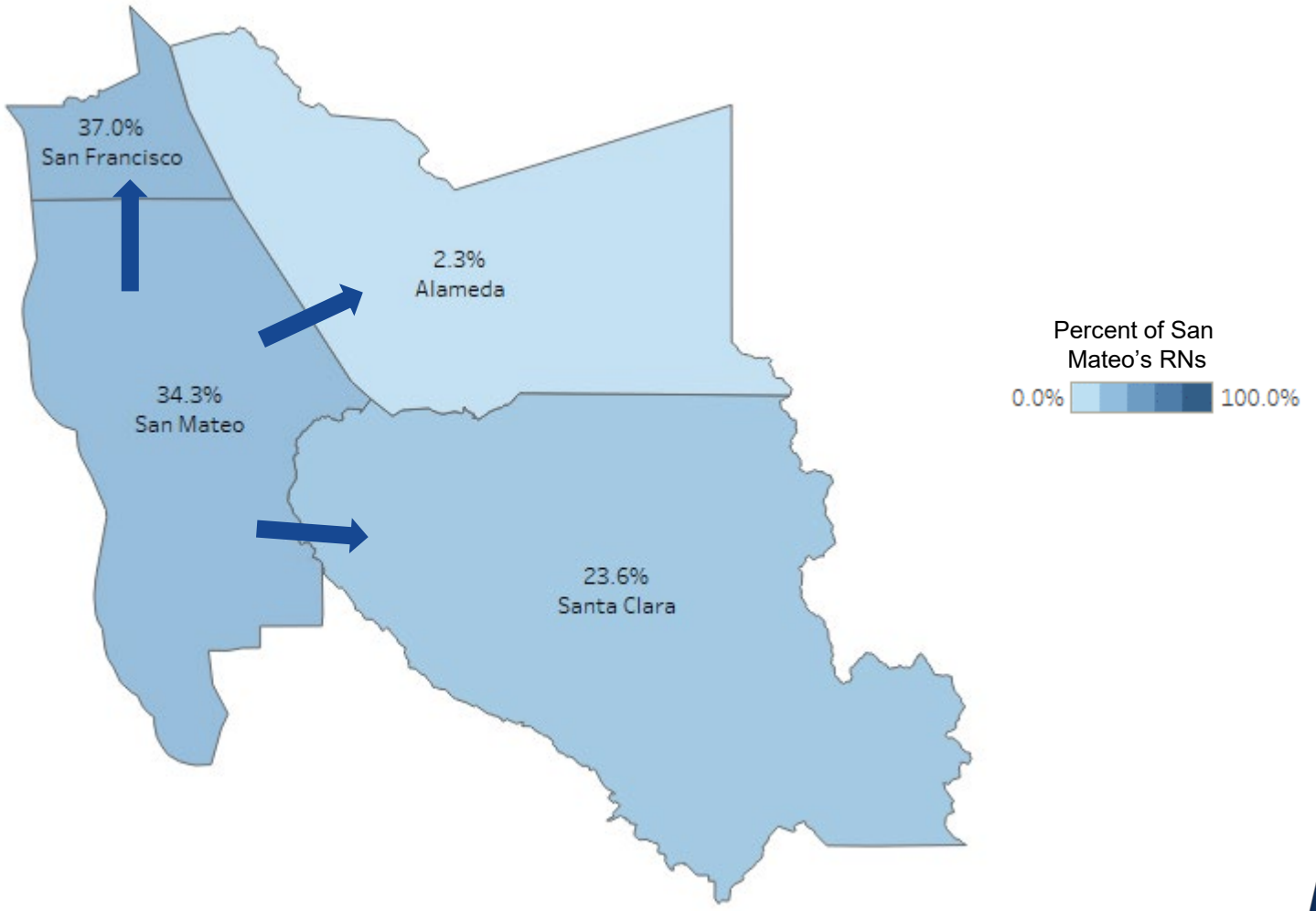
Approach

Compare the Address of Record (AoR) from the license data to the Primary Practice Address (PPA) reported in the HCAI License Renewal Survey

- For roles such as RN and LVN, we have a robust set of responses to analyze.[1]
- For every respondent, the county/SPA from the AoR was compared to the county/SPA of the reported PPA. This creates a 'commuting matrix' showing the percentage of the workforce crossing county lines *from* every county *to* every county.
- Counties that did not have a representative sample were not adjusted.[3] 54 counties for RNs and in 45 counties for LVNs were within our margin of error.[2]
- For roles where we did not have sufficient data for more than half the counties (NP, NA, Midwives), no adjustment was performed. The data will be re-examined at the next model refresh.

[1]RN N=110,339, LVN N=24,757. Decline to State responses were not included. [2]Based on 90% confidence interval, 15% margin of error based on sample size in each county.
[3]RN = Alpine, Colusa, Sierra, Trinity unadjusted. LVN = Alpine, Amador, Calaveras, Colusa, Glenn, Inyo, Mariposa, Modoc, Mono, Plumas, Sierra, Trinity, Tuolumne unadjusted.

Registered Nurse – Where San Mateo RNs report working



Note: Figure illustrates commuting matrix only for San Mateo county. Does not include migration *into* the area from neighboring counties. Areas with less than 1% migration are not shown.

- **Only 34.3%** of the RNs in San Mateo also reported working in San Mateo
- The **majority reported working in other nearby counties**, like San Francisco (37%) and Santa Clara (23.6%)
- Without the commuting adjustment, RNs are **misattributed** to San Mateo's supply, creating an **artificial surplus** in San Mateo
- Applying the commuting adjustment **more accurately** reflects the county's workforce

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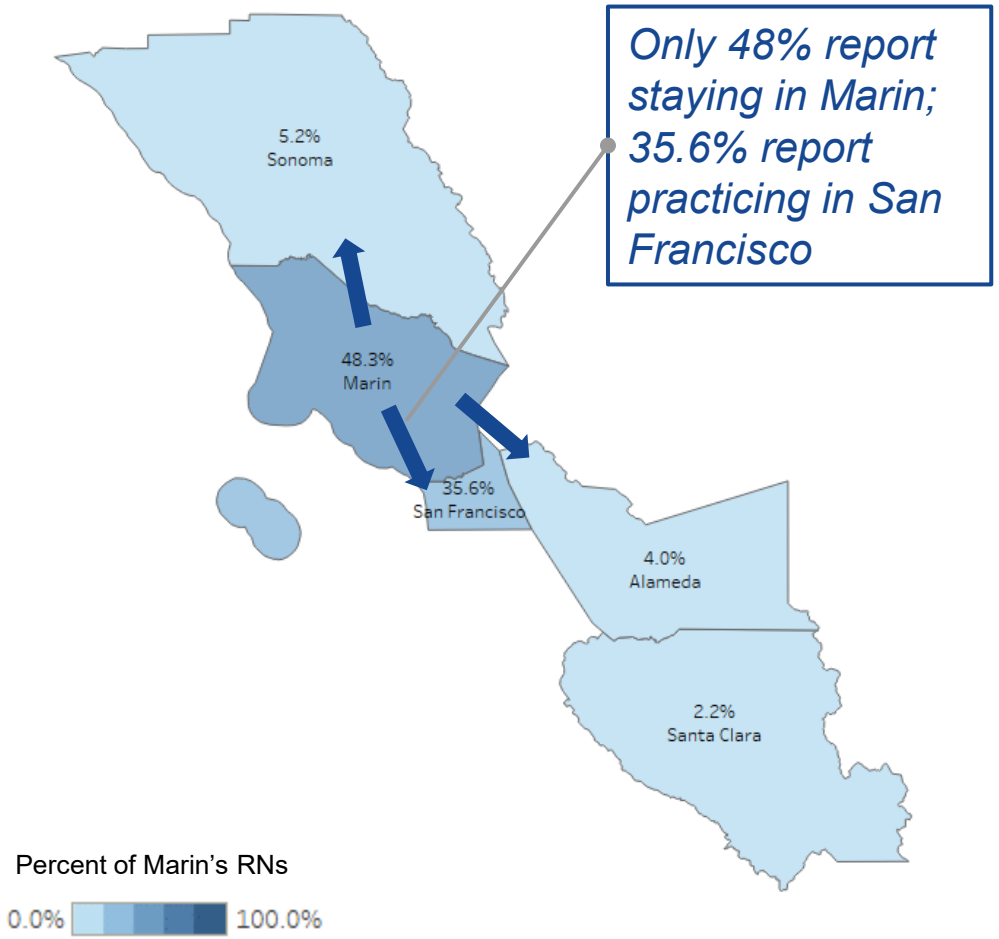
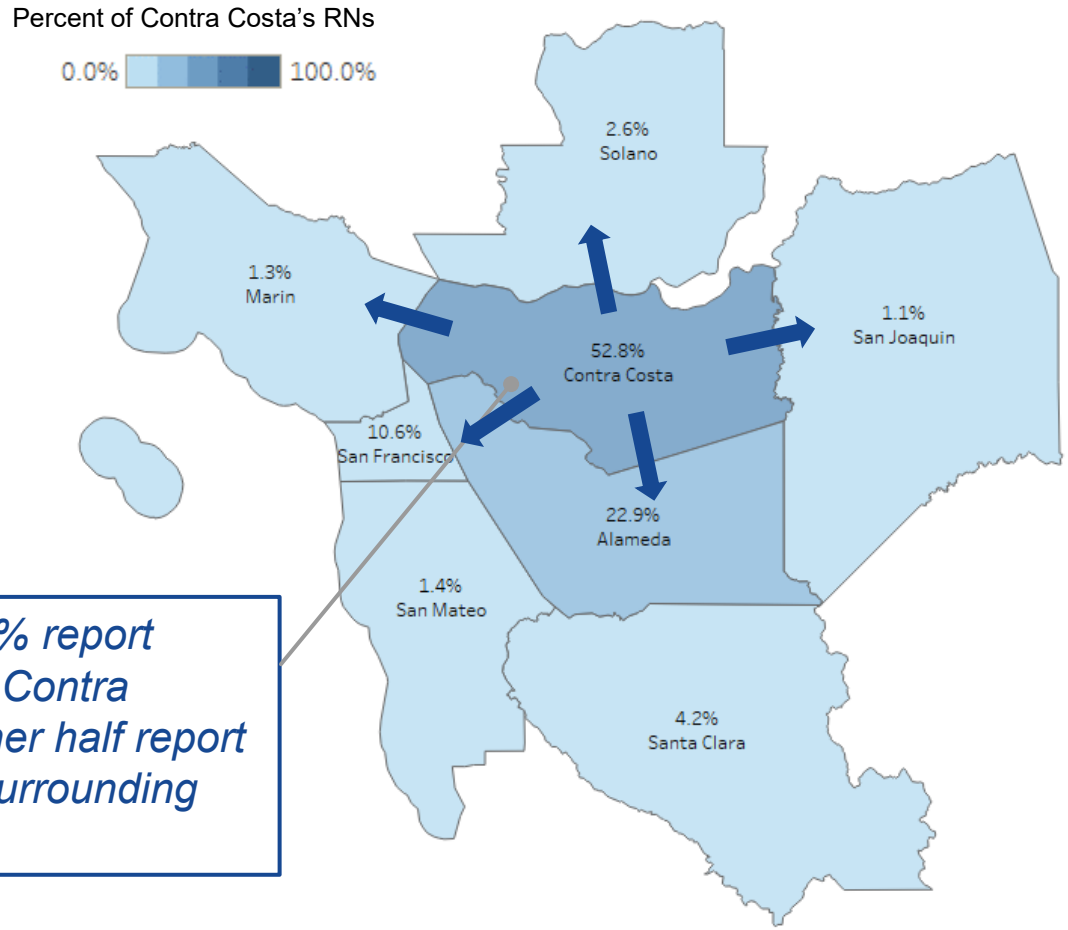
Registered Nurse – Where Marin & Contra Costa's RNs report working



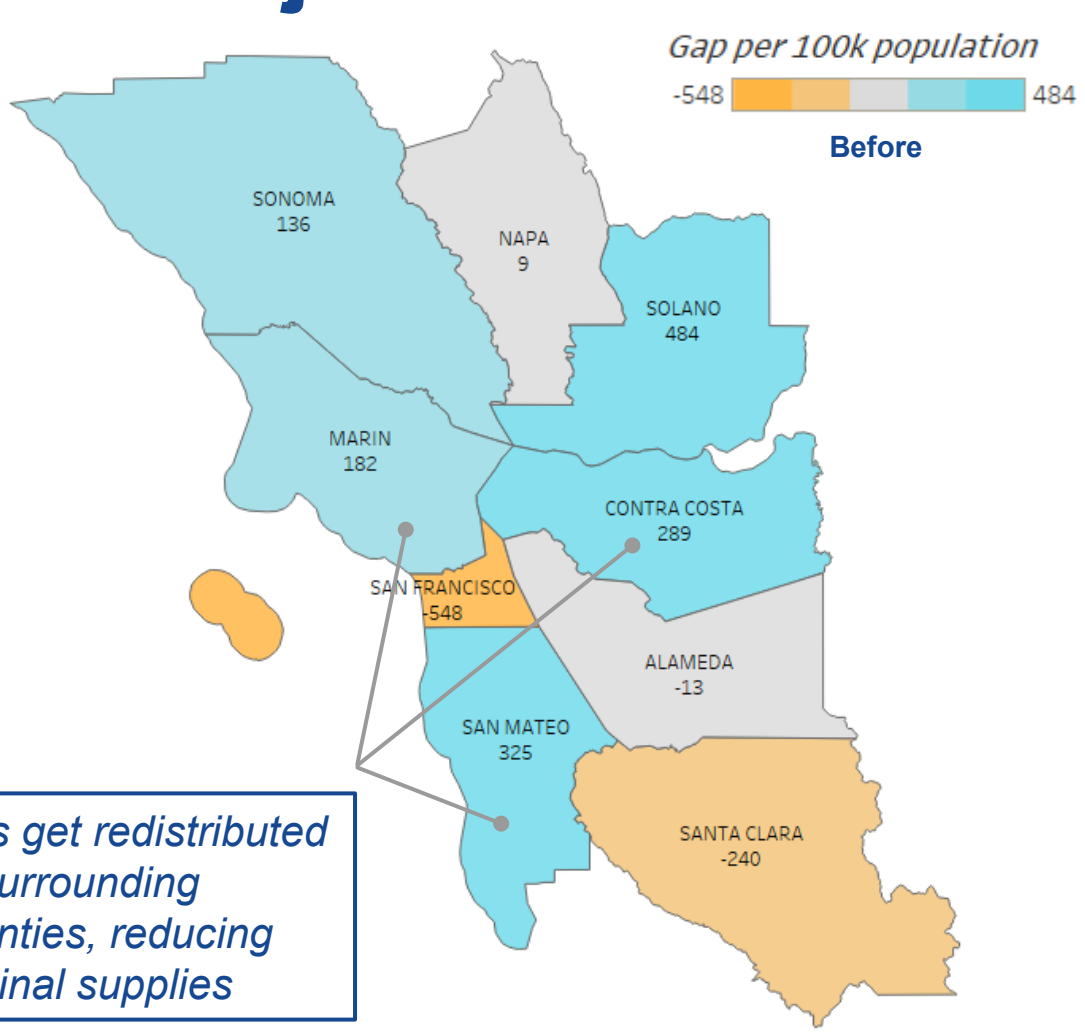
Only 48% report staying in Marin; 35.6% report practicing in San Francisco



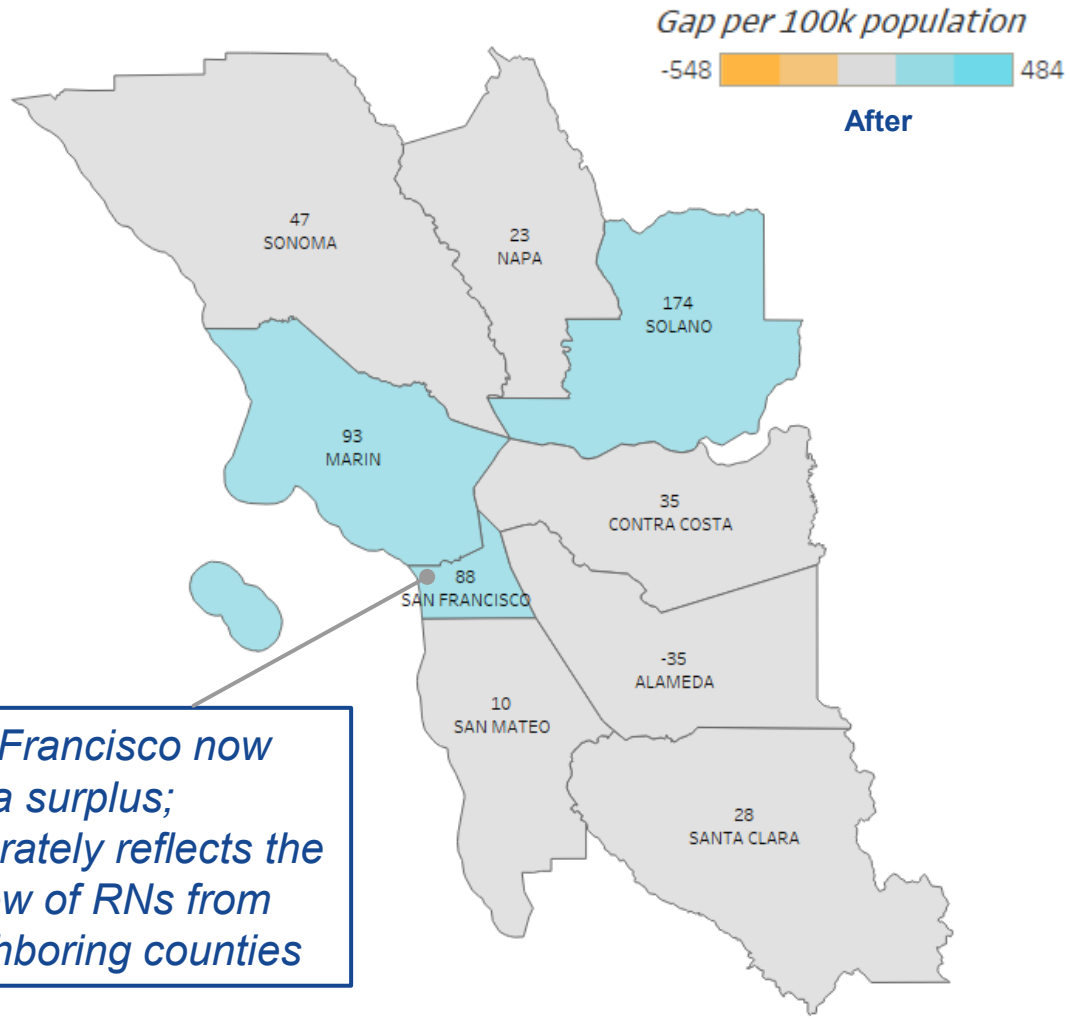
Only 52.8% report staying in Contra Costa; other half report going to surrounding counties

Note: Figures illustrate commuting matrix for each county individually. Does not include migration *into* the area from neighboring counties. Areas with less than 1% migration are not shown.

Registered Nurses - Greater Bay Area before vs after adjustment



RNs get redistributed to surrounding counties, reducing original supplies



San Francisco now has a surplus; accurately reflects the in-flow of RNs from neighboring counties

Note: These counties are highlighted as examples, but new totals reflect summation of **all** in-flows and out-flows from every county statewide

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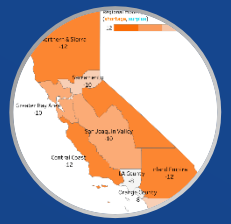
Summary of **county level** findings



38 counties are currently experiencing a **Registered Nurse shortage**. By 2033 this is projected to grow to nearly **51 counties**, with the counties in **Northern and Sierra region** impacted the most.

Despite a statewide surplus, **nearly half of all counties** are experiencing a **shortage of Vocational Nurses** and **60%** are experiencing a **shortage of Nurse Practitioners**. This number is projected to **increase by 2033.**

The number of counties with a **surplus** is projected to **increase** for **Nurse Anesthetists** and **Midwives**, despite a projected worsening of the overall statewide shortage of these roles.

County level data highlights the issues every nursing role is experiencing with **maldistribution**, even within regions. This issue is most apparent in **Northern and Sierra** and is projected to **worsen by 2033.**

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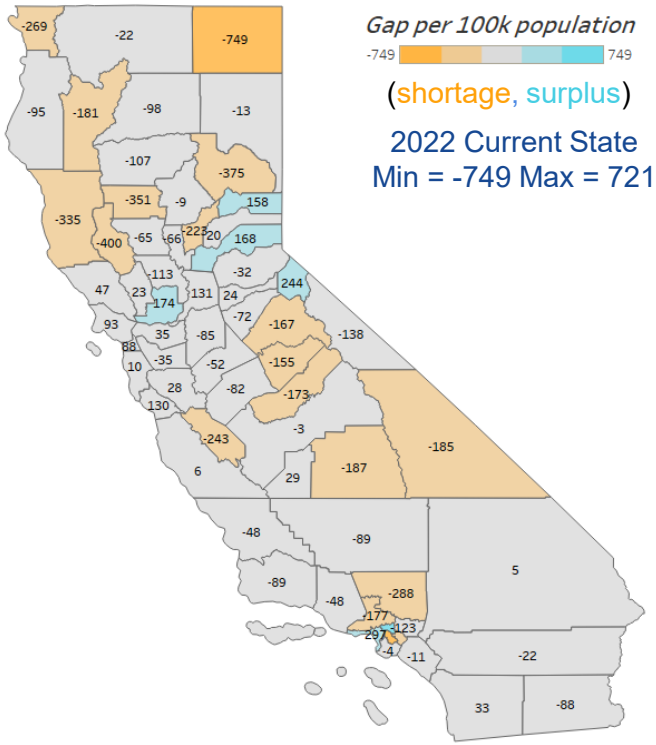
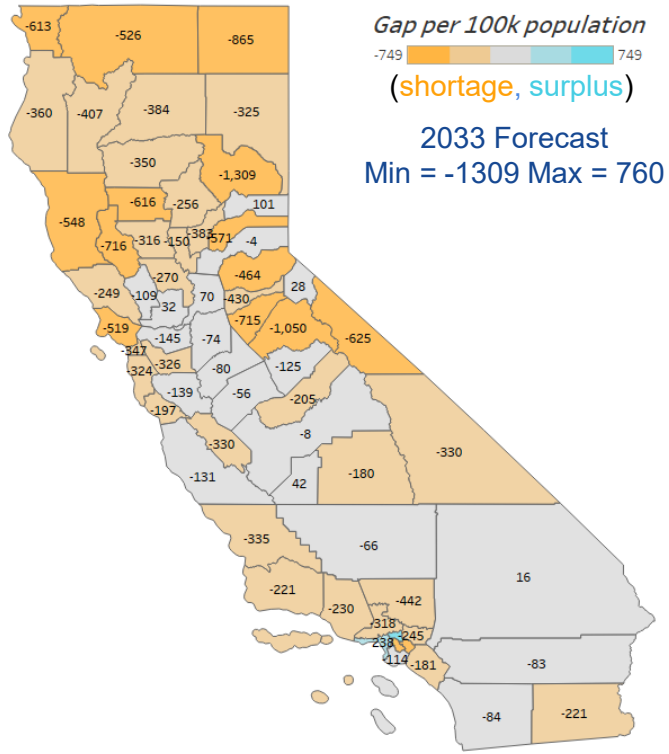
Registered Nurses – County Level Forecast

*Largest regional shortage in **Northern and Sierra** coming from **21 counties;** overall statewide shortages in **38 counties and 6 SPAs***





*Largest regional shortage still in **Northern and Sierra** coming from **23 counties;** overall projected shortages increased to **51 counties and 6 SPAs***

Note: 2033 plotted on same scale as 2022 for equal comparison. 2033 Min/Max may be outside 2022 scale range

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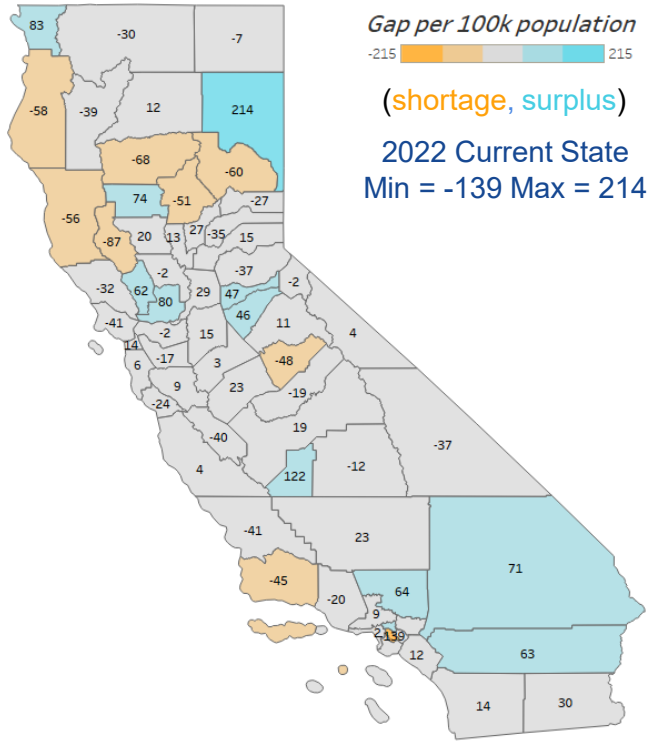
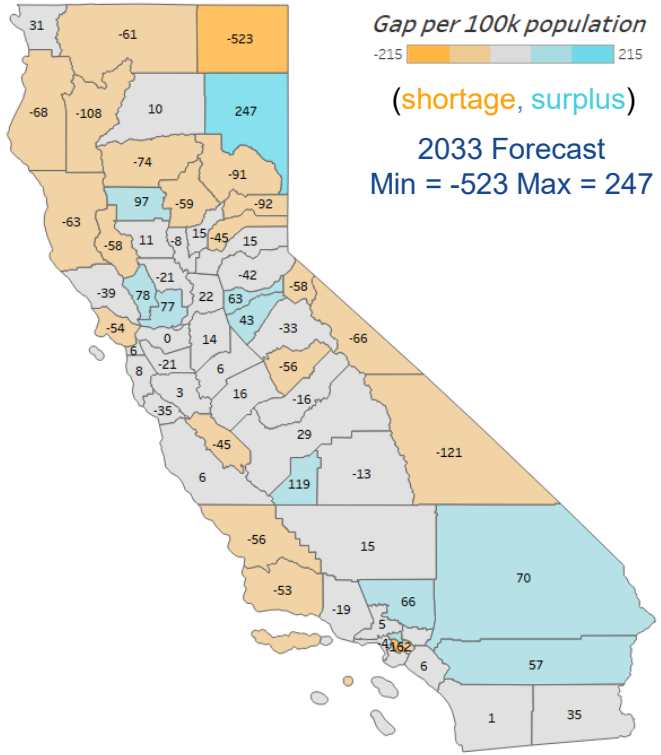
Vocational Nurses – County Level Forecast

*Largest regional shortage in **Central Coast** coming from **5 out of 6 counties;** overall statewide shortages in **27 counties and 3 SPAs***



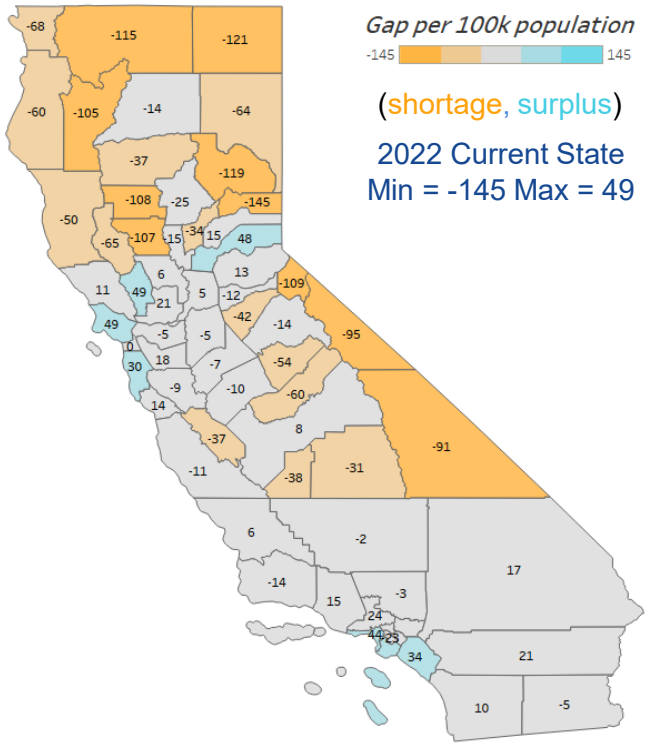
*Largest regional shortage still in **Central Coast** coming from **5 out of 6 counties;** overall projected shortages increased to **29 counties and 4 SPAs***



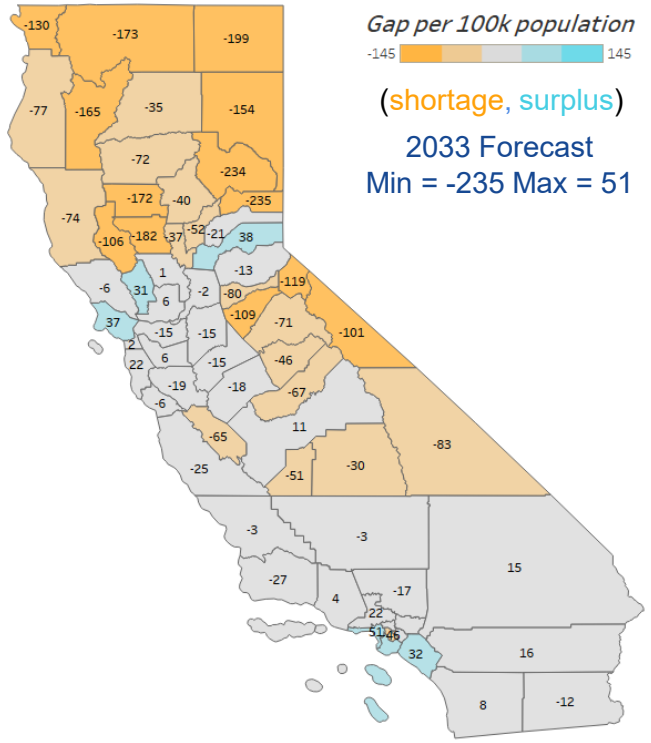
Note: 2033 plotted on same scale as 2022 for equal comparison. 2033 Min/Max may be outside 2022 scale range

Nurse Practitioners – County Level Forecast

*Largest regional shortage in **Northern and Sierra** coming from **24 of the 25 counties;** overall statewide shortages in **37 counties and 2 SPAs***



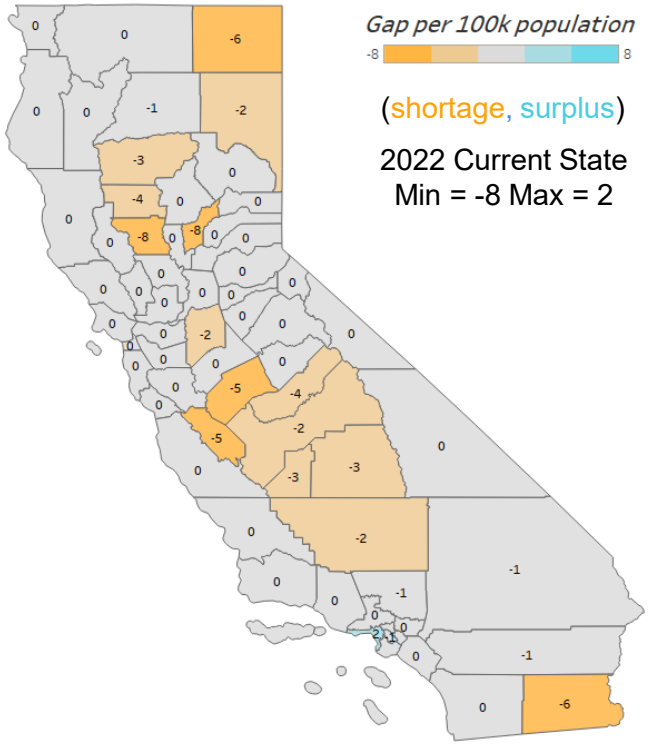
*Largest regional shortage still in **Northern and Sierra** coming from **all 25 counties;** overall projected shortages increased to **43 counties and 4 SPAs***



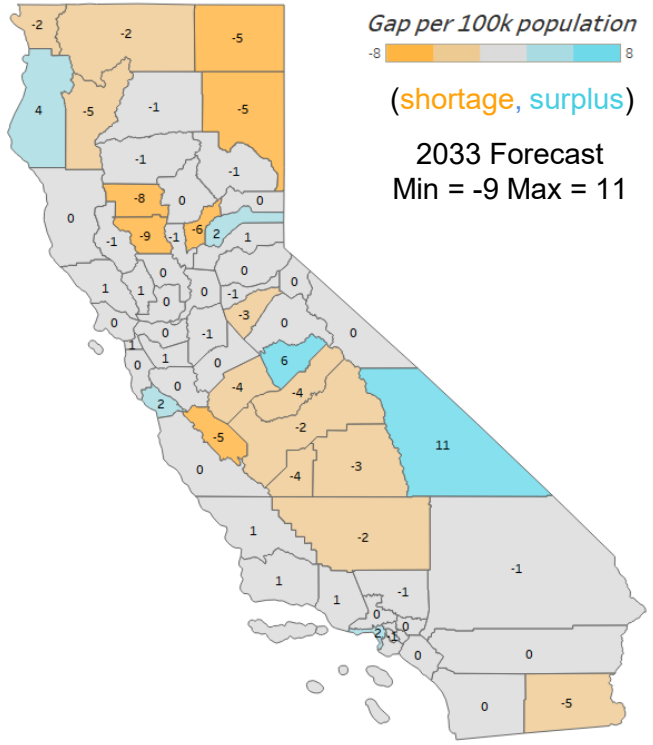
Note: 2033 plotted on same scale as 2022 for equal comparison. 2033 Min/Max may be outside 2022 scale range

Midwives – County Level Forecast

*Largest regional shortage in **San Joaquin Valley** coming from **7 of the 8 counties;** overall statewide shortages in **18 counties and 3 SPAs***



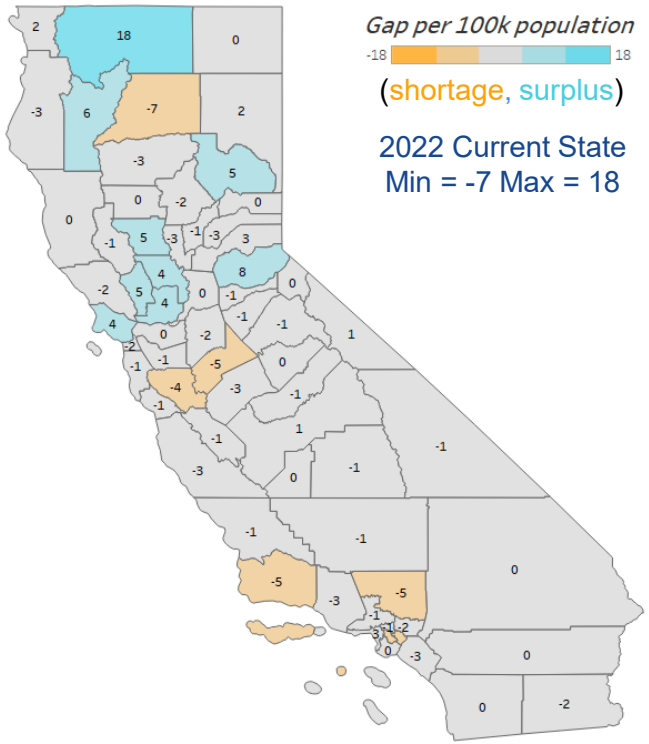
*Largest regional shortage still in **San Joaquin Valley** coming from **7 of the 8 counties;** overall projected shortages increased to **25 counties and 4 SPAs***



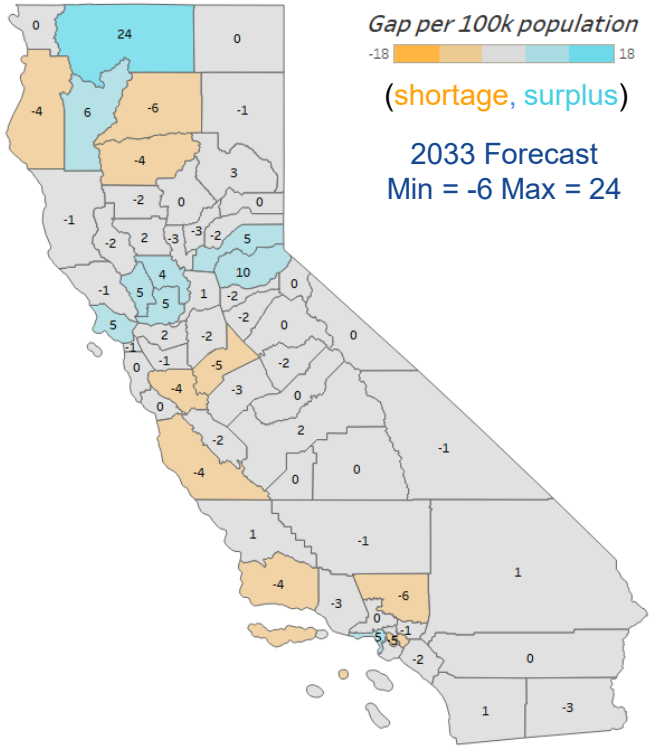
Note: 2033 plotted on same scale as 2022 for equal comparison. 2033 Min/Max may be outside 2022 scale range

Nurse Anesthetists – County Level Forecast

*Largest regional shortage in **Central Coast** coming from **7 of the 8 counties;** overall statewide shortages in **31 counties and 6 SPAs***



*Largest regional shortage still in **Central Coast** coming from **7 of the 8 counties;** overall projected shortages decreased to **28 counties and 4 SPAs***

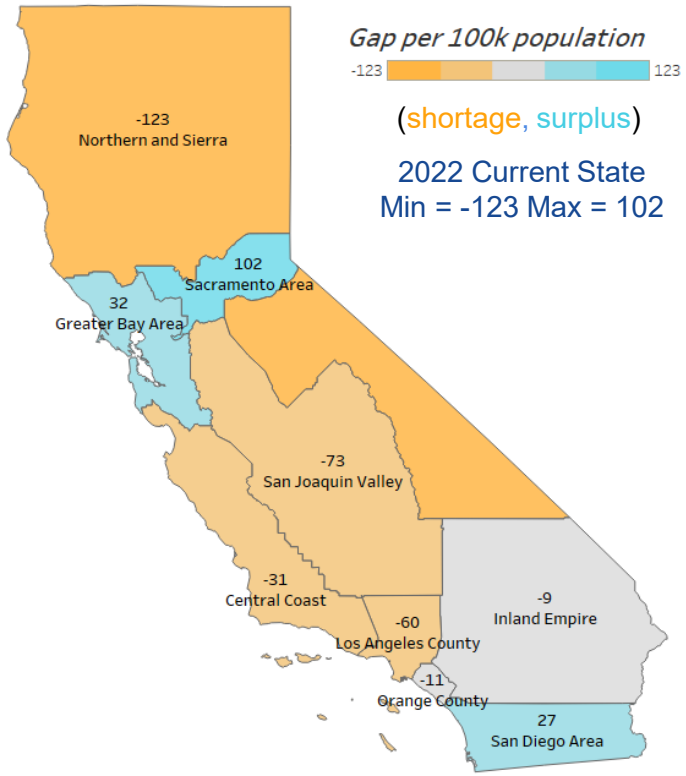


Note: 2033 plotted on same scale as 2022 for equal comparison. 2033 Min/Max may be outside 2022 scale range

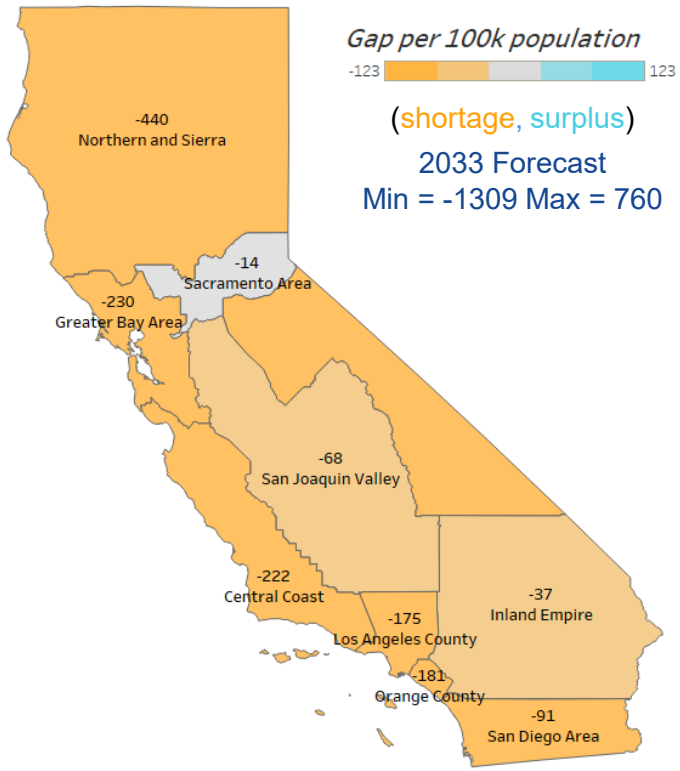
Questions?

Registered Nurses – Regional Projections

*Largest shortages in **Northern and Sierra, San Joaquin Valley, Central Coast & Los Angeles Regions**; overall statewide shortfall is small at around 2%*



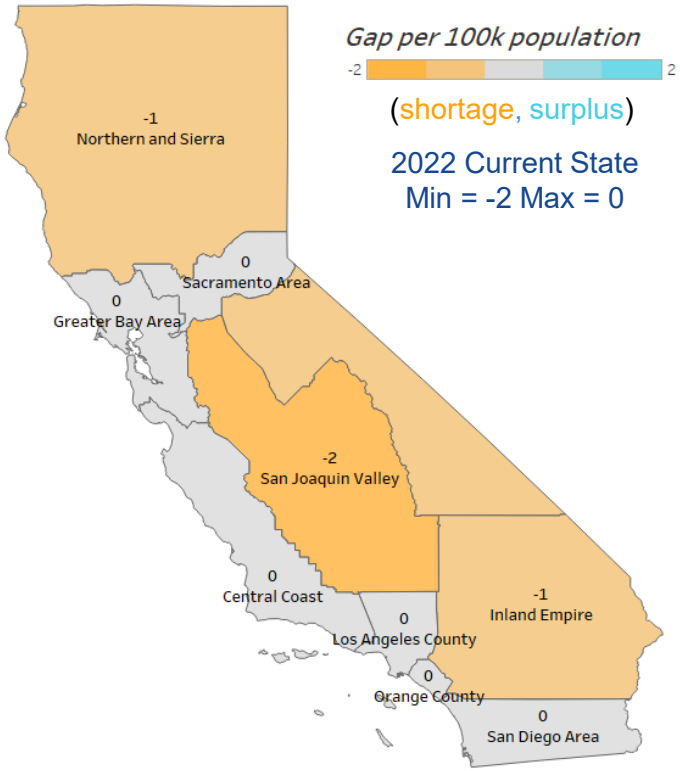
*Shortages in all nine regions. Largest in **Northern and Sierra, Greater Bay Area, & Central Coast regions**; overall statewide shortfall is large at around 16%*



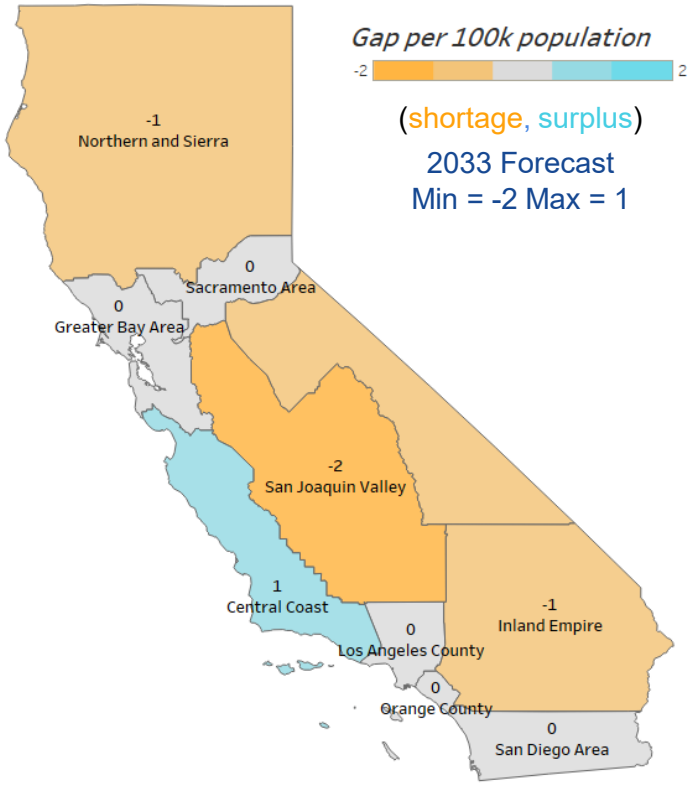
Note: 2033 plotted on same scale as 2022 for equal comparison. 2033 Min/Max may be outside 2022 scale range

Midwives – Regional Projections

*Shortages in **Northern and Sierra, San Joaquin Valley & Inland Empire Regions**; overall statewide shortfall is large at around 17%*



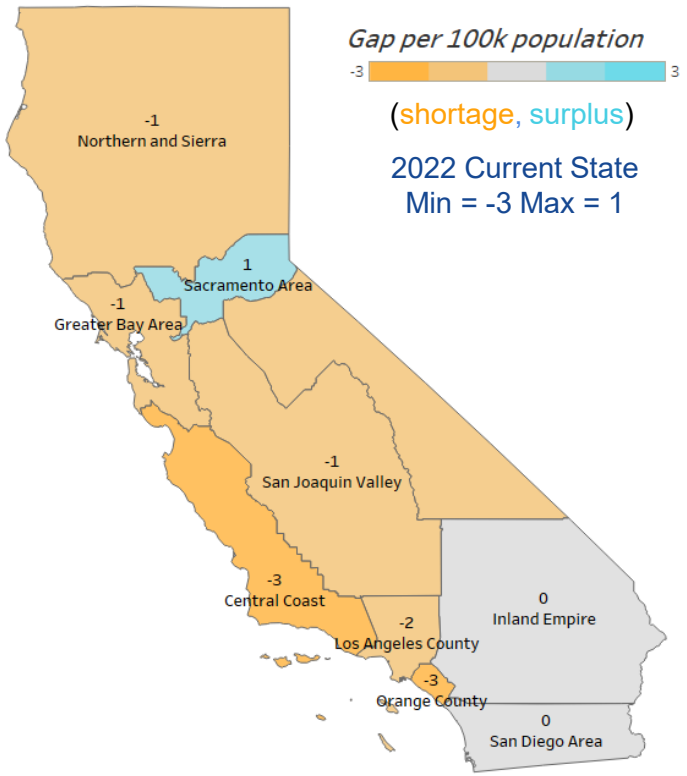
*Shortages in **Northern and Sierra, San Joaquin Valley & Inland Empire**; overall statewide shortfall is large at around 10%*



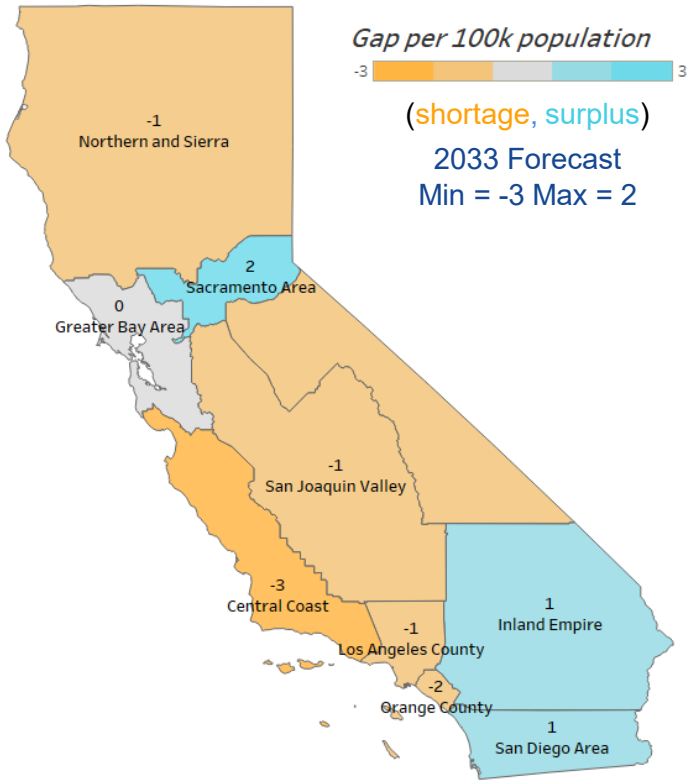
Note: 2033 plotted on same scale as 2022 for equal comparison. 2033 Min/Max may be outside 2022 scale range

Nurse Anesthetists – Regional Projections

*Largest shortages in **Central Coast, Los Angeles County & Orange County Regions**; overall statewide shortfall is large at around 23%*



*Largest shortages in **Central Coast & Orange County**; overall statewide shortage is small at around 8%*

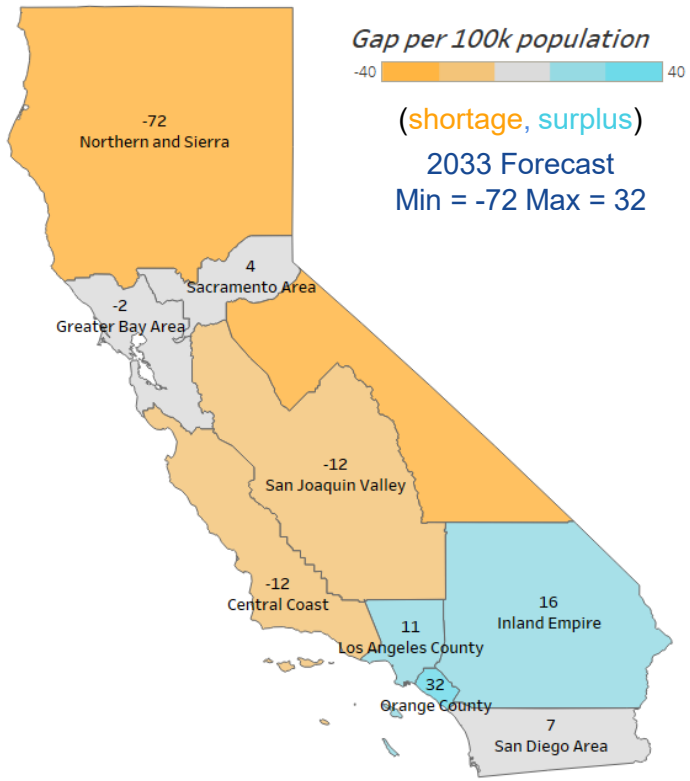


Note: 2033 plotted on same scale as 2022 for equal comparison. 2033 Min/Max may be outside 2022 scale range

Nurse Practitioners – Regional Projections

*Shortages in **Northern and Sierra & San Joaquin Valley Regions**; overall statewide surplus is large at around 25%*

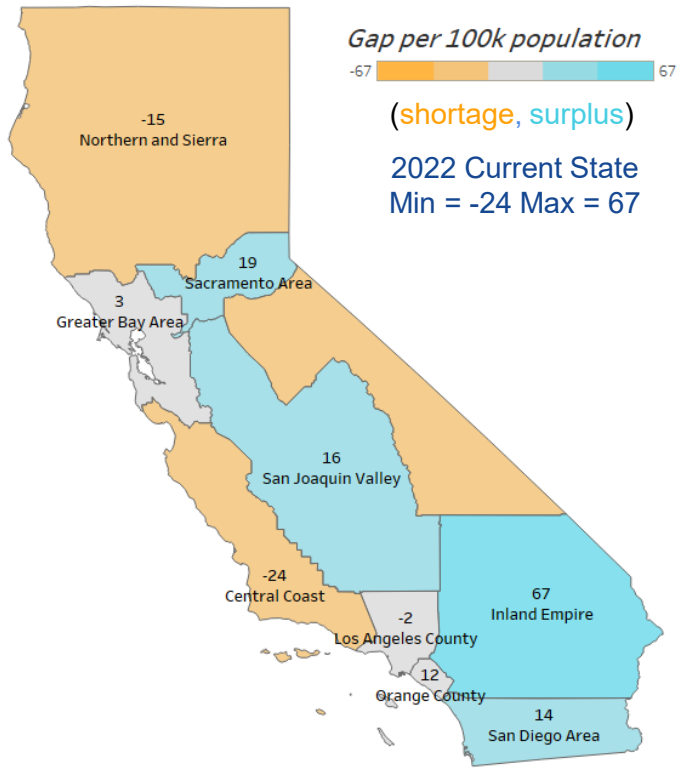
*Largest shortages in **Northern and Sierra, San Joaquin Valley & Central Coast**; overall statewide surplus is small at around 5%*



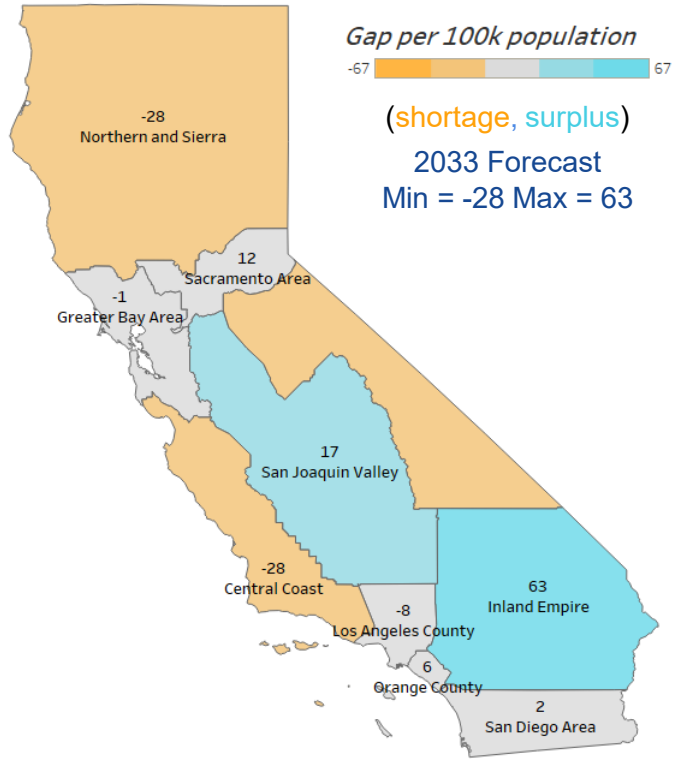
Note: 2033 plotted on same scale as 2022 for equal comparison. 2033 Min/Max may be outside 2022 scale range

Vocational Nurses – Regional Projections

*Shortages in **Northern and Sierra, Central Coast & Los Angeles County Regions**; overall statewide surplus is small at around 7%*



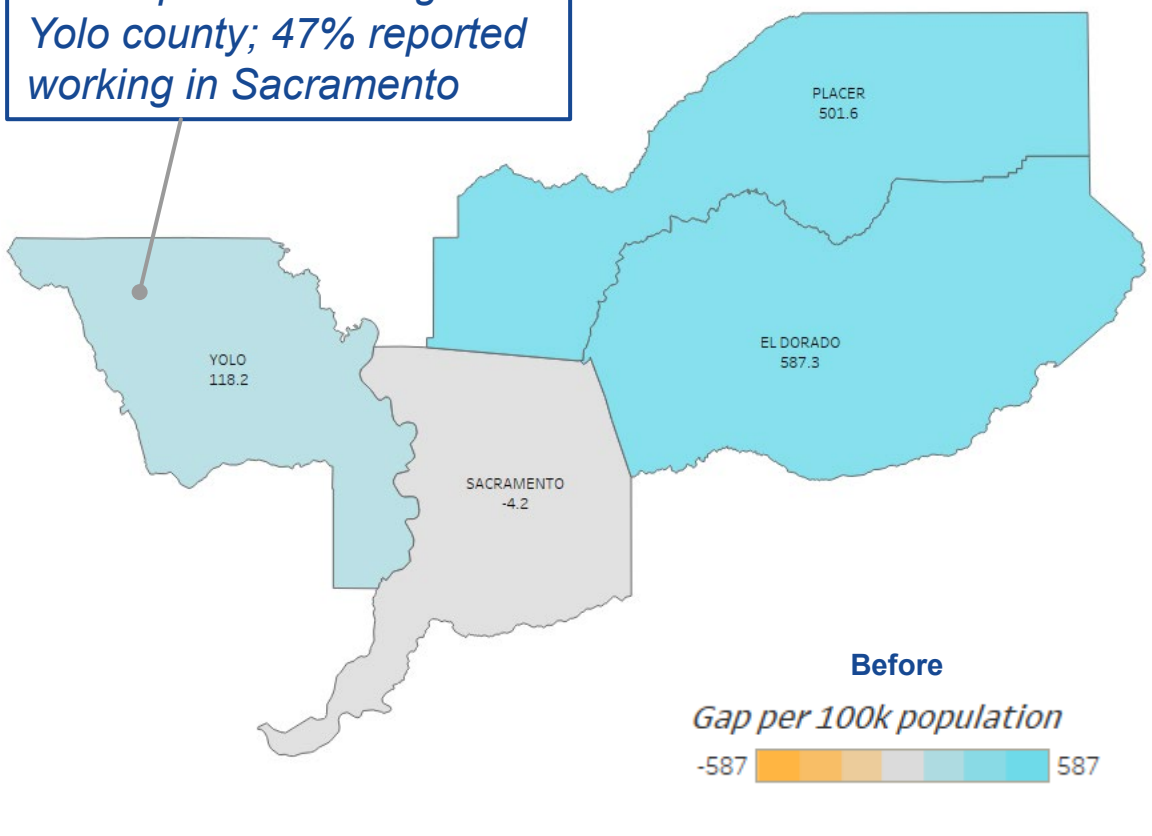
*Shortages in **Northern and Sierra, Greater Bay Area, Central Coast & Los Angeles County**; overall statewide surplus is small at around 4%*



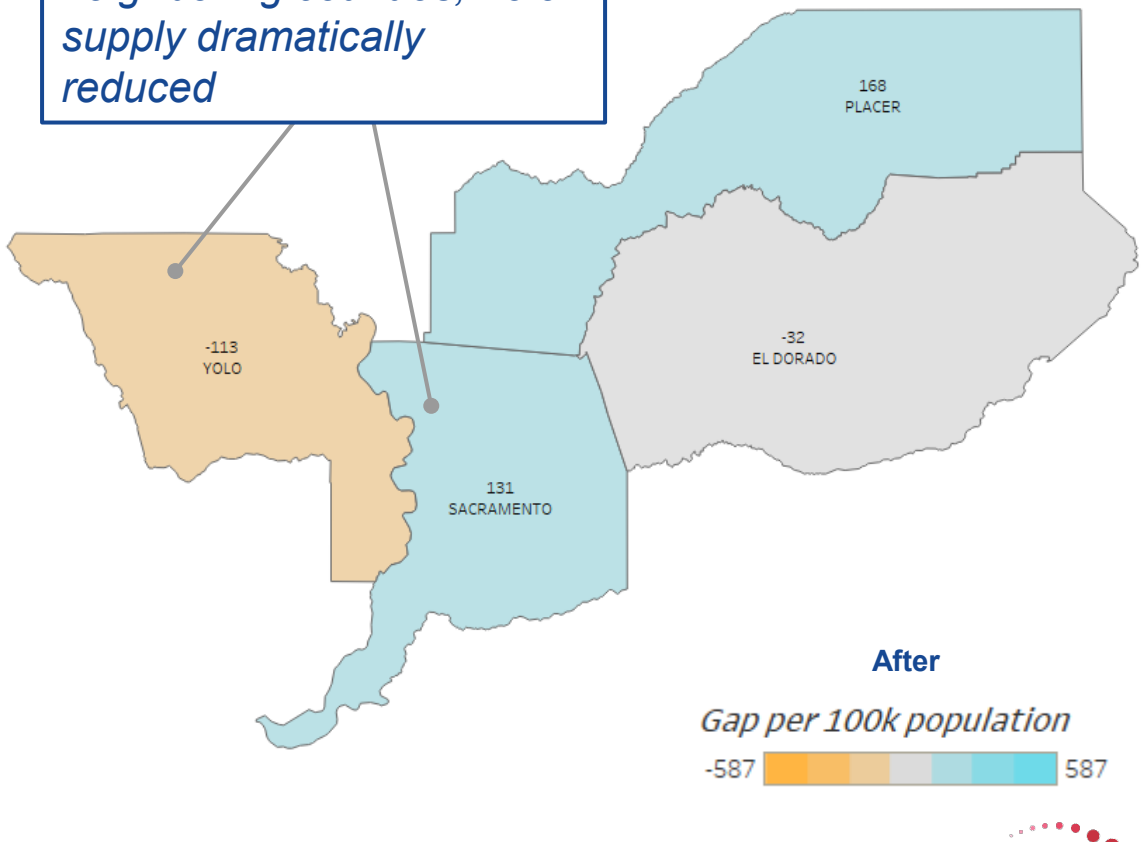
Note: 2033 plotted on same scale as 2022 for equal comparison. 2033 Min/Max may be outside 2022 scale range

Registered Nurses - Sacramento Area before vs after adjustment

Only 27% of Yolo county RNs reported working in Yolo county; 47% reported working in Sacramento



Sacramento now reflects the in-flow of RNs from neighboring counties; Yolo supply dramatically reduced



Note: These two counties are highlighted as examples, but new totals reflect summation of **all** in-flows and out-flows from every county statewide

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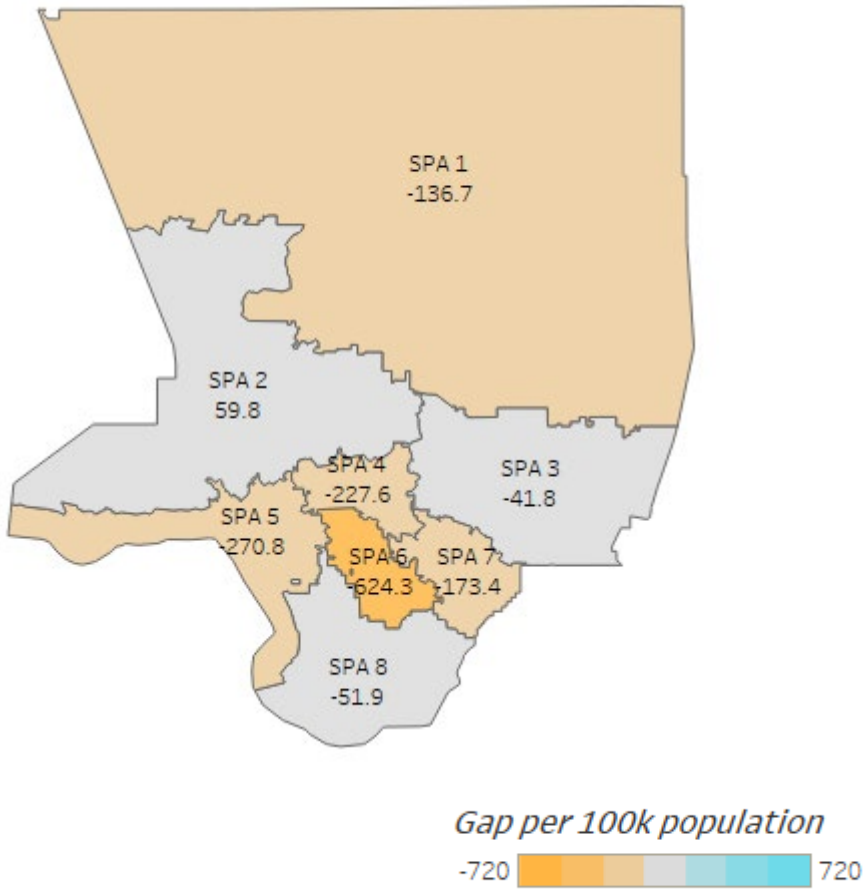
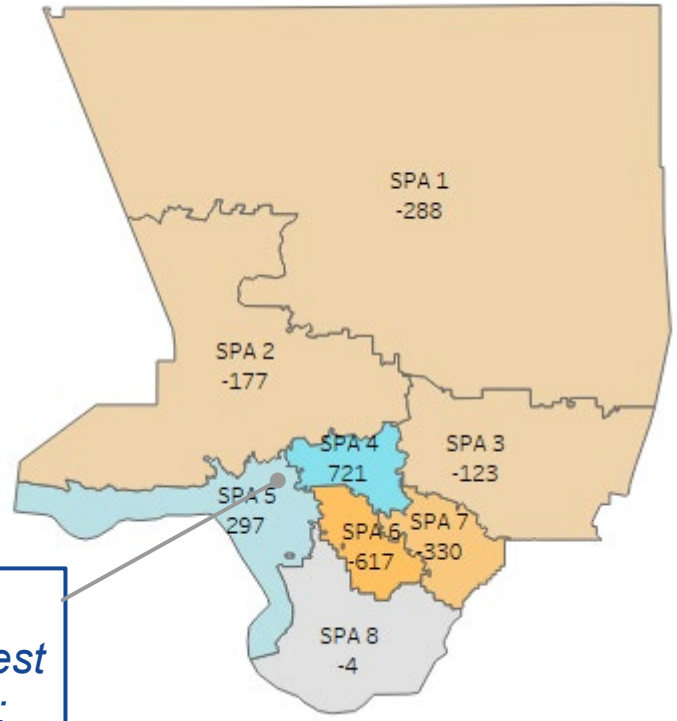
Registered Nurses – Los Angeles County before vs after adjustment





Surplus SPAs correlate with highest cost of living areas; adjustment corrects for RNs who work here but don't live here

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