

Pre-Disaster Community Assessment and Flowchart

Maui County, Hawaii

Stephanie McNeese

Texas Tech University Health Sciences Center

NURS 5328 – Introduction to Public Health Informatics

Dr. Katherine Taylor Pearson

November 24, 2025



Overview

- ❖ **About Maui County, Hawaii**
- ❖ **Historical Disasters of the Hawaiian Islands**
- ❖ **Vulnerability Profile**
- ❖ **Current Health Trends Relevant to Disaster Preparation**
- ❖ **Healthcare Capacity**
- ❖ **Risk Identification**
- ❖ **Risk Matrix**
- ❖ **Mitigation Strategies**
- ❖ **Pre-Disaster Action Plan**
- ❖ **Summary**
- ❖ **Generative AI Attestation**
- ❖ **References**

Maui County, Hawaii

Maui County covers over 1,100 square miles and four islands (only three are inhabited): Maui, Moloka'i, Lanai, and Kaho'olawe.

- ❖ Total Population approx. 164,000 (County of Maui, n.d.)
 - Island of Maui: population 153,400
 - Island of Moloka'i: population 7,400
 - Island of Lanai: population 3,200
- ❖ White, Asian, and Multiracial residents make up more than $\frac{3}{4}$ of population
- ❖ Native Hawaiian are a minority population across the county as a whole
 - On Moloka'i, Native Hawaiian are the community majority with 65% of the island population
- ❖ Unemployment rate 3.4%
- ❖ Two official languages: English and Hawaiian
- ❖ Median household income of \$95,076
- ❖ Internet access in 83.6% of households (Hawai'i Health Matters, 2024)
- ❖ 9.8% of residents live below the poverty level (U.S. Census Bureau, 2023)
- ❖ 13.8% of residents receive SNAP benefits

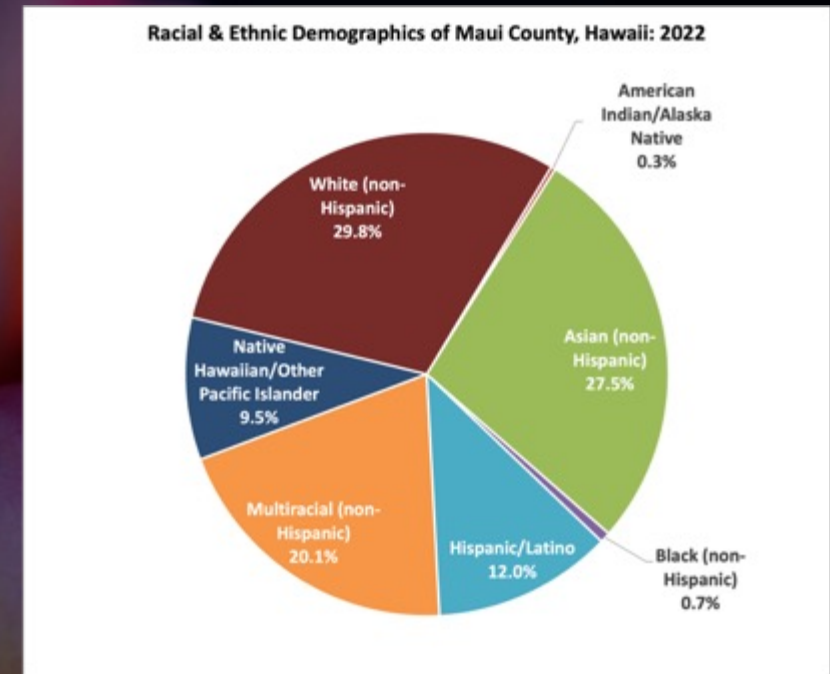


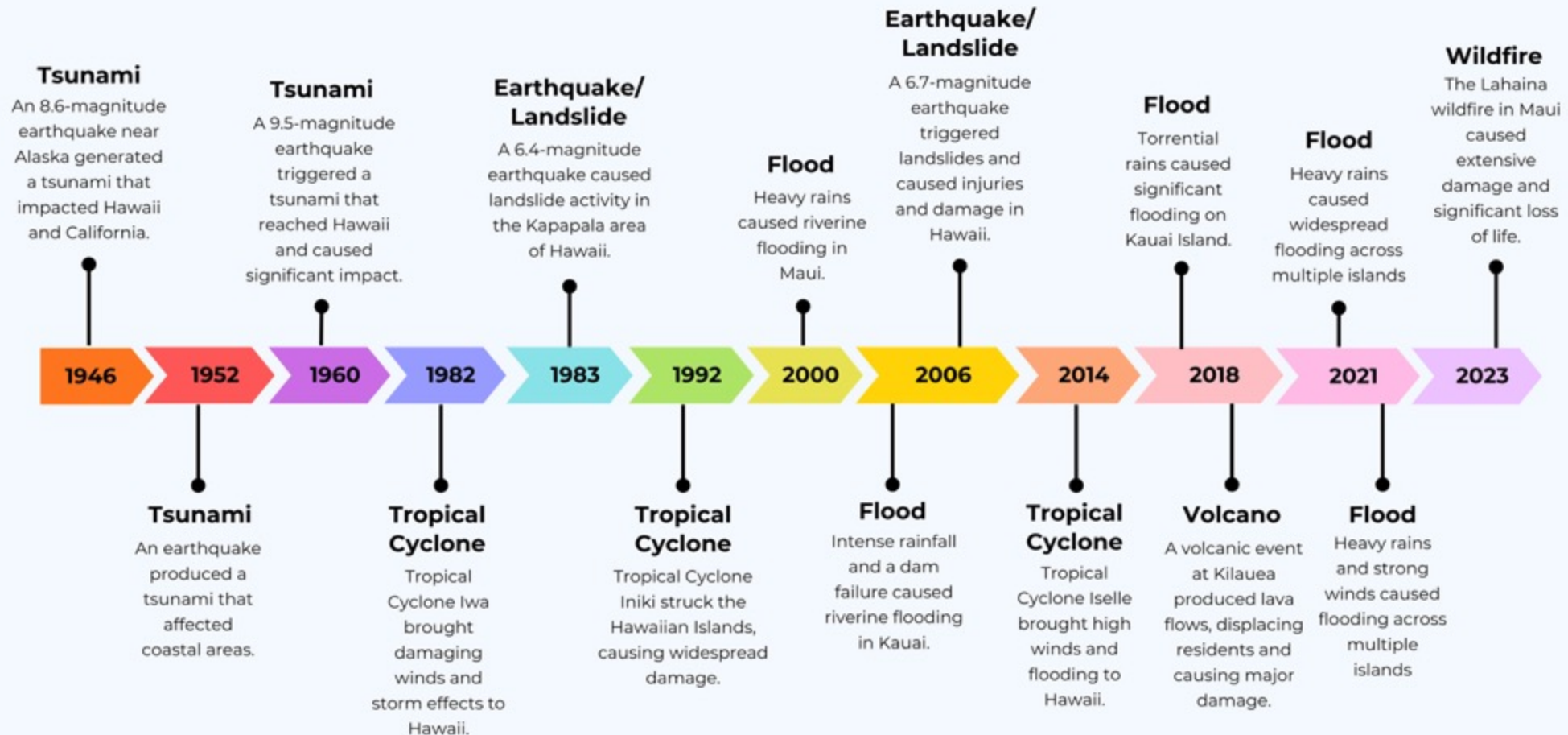
Figure 1. Pie chart of Maui County racial and ethnic demographics. Graphic created by the author using Excel using County of Maui data. Source: McNeese, S. (2025) (Data derived from County of Maui, n.d.)



Figure 2. Maui County map. Screenshot of Maui County geography. Source: Google. (n.d.). Google Maps. <https://www.google.com/maps>

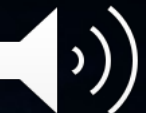
Historical Disasters of the Hawaiian Islands

Timeline of Major Disasters of the Hawaiian Islands

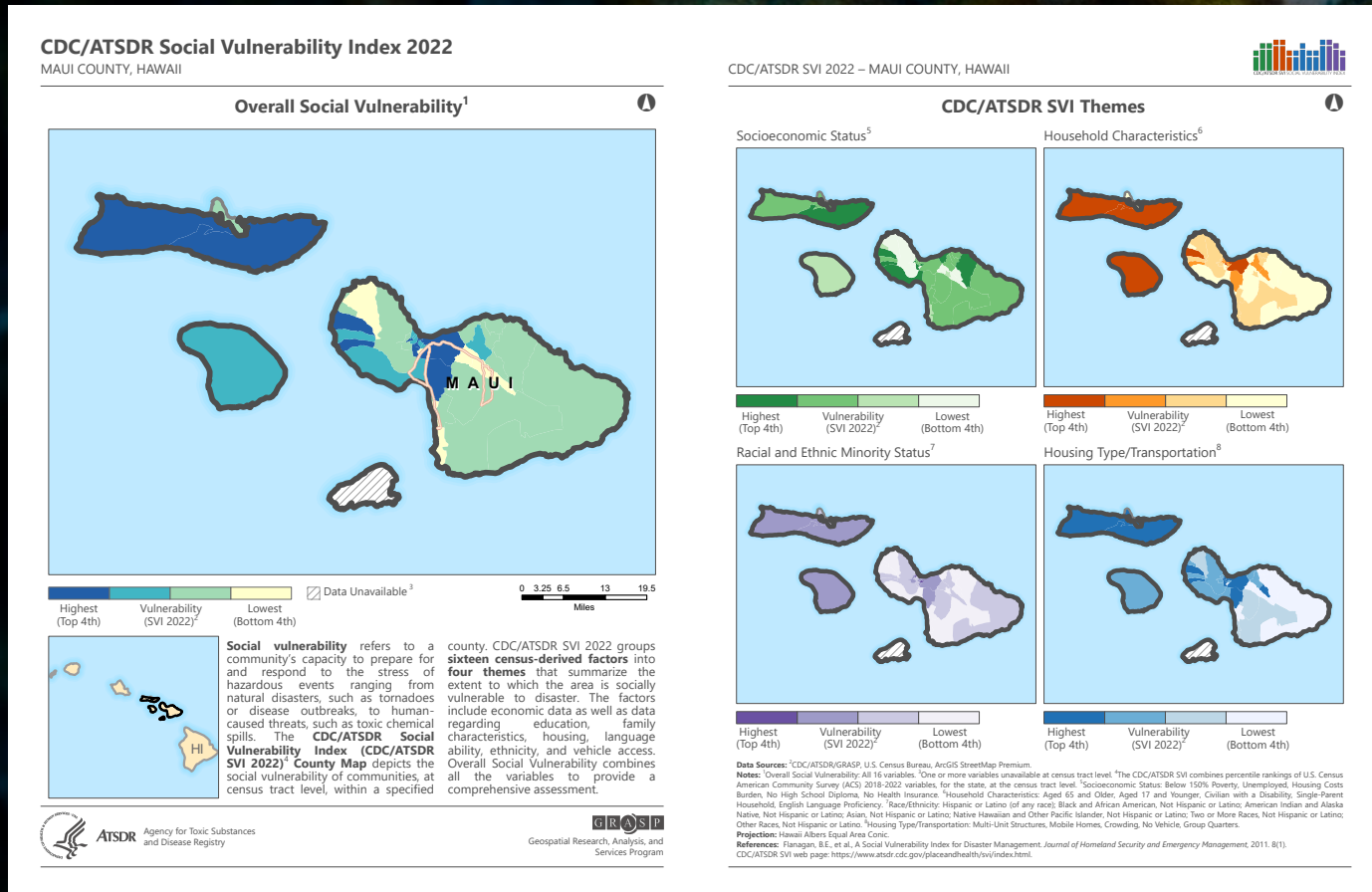


(EM-DAT: The International Disaster Database, 2025; OpenAI, 2025)

Figure 3. Timeline of historical disasters affecting Hawai'i. Graphic created by the author using Canva. Source: McNeese, S. (2025).



Vulnerability Profile



- ❖ Only four hospitals in the county with licensed acute care beds (Ye, 2025)
- ❖ Significant portion of populated coastline falls within the tsunami evacuation zone (Tsunami Aware, 2025)
- ❖ None of the four major hospitals are located within the tsunami zone
- ❖ Island of Maui has three primary airports (State of Hawaii, n.d.-a)
- ❖ Lanai and Moloka'i each have small regional airports
- ❖ Many communities are rural and geographically isolated
- ❖ Moloka'i Island has the highest social vulnerability (ATSDR, 2022)

Figure 4. Social Vulnerability Index map for Maui County, Hawai'i (2022). Reproduction of ATSDR SVI map.

Source: Agency for Toxic Substances and Disease Registry. (2022). CDC/ATSDR Social Vulnerability Index 2022: Maui County, Hawaii. https://svi.cdc.gov/Documents/CountyMaps/2022/Hawaii/Hawaii2022_Maui%20County.pdf

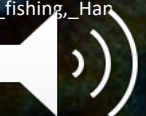


Vulnerability Profile: Moloka'i Island

- ❖ Geographically isolated with single community airport and one ferry that runs 3x/day
- ❖ Low wages combined with high cost of living contribute to food and housing insecurity (U.S. Census Bureau, 2023)
- ❖ Number of households below the poverty line: 18%
- ❖ 33% of families receive SNAP benefits
- ❖ Unemployment rate in August 2025 was 3.9% (State of Hawaii, n.d.-b)
- ❖ Less-traditional residences make up 12% of housing (OHA, 2024)
- ❖ Extremely limited access to local healthcare resources
- ❖ Native Hawaiian are 65% of population; rely heavily on subsistence/farming as food sources (Akutagawa et al., 2016)
- ❖ Traditional spearfishing has been practiced for centuries (Hansen et al., 2025)



Figure 5. Hawaiian man spearfishing in Hana, Maui, circa 1890.
Historical image from Wikimedia Commons.
Source: Wikimedia Commons. (n.d.). Hawaiian man spear fishing, Hana, Maui, ca. 1890.
https://commons.wikimedia.org/wiki/File:Hawaiian_man_spear_fishing,_Hana,_Maui,_ca._1890.jpg



Current Health Trends Relevant to Disaster Preparation

❖ Influenza

- Respiratory virus, spread by droplets (CDC, 2024b)
- Vaccination is first and best line of defense
- Mask wearing may be helpful in a disaster scenario
- Outbreaks common after destructive tsunamis (Mavrouli et al., 2021)

❖ Campylobacteriosis

- bacterial diarrheal illness (CDC, 2024a)
- actual cases may be higher than reported
- commonly spread through contaminated poultry
- Increase in antibiotic-resistant strains past 20 years
- can be a significant problem following a disaster (Saingam et al., 2021)

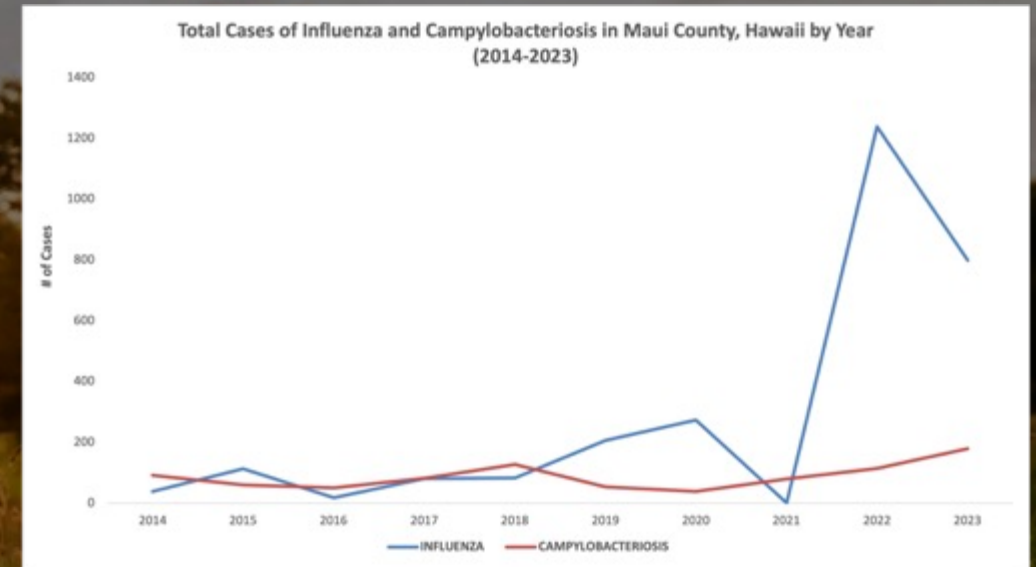


Figure 6. Maui County influenza and campylobacteriosis cases (2014–2023).

Data visualization created by the author in Excel using SHDH data.

Source: McNeese, S. (2025). (Data derived from State of Hawaii Department of Health, 2025c)

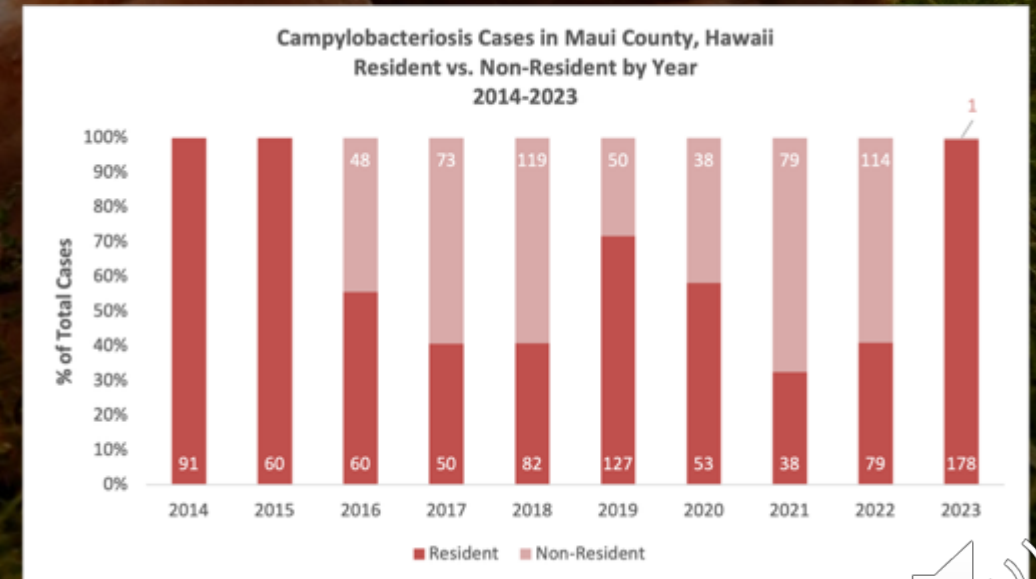


Figure 7. Campylobacteriosis cases in Maui County (2014–2023).

Data visualization created by the author in Excel using SHDH data.

Source: McNeese, S. (2025). (Data derived from State of Hawaii Department of Health, 2025c)



Healthcare Capacity

- ❖ Only four hospitals in the county with licensed acute care beds (Ye, 2025)
- ❖ Of these, Maui Memorial contains the most at 219 acute care beds
- ❖ Moloka'i has only 2.02 beds per 1000 capita
- ❖ LTC and Specialty care beds may potentially be converted
- ❖ There are also three ambulatory surgery centers in the county with potential resources (State of Hawaii Department of Health, 2025b)

Licensed Acute Care Beds			
Facility	Capacity	Occupancy Rate %	Readiness Score
Kula Hospital	9	52.69	47.31
Lanai Community Hospital	4	0.00	100.00
Molokai General Hospital	15	12.80	87.20
Maui Memorial Medical Center	219	70.66	29.34
Licensed Long-Term Care Beds			
Facility	Capacity	Occupancy Rate %	Readiness Score
Kula Hospital	105	89.74	10.26
Lanai Community Hospital	10	97.01	2.99
Hale Makua Health Services – Kahului	254	80.95	19.05
Hale Makua Health Services – Wailuku	90	82.87	17.13
Licensed Specialty Care Beds			
Facility	Capacity	Occupancy Rate %	Readiness Score
'Ai Pono Maui	12	54.63	45.37
Aloha House, Inc.	48	72.87	27.13
Maui Recovery	8	61.30	38.70
Total Available Beds by Island			
Island	# of Beds	Total Population	Hospital Beds per 1000 People
Maui	745	153400	4.85
Lanai	14	3200	4.38
Molokai	15	7400	2.03

Figure 8. Licensed care beds in Maui County hospitals (2024).
 Data visualization created by the author in Excel using SHPDA data.
 Source: McNeese, S. (2025).
 (Data derived from Ye, 2025.)

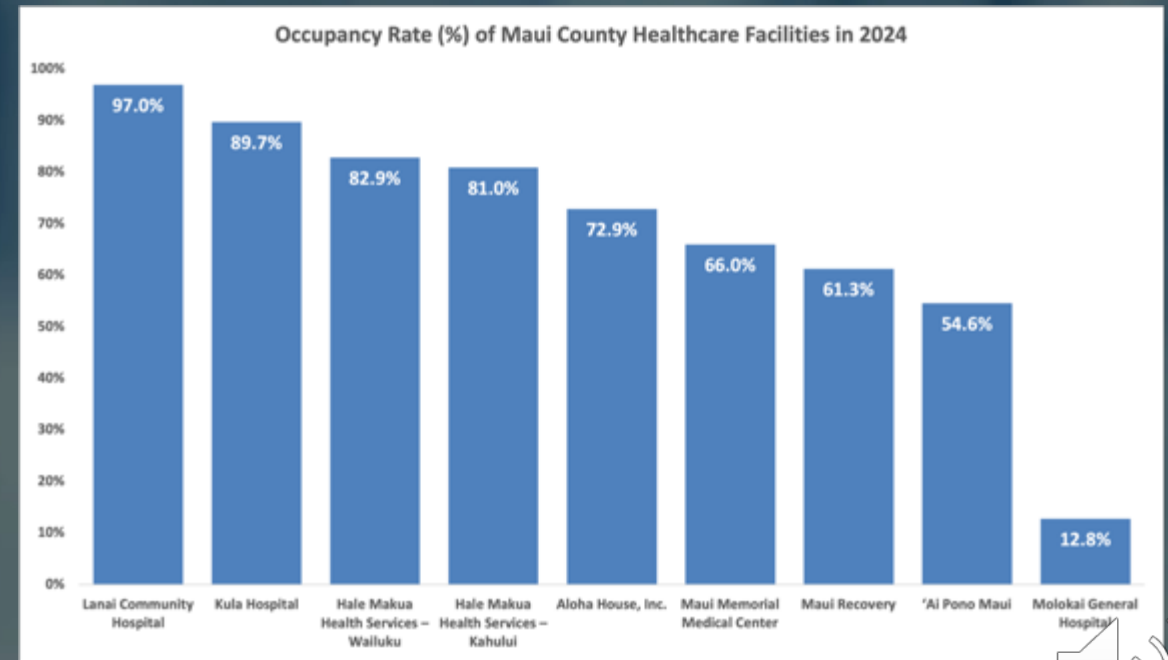


Figure 9. Occupancy rates in Maui County hospitals (2024).
 Data visualization created by the author in Excel using SHPDA data.
 Source: McNeese, S. (2025).
 (Data derived from Ye, 2025.)



Risk Identification

Geographic & Environmental Risks

- ❖ High-SVI areas (especially Moloka'i) with limited transportation and higher isolation risk
- ❖ Elevated potential for wildfires (Sowby & Porter, 2024)
- ❖ Coastal communities and critical infrastructure within tsunami evacuation zones (Tsunami Aware, 2025)
- ❖ Rural regions with limited access roads

Healthcare System Risks

- ❖ Limited acute bed capacity on Moloka'i (Ye, 2025)
- ❖ Potential disruption to inter-island transport for patient transfers (OHA, 2024)
- ❖ Reliance on a small number of hospitals for countywide surge events (Ye, 2025)

Technology/Communication Risks

- ❖ Households without internet/smartphone access (Hawai'i Health Matters, 2024)

Population Health Risks

- ❖ Elderly, low-income, and Native Hawaiian populations with higher vulnerability (County of Maui, n.d.)
- ❖ Exacerbations of respiratory, cardiac, and GI health issues following a disaster (Stimpson et al. 2025)

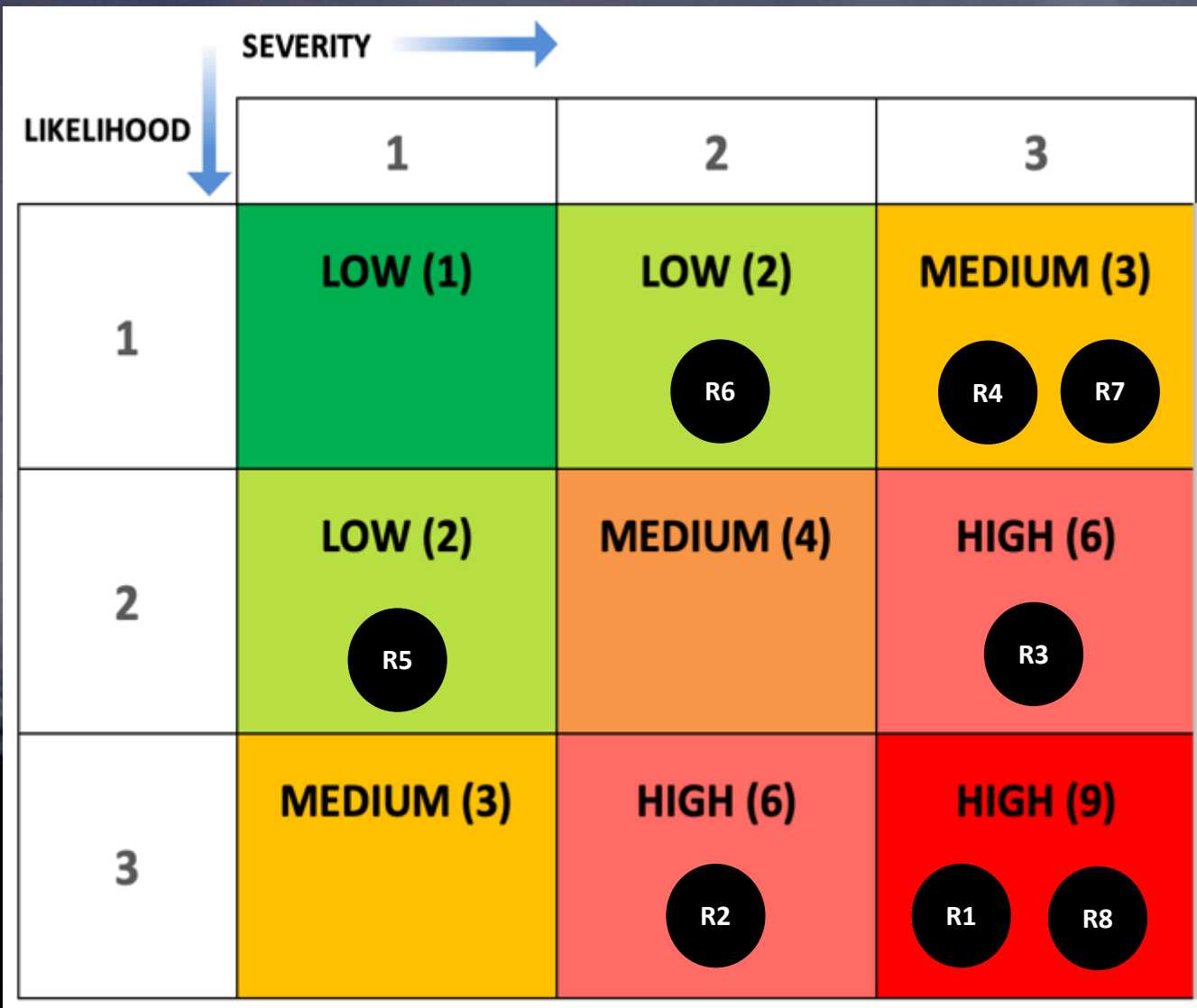


Risk Identification

- ❖ Disasters and extreme weather events are linked to higher rates of PTSD, depression, and anxiety (Stimpson et al. 2025).
- ❖ Heatwaves, droughts, and wildfires are tied to increases in cardiovascular, respiratory, and metabolic problems.
- ❖ Only a small portion of disaster-health research looks at how SDOH such as poverty, rural location, and ethnicity overlap
- ❖ Research focusing on the island of Moloka'i, rather than Maui County as a whole, is sparse.

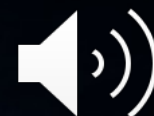


Risk Matrix



- R1. Isolation of Molokaʻi during a disaster
- R2. Hospital surge with limited acute beds
- R3. Broadband or communication outage
- R4. Tsunami impact on coastal communities
- R5. Post-disaster influenza increase
- R6. Campylobacter outbreaks after disaster
- R7. Airport disruption affecting medical evacuations
- R8. Wildfire event overwhelming emergency response

Figure 10. Risk matrix of prioritized hazards for Maui County.
 Matrix created by the author to rank disaster risks.
 Source: McNeese, S. (2025).



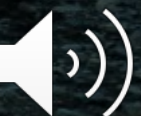
Disaster Mitigation

Strengthen Healthcare Readiness

- ❖ Pre-position medical supplies and emergency kits in high-risk and remote areas
- ❖ Deploy mobile healthcare units to extend reach when roads, airports, or ferries are disrupted
- ❖ Identify potential surge spaces (e.g., LTC/Specialty beds that can be temporarily converted)

Boost Community Resilience

- ❖ Build reliable communication channels: SMS alerts, radio broadcasts, and partnerships with community leaders
- ❖ Provide targeted outreach to high-SVI populations on preparedness, safe food/water practices, and evacuation procedures
- ❖ Coordinate with EMS, public health, and local hospitals for unified emergency operations
- ❖ Increase public campaigns for influenza vaccination, before the next disaster occurs



Pre-Disaster Action Plan

Priority Focus: Wildfire, Tsunami, Hospital Surge, Moloka'i Isolation

Vulnerability Assessment

- ❖ High-SVI communities on Moloka'i, East Maui, and rural areas
- ❖ Limited acute care beds; transport-dependent islands; communication gaps
- ❖ Identify at-risk populations

Risk Mitigation Strategies

- ❖ Pre-position supplies (PPE, medications, IV fluids)
- ❖ Identify and prepare surge beds and LTC-to-acute conversion spaces
- ❖ Develop mobile clinic model for Moloka'i in event of isolating event
- ❖ Strengthen food/water safety and pre-season flu outreach

Emergency Response Coordination

- ❖ Coordinate with stakeholders
- ❖ Integrate alternate-care sites and evacuation/shelter partners into planning

Communication Plan

- ❖ Redundant alerts: explore SMS/radio/in-person outreach
- ❖ Partner with Moloka'i leaders for culturally aligned messaging
- ❖ Target high-SVI communities with plain-language updates



Pre-Disaster Flowchart

Pre-Disaster Action Plan Workflow for Maui County

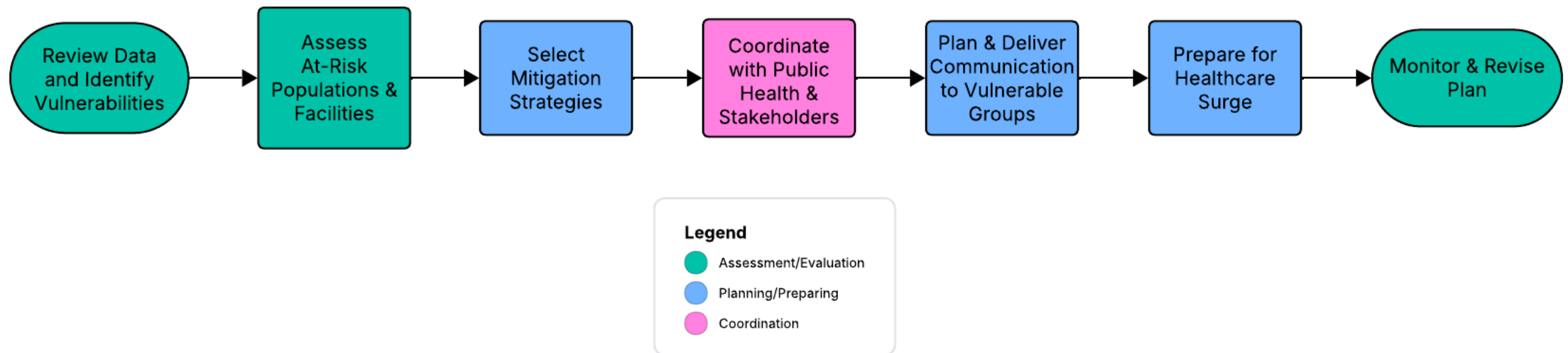
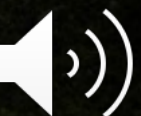


Figure 11. Pre-disaster action plan workflow. Flowchart created by the author using LucidChart. Source: McNeese, S. (2025).



Summary

Maui County faces a unique combination of geographic isolation, uneven healthcare capacity, and high social vulnerability, especially on Molokaʻi, which all elevate risk during major disasters. This assessment brought those gaps to light by identifying where resources and data are limited, which populations are most at risk, and how hazards like wildfires, tsunamis, and disease outbreaks intersect with these vulnerabilities. The Pre-Disaster Action Plan strengthens community readiness by targeting mitigation strategies, coordinated communication, and surge planning that supports a more resilient and equitable response. While this project provides a solid foundation, there is far more that could be explored with additional time, particularly deeper Molokaʻi-specific research expanding to include the tiny county of Kalawao, which shares the island. Expanding this work could one day grow into a meaningful doctoral project.



Generative AI Attestation

I attest that I used a generative AI tool in accordance with course guidelines and assignment-specific permissions. I used ChatGPT (OpenAI, 2025) on November 13, 2025 and November 19, 2025, for the purpose of generating one-sentence summaries for my disaster timeline, assisting with data set analysis, translating PDF data into Excel tables, and comparing my assignment with the rubric. The prompt(s) used included: “Help me generate a one-sentence summary for each disaster,” “Convert this campylobacteriosis row into an excel table with two rows labeled Resident and Non-Resident, with the years along the top,” and “Help me extract information from this hazard mitigation plan to create a Pre-Disaster Action Plan specifically for Maui County.”

All AI-generated content was critically reviewed, edited, and appropriately integrated with my own academic and clinical reasoning.



References

- Agency for Toxic Substances and Disease Registry. (2022). *CDC/ATSDR Social vulnerability index 2022: Maui County, Hawaii*. Geospatial Research, Analysis, and Services Program. https://svi.cdc.gov/Documents/CountyMaps/2022/Hawaii/Hawaii2022_Maui%20County.pdf
- County of Maui. (n.d.). *County profile*. <https://www.mauicounty.gov/DocumentCenter/View/155215/010-07-County-Profile>
- County of Maui. (2025, August). *County of Maui 2025 hazard mitigation plan* [Hazard mitigation plan]. Maui Emergency Management Agency. <https://www.mauicounty.gov/DocumentCenter/View/155657/2025-County-of-Maui-Hazard-Mitigation-Plan>
- EM-DAT: The International Disaster Database. (2025, November 7). *Natural and technological disasters of the Americas from 1900 to 2025* (EM-DAT, CRED/UCLouvain, Brussels, Belgium; Version 2025-11-07) [Data set]. Centre for Research on the Epidemiology of Disasters. <https://public.emdat.be/data>
- Google. (n.d.). *Google Maps*. <https://www.google.com/maps>
- Hansen, L., Wu, Y. Y., Sentell, T. L., Thompson, M., St John, T. L., Schmid, S., & Pirkle, C. M. (2025). Spearfishing and public health promotion: A cross-sectional analysis of the Hawai'i Behavioral Risk Factor Surveillance System survey. *PLoS One*, 20(3), e0319169. <https://doi.org/10.1371/journal.pone.0319169>
- Hawai'i Health Data Warehouse. (n.d.). *Build your own report*. Department of Public Health Sciences. <https://hhdw.org/data-sources/>
- Hawai'i Health Matters. (2024, December). *Households with a smartphone*. Conduent Healthy Communities Institute. <https://www.hawaiihealthmatters.org/?module=indicators&controller=index&action=view&comparisonId=&indicatorId=10515&localeId=12241>
- Honolulu Civil Beat. (2025, August 7). *See a bird's-eye view of Lahaina's fire recovery*. <https://www.civilbeat.org/2025/08/the-view-from-above-how-far-weve-come-since-the-maui-fires-2/>
- Lyte, B. (2023, May 7). *With one airline left, Molokai and Lanai residents struggle to access medical care*. Honolulu Civil Beat. <https://www.civilbeat.org/2023/05/with-one-airline-left-molokai-and-lanai-residents-struggle-to-access-medical-care>
- Office of Hawaiian Affairs. (2024). *Island community report: Moloka'i*. Office of Research and Evaluation. <https://www.oha.org/wp-content/uploads/2024-Molokai-Island-Community-Report.pdf>
- Office of Hawaiian Affairs. (n.d.). *Kalawao County*. https://www.oha.org/wp-content/uploads/RPT_Kalawao-County.pdf
- OpenAI. (2025). ChatGPT (GPT-5, November 13 version) [Large language model]. <https://chatgpt.com/share/6916bff2-9ac0-800b-bb65-64927b43c4a2>
- Maui Economic Development Board. (n.d.). *Molokai*. <https://www.medb.org/maui-sectors/molokai/>
- Mavrouli, M., Mavroulis, S., Lekkas, E., & Tsakris, A. (2021). Respiratory infections following earthquake-induced tsunamis: Transmission risk factors and lessons learned for disaster risk management. *International Journal of Environmental Research and Public Health*, 18(9), 4952. <https://doi.org/10.3390/ijerph18094952>
- Molokai Community Health Center. (n.d.). Overview of organization [Image]. <https://molokaichc.org/wp-content/uploads/2015/11/entrance-top.jpg>
- Perry, B. (2024, July 2). Governor signs bill to help tame flocks of feral chickens in Hawai'i. MauiNow. <https://mauinow.com/2024/07/02/governor-signs-bill-to-help-tame-flocks-of-feral-chickens-in-hawai%CA%BE>



References

- Saingam, P., Li, B., Sung, S., & Yan, T. (2021). Immediate impact of Hurricane Lane on microbiological quality of coastal water in Hilo Bay, Hawaii. *Environmental Science & Technology*, 55(5), 2960–2967. <https://doi.org/10.1021/acs.est.0c07082>
- Sowby, R. B., & Porter, B. W. (2024). Water supply and firefighting: Early lessons from the 2023 Maui fires. *Water*, 16(4), 600. <https://doi.org/10.3390/w16040600>
- State of Hawaii. (2025, September). *Census data highlights*. Department of Business, Economic Development & Tourism. https://files.hawaii.gov/dbedt/census/acs/acs2024/1yr/acs2024_1-yr_highlights_2025-09-11.pdf
- State of Hawaii. (n.d.-a). *Hawaii airports system*. Department of Transportation. <https://airports.hawaii.gov/>
- State of Hawaii. (n.d.-b). *Unemployment statistics*. Department of Business, Economic Development & Tourism. <https://dbedt.hawaii.gov/economic/unemployment-statistics/>
- State of Hawaii Department of Health. (2025a, June 12). *New case counts*. Disease Outbreak Control Division. https://health.hawaii.gov/coronavirusdisease2019/tableau_dashboard/new-case-counts/
- State of Hawaii Department of Health. (2025b, July 23). *Ambulatory surgery centers: Freestanding surgical outpatient facilities*. Office of Health Care Assurance. <https://health.hawaii.gov/ohca/medicare-facilities/ambulatory-surgery-centers-freestanding-outpatient-surgical-facilities/>
- State of Hawaii Department of Health. (2025c, August 7). *Mpox (Monkeypox)*. Disease Outbreak Control Division. https://health.hawaii.gov/docd/disease_listing/mpox/
- State of Hawaii Department of Health. (n.d.). *10-year summary of reported cases of notifiable diseases, Maui County, Hawai'i, 2014–2023*. Disease Outbreak Control Division. https://health.hawaii.gov/docd/files/2025/01/Disease-Summary-Table-2014_2023_Maui.pdf
- Stimpson, J. P., Rashed, A. L., Pandya, J., Baudot, E. C., Whitfill, J., & Ortega, A. N. (2025). Health equity in the wake of disasters and extreme weather: evidence from an umbrella review. *Health Affairs Scholar*, 3(11), qxaf207. <https://doi.org/10.1093/haschl/qxaf207>
- Taylor, M.. (2024, Feb 21). *States ranked by hospital beds per 1,000 population*. Beckers Hospital Review. <https://www.beckershospitalreview.com/rankings-and-ratings/states-ranked-by-hospital-beds-per-1-000-population-4/>
- Tsunami Aware. (2025). *Hawai'i*. <https://tsunami.coast.noaa.gov/>
- USAFacts. (2022, July). *Our changing population: Maui County, Hawaii*. <https://usafacts.org/data/topics/people-society/population-and-demographics/our-changing-population/state/hawaii/county/maui-county/?endDate=2022-01-01&startDate=2010-01-01>
- U.S. Census Bureau. (2023). *American Community Survey 5-year estimates*. Census Reporter. <https://censusreporter.org/search/?q=molokai>
- U.S. Centers for Disease Control and Prevention. (2024a, May 10). *About campylobacter infection*. <https://www.cdc.gov/campylobacter/about/>
- U.S. Centers for Disease Control and Prevention. (2024b, August 13). *About influenza*. <https://www.cdc.gov/flu/about/>
- Wikiedia Commons. (n.d.). *Hawaiian man spear fishing in Hana, Maui, ca. 1890* [Image]. https://commons.wikimedia.org/wiki/File:Hawaiian_man_spear_fishing,_Hana,_Maui,_ca._1890.jpg
- Ye, D. (2025, September 3). *Healthcare utilization report: Hawaii 2024*. State Health Planning and Development Agency. <https://health.hawaii.gov/shpda/files/2025/09/2024-Hawaii-Healthcare-Utilization-Report-20250903.pdf>

