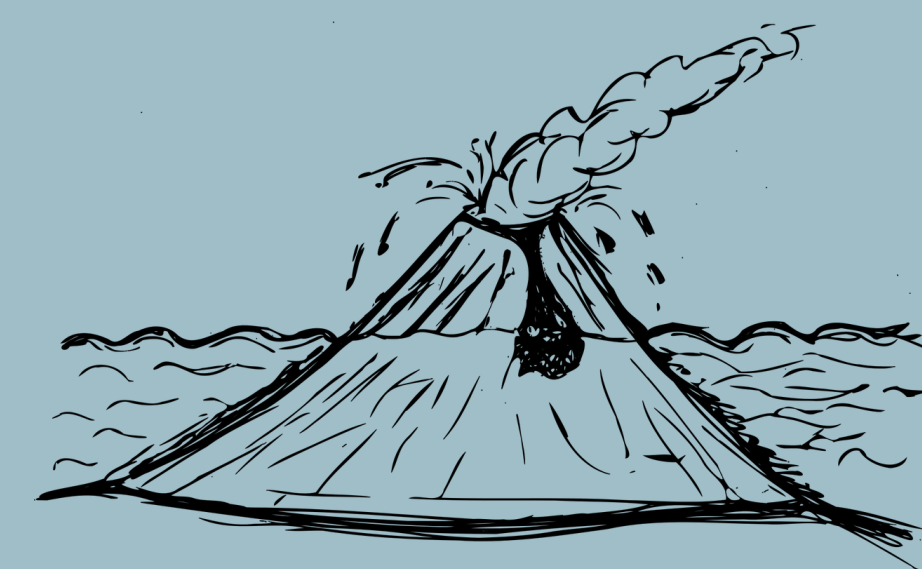
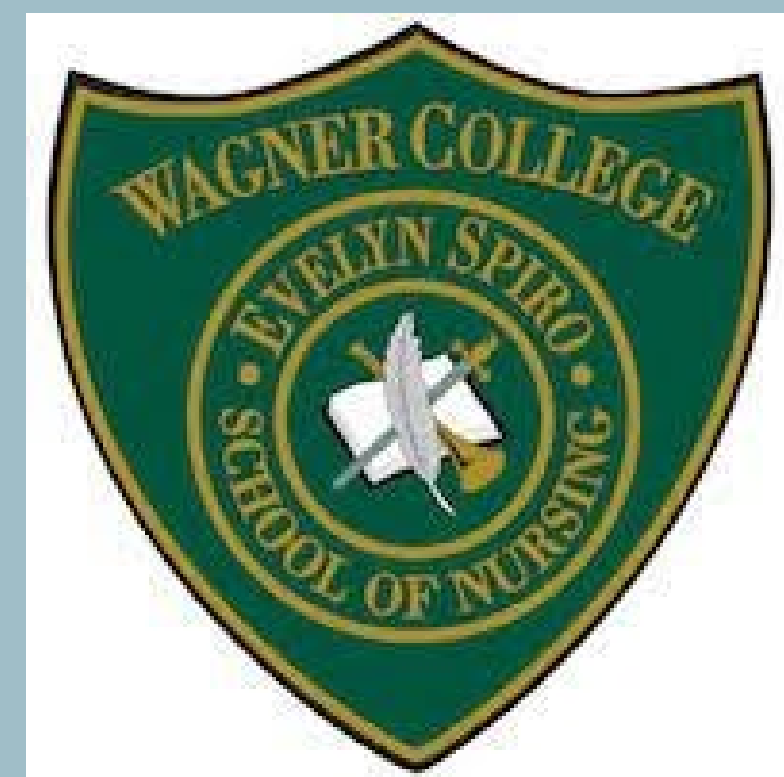
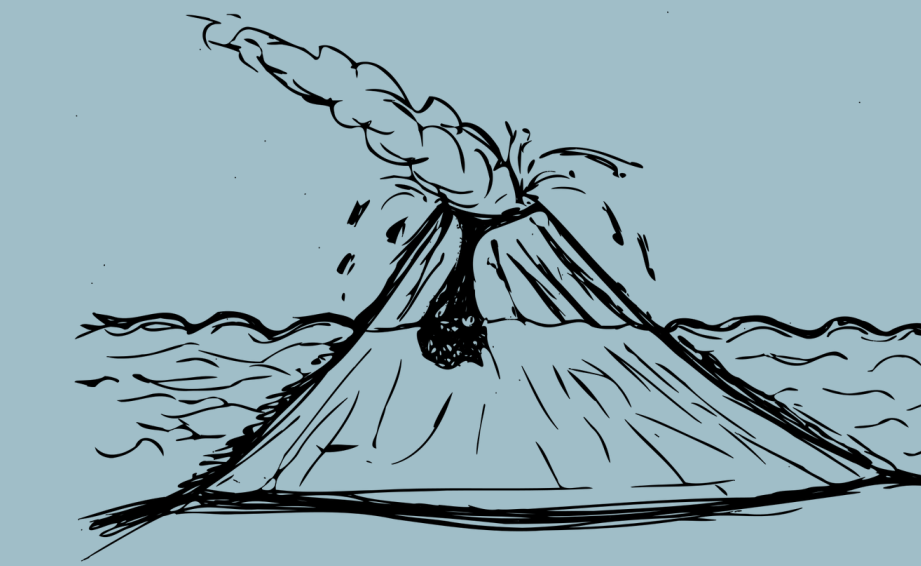


“Listen-Grab-Go” When Volcano Kīlauea Erupts in Southern Hawaii



Olivia Barone WCSN, Sara Nesimi WCSN, Etnada Poga WCSN
Wagner College Evelyn L. Spiro School of Nursing



Abstract

A volcanic eruption is dangerous to any community and can affect the health of the population who lives near an active volcano. Unfortunately, no one can stop a natural disaster. However, the potentially affected communities can prepare for one. 1 The CDC states several health problems associated with volcanic eruptions. In early May 2018, Volcano Kīlauea erupted which caused the southern part of Hawaii to be destroyed and left the population to have health injuries related to the volcanic eruption. 2 From May through August, Volcano Kīlauea was erupting causing large lava flows to cover parts of the island and destroyed the community. 3 Kīlauea is the youngest and most active volcano on the Island of Hawaii. The proposal for the research study analyzes the health effects caused by the 2018 Volcanic Kīlauea eruption in Southern Hawaii. Will having an emergency preparedness plan minimize health problems associated with volcanic eruptions in adults who live in Southern Hawaii?

Community

- The community this research study is going to focus on is Southern Hawaii. The largest ethnic group, in 2018, was the Asian and Pacific Islander (non-Hispanic) groups. 4
- In Hawaii, the fastest age group to increase was the age group 65 and older. From 1998 to 2018, this population increased by 68%. The age group that declined the most was the age group of 35 to 49. This age group dropped 6.3% from 1998 to 2018. 4
- In 2020, the patient-to-primary care physician ratio is 1,387 to 1. A total of \$7,299 is spent on personal health care in Hawaii. The health care coverage in Hawaii is as follows: 4.89% are uninsured, 51.8% are employer coverage, 16.4% have Medicaid, 15.8% have Medicare, 10.4% are non-group and 0.775% are military or VA. 5
- The median household income in Kauai, Hawaii has an annual income of \$82,818. The United States median annual income is \$64,994. Hawaii median annual income is more than the national average. 5
- In Hawaii, 36.4k is employed by an occupation. In Kauai County, the most common job groups are Sales and Related Occupations, Food Preparation and Serving Related Occupations. 5
- The lowest number of employees Hawaii has are in Architecture and Engineering Occupations, Life, Physical, and Social Science, Farming, Fishing, and Forestry Occupations, Computer Mathematical Occupations, and Legal Occupations. 5
- The leading cause of death in Hawaii are heart disease, cancer, and strokes. Furthermore, pneumonia had 637 deaths. 5 Hawaii promotes blood pressure screening, education and management to the at-risk population. 6
- Around 3,000 people lost their jobs as a result of the eruption in 2018. Farms reported a loss of more than \$27,000,000 in assets and potential future sales. Over 12 months, the island lost out on upward of 415,000,000 in tourism losses. 7

Problem

- The high temperatures of the gasses and entrained particles causes burns to be the most prevalent health problem in Southern Hawaii when volcanic eruptions happen. 8
- Burns are the deadliest skin injury during an episode of volcano eruption “due to the unpredictable spread of the lava, volcanic gasses, and ashfall” 9
- In 2010, the eruption of Mount Merapi in Indonesia caused, “45% of patients to experience 40-79% total body surface range, while 35 (3%) patients suffered over 80% TBSA burn... and of those only one patient survived” 10
- Burns not only affect the skin but it affects the eyes and respiratory system as well due to inhalation of gasses emitted by the volcanic eruption.
- Mount St. Helens eruption that occurred in Washington, United States, revealed that high temperature gasses and entrained particles that cause burns also caused “a rise in ED visits due to conjunctivitis” after the eruption happened 8
- After the eruption of Volcano Kīlauea, there was an increase in symptoms of cough, phlegm, chest tightness, and dyspnea 8
- Hawaii eruptions were studied and it was found that post-eruption, “non-specific lung irritations were increased by 46% and asthma attacks by 4%” within the community 8
- The 2010 Eyjafjallajökull eruption in Iceland, “50% of adults and all children examined who had previously been diagnosed with asthma reported an acute exacerbation within 2 months following the eruption” 12
- According to the CDC, Hawaii ranks first in the United States for pneumonia deaths.

Proposed Solution

HOW WILL OUR SOLUTION WORK

- The proposed solution is a three day program called “Listen, Grab, Go”
- The community of Southern Hawaii needs to adopt an emergency preparedness plan to reduce their risk of skin, ocular, and respiratory problems. Emergency preparedness will help prevent major health problems as previously seen with volcanic eruptions by eliminating human exposure to the risk factors. This solution differs from what is currently in place because it is more detailed and focused towards volcanic emergency preparedness. The solution will be funded by FEMA.
- Many studies show that programs involving emergency preparedness reduce the risk of injuries and death. 14
- According to theorist Callista Roy, humans are viewed as biopsychosocial adaptive systems that cope with environmental change through the process of adaptation, and this development theory supports emergency preparedness because residents of Hawaii must adapt to their environment and volcanos through preparing adequately. 15
- “Listen, Grab, Go”
 - Day 1:** The first day will entail how to “Listen” for a volcano warning. Listening to an evacuation route or evacuation shelter is essential to not be near the volcanic eruption to reduce health problems. If there is a volcano warning, residents will “Listen for emergency information and alerts. Follow evacuation or shelter orders. If advised to evacuate, do so early” 16
 - Day 2:** The second day of the program will focus on “Grab.” While living in Southern Hawaii, it is essential to have a grab-and-go bag already packed which will have everything needed in case of a rapid evacuation. The participants of this program will pack an emergency preparedness go bag. The bag will be individualized to suit everyone's personal needs. the Hawaii Emergency Management Agency recommends a fourteen-day supply of the basics of water, food, battery operated radio, a whistle, hygiene and cleanliness, and medication. 17
 - Day 3:** During the third day of the program, participants will be informed on the “Go”; when to “go” evacuate, and when to “go” back home. The U.S. Department of Homeland Security has implemented precautions when returning home after a volcanic eruption to minimize the health problems associated with the aftermath of volcanic eruptions. 16

OBJECTIVES

- Participants will be able to identify ways to listen for a volcanic eruption warning after the first day of the program.
- Participants will pack a go-bag which will include essentials that will be needed in case of an emergency evacuation and will be individualized to fit their personal needs after the second day of the program
- Participants will teach back safety precautions taken when returning home after a volcanic eruption after the third day of the program.

GOALS

- The goals of our program, once achieved, will bring down the rates of skin, ocular, and respiratory problems in Southern Hawaii creating a healthy, emergency preparedness community.
- “Listen, Grab, Go” will ultimately ensure safety for the residents of Southern Hawaii. This program will be directed at preparing the residents for an emergency eruption by evacuating which will ultimately reduce direct exposure to the harms associated with volcanic eruptions.

Leading Cause of Death in Hawaii

Heart Disease	2,575 deaths
Cancer	2,456 deaths
Stroke	764 deaths
Pneumonia	637 deaths
Firearm	39 deaths
Homicide	35 deaths
Overdose	203 deaths

Leading cause of death in volcanic eruptions

- 1.) Skin injuries/ burns
- 2.) Inhalation of gasses
- 3.) Blast injuries

References

- Centers for Disease Control and Prevention. (2022, January 25). *Key facts about volcanic eruptions*. CDC. <https://www.cdc.gov/disasters/volcanoes/facts.html#print-eruption.html?text=1&id=202018%2C%20the%20new%20eruption%20areas%20in%20the%20Pacific%20District>
- National Park Services. (2021, June 7). *2018 Eruption and Summit Collapse*. Hawaii Volcanoes. <https://www.nps.gov/havo/learn/nature/2018-eruption.htm>
- Hawaiian Volcano Observatory. (n.d.). *Active volcanoes of Hawaii*. USGS. <https://www.usgs.gov/observatories/hvo/active-volcanoes-hawaii#:~:text=K%2C%20the%20youngest%20and%20most,the%20volcano%20East%20Rift%20Zone>
- USA Facts. (2022, July). *Our changing population: Hawaii County*. Hawaii. USAFACTS. <https://usafacts.org/data/topics/people-society/population-and-demographics/our-changing-population/state/hawaii/county/hawaii-county/endDate=2018-01-01&startDate=1998-01-01>
- Data USA. (n.d.). *Kauai County, HI*. DATAUSA. Kauai County, HI | Data USA
- State of Hawaii, Department of Health. (2023). *Heart Disease and Stroke Program*. Chronic Disease management. <https://health.hawaii.gov/heart-disease-stroke/>
- Institute for Sustainable Development. (2020, December). *2018 Kīlauea disaster economic recovery plan*. Hawaii County. <https://recovery.hawaiicounty.gov/home/showpublisheddocument/302779/63742680106170000>
- Beylin, D., Mantal, O., Haik, J., Kornhaber, R., Cleary, M., Neil, A., & Harats, M. (2022). Soft tissue-related injuries sustained following volcanic eruptions: An integrative review. *Burns*, 48(7), 1727–1742. <https://doi.org/10.1016/j.burns.2021.09.008>
- Meredith, E. S., Jenkins, S. F., Hayes, J. L., Deligne, N. L., Lallemand, D., Patrick, M., & Neal, C. (2022). Damage assessment for the 2018 lower East Rift Zone lava flows of Kīlauea volcano, Hawaii. *Bulletin of Volcanology*, 84(7), 1–23. <https://doi.org/10.1007/s00445-022-01568-2>
- Baxter, P. J., Jenkins, S., Seswandhana, R., Komorowski, J.-C., Dunn, K., Purser, D., Voight, B., & Shelley, I. (2017). Human survival in volcanic eruptions: Thermal injuries in pyroclastic surges, their causes, prognosis and emergency management. *Burns*, 43(5), 1051–1069. <https://doi.org/10.1016/j.burns.2017.01.025>
- Centers for Disease Control and Prevention. (2018, April 13). *Status of the State of Hawaii*. Centers for Disease Control and Prevention. Retrieved March 28, 2023, from <https://www.cdc.gov/nchs/pressroom/states/hawaii/hawaii.htm>
- Carlsen, H. K., Gislason, T., Benediktsson, B., Kolbeinnsson, T. B., Hauksdottir, A., Thorsteinsson, T., & Briem, H. (2012). A survey of early health effects of the Eyjafjallajökull 2010 eruption in Iceland: a population-based study. *BMJ open*, 2(2), e000343. <https://doi.org/10.1136/bmjopen-2011-000343>
- Federal Emergency Management Agency. (2021). *Developing and maintaining emergency operations plans*. https://www.fema.gov/sites/default/files/documents/fema_cpg-101-v3-developing-maintaining-cops.pdf
- Federal Emergency Management Agency. (2021). *Developing and maintaining emergency operations plans*. https://www.fema.gov/sites/default/files/documents/fema_cpg-101-v3-developing-maintaining-cops.pdf
- Roy, C., & Andrews, H. (2009). *The Roy Adaptation Model*. (3rd ed.). Prentice Hall.
- U.S Department of Homeland Security. (2022). *Volcanoes*. Ready.gov. <https://www.ready.gov/volcanoes>
- Hawaii Emergency Management Agency. (2022). *Preparedness information*. Hawaii.gov. <https://dod.hawaii.gov/hiema/public-resources/preparedness-information/>