



ADJUSTING DEMAND PROJECTIONS FOR EMERGENCY MEDICINE PHYSICIANS BASED ON RESIDENT AND NON-RESIDENT VISITS

Kellie Goya, BS, MS², Kelley Withy, MD, MS, PhD^{1,2}

¹John A. Burns School of Medicine, ²Hawai'i/Pacific Basin Area Health Education Center



Background

With low Medicare reimbursement rates, extra taxation on Medicare patients via general excise tax, and the ever-growing cost of living in Hawai'i, the state has struggled to attract and retain health care providers. A 2018 Medscape Physician Compensation Report ranked Hawai'i as the 3rd lowest payment in the nation¹. Combined with housing costs that are 319% higher than the national average¹, physicians may consider better opportunities on the mainland.

In 2020, local research showed Hawai'i faced a 29% shortage of physicians statewide, with significant variation among counties ranging from 20-53%², with neighbor islands facing the greatest deficit. In that same year, the number of practicing physicians decreased by 162 and 120 physicians decreased their work hours. Of practicing physicians in Hawai'i, 46% were aged 55 or older, 21% were 65 or older². Statewide Emergency Medicine shortage was 17% in 2020.

However, a national 2017 study on supply and demand of emergency medicine board-certified emergency physicians (EMBC EPs) estimated Hawai'i to have an oversupply of 142%³. Supply was estimated using the American Board of Medical Specialties data. Demand was determined by dividing the number of ED visits by average visit volume of 3,548/yr. The same year, local data showed Hawaii had a statewide shortage of ED doctors of 10%. Individual county shortages were: Honolulu 0%, Kaua'i 0%, Hawai'i 15%, Maui 50%.⁴

Little data has been published on how demand varies in areas separated from the contiguous United States by water. The authors hypothesize that local factors have more significance in an island state than on the Continental US.

Objectives

The main objective of this project was to analyze emergency department (ED) usage among four counties and apply revisions to physician demand projections from a workforce model (2021) that uses national data in order to tailor them to Hawai'i's demographics. As an island population with multiple counties with different layouts and a large transient tourist as well as homeless population, we aimed to make adjustments to demands as they may be influenced by these factors. By understanding the nuanced demands of physician specialties in emergency medicine across different islands, we hope to provide data to accurately represent needs.

Methods

Demand model and projections were obtained from *IHS Markit Ltd.*, a company outsourced to provide analytics and intelligence for various industries and markets. Projections of physician demands were made for 2019-2039 under alternative scenarios, taking into account the implications of a growing and aging population as well as policies or trends that might affect future demand for healthcare services.

From the Department of Health, we obtained data on the number of ED visits across four counties from 2016-2019 by residents vs. non-residents of that county. The proportion of resident visits (RV) vs. non-resident visits (NRV) out of total visits were calculated. To obtain the projected percent increase in demand, the number of NRV was divided by RV.

Results

Data from the Department of Health on ED visits demonstrated O'ahu had the greatest number of total and non-resident visits, reflective of the largest resident and tourist population. Kaua'i had the second highest number of non-resident visits, while Hawai'i island had the second highest number of resident visits.

The projected percent increase is listed in Table 1. Resident only refers to resident of that county. Non-resident visits include those made by international, domestic, and inter-island travelers. Results showed Kaua'i requires a 17% increase, O'ahu with the highest 40%, Maui with 20%, and Hawai'i island with 9%.

A key assumption is that the percent of non-resident ED visits increase the demand for ED physicians by that percent. These projected values indicate Hawai'i requires more providers than national data suggests by each percent listed, respectively.

County	Resident Visits (2016-2019)	Non-Resident Visits (2016-2019)	Total Visits (2016-2019)	Projected % Increase in Demand
Kaua'i	170,315	33,321	203,636	17%
O'ahu	911,949	363,720	1,275,669	40%
Maui	116,468	19,510	135,978	20%
Hawai'i	294,228	25,597	319,825	9%

Table 1. Emergency department visits among counties of Kaua'i, O'ahu, Maui, and Hawai'i from 2016-2019. Projected % increase in demand reflects the proportion of non-resident ED visits.

Based on this data, a "Tourist ED adjustment scalar" needed to be implemented by IHS Markit Ltd. It would allow for adjustments to be made for demand projections based on actual utilization data and proportion of tourists based on published estimates.

Conclusion

- Projection estimates of physicians that are mainly based on population data may underrepresent the needs in areas with high tourism rates, such as Hawaii
- When assessing demand for emergency department physicians, tourism can be taken into account by implementing percent of patient visits that are non-residents

Limitations

- **Lack of confidence range or statistical power.** The nature of this research does not allow for statistical analysis.
- **Additional parameters not assessed.** While this study assessed total ED visits, it did not evaluate specifics of each visit (eg. resources used, procedures performed, staff personnel needed, etc.)
- **Additional factors for ED use.** Other factors influence emergency department usage. For example, lack of access to primary care or auxiliary services may prompt more ED visits.

Future Studies

- **Other departments.** Investigating other departments that may also be affected by Hawai'i-specific concerns (eg. pulmonology with "vog" – air pollution from volcanic emissions)
- **Impact on retention.** Future studies can assess how physician retention efforts have changed after demand adjustments.
- **Effect of COVID.** ED usage has increased dramatically with the arrival of COVID-19 and its variants. Future studies can investigate its impact on physician demand.

References

- 1) Junger, S. The Perfect Storm 2021: Hawai'i's Physician Shortage Crisis, 2nd edition.
- 2) Withy, K. 2020. University of Hawai'i System Annual Report: Annual Report on Findings from the Hawai'i Physician Workforce Assessment Project. https://www.hawaii.edu/govrel/docs/reports/2021/act18-sslh2009_2021_physician-workforce_annual-report_508.pdf
- 3) Clay, C. E., Sullivan, A. F., Bennett C.L., et al. 2020. Supply and demand of emergency board certified emergency physicians by U.S. state, 2017. *Academic Emergency Medicine*, 28(1), 98-106. <https://doi.org/10.1111/acem.14157>
- 4) Withy, K. 2017. University of Hawai'i System Annual Report: Annual Report on Findings from the Hawai'i Physician Workforce Assessment Project. <https://www.ahec.hawaii.edu/workforce-page/#stats>