

Pacific Heads of Health

Réunion des directeurs de la santé du Pacifique

Vulnerability of Pacific Island Country Hospitals: Critical Infrastructure that must be addressed

At a glance

- The COP27 Loss and Damage Fund agreement was a celebrated win for Pacific Island Countries (PICs). They are within the most at risk region worldwide due to regular extreme weather events.
- Small Island States lose on average 1-9% of their GDP per year due to damage following natural disasters. Yet they contribute less than 0.03% toward the world's greenhouse gases.
- The World Risk Report identified critical infrastructure as an area for adaptation funding to focus on.
- Of 78 hospitals in 14 Pacific Island Countries evaluated based upon distance from hydrological threat, elevation above sea-level and size of population served 56% were physically vulnerable with 63% of the collective population at risk of losing hospital services if damaged.
- Hospitals span two sectors: health and infrastructure. Their role during natural disasters must be recognized and prioritized as critical infrastructure.

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Current situation

The COP27 Loss and Damage Fund agreement was a celebrated win for Pacific Island Countries (PICs). They are within the most at risk region worldwide due to being subject to regular extreme weather events. Adaptation funding has not adequately addressed preventing risk and loss. In 2016 the World Risk Report defined critical infrastructure as essential adaptation to address in order to reduce both human and economic losses due to risk vulnerability. The sectors that make up critical infrastructure include “health” which straddles two adaptation sectors: hardscape infrastructure which includes hospitals and conventional health delivery. Hospitals have historically been seen as investments in health. Vulnerable Pacific Island hospitals that lack the luxury of redundancy of services while serving populations of people living on atolls and isolated islands need to be seen as critical infrastructure. This analysis looks at 78 hospitals located in 14 Pacific Island Countries through the lens of climate change critical infrastructure adaptation.

Future vision

Relocating a hospital is a large capital expenditure for many Pacific Island Countries, but in many cases a necessary one. For Pacific Island countries with limited economic flexibility worsened by the pandemic and annual disaster expenses the ability to budget for hospital adaptation such as relocation or remodelling is difficult. While the majority of climate change policy and funding addresses efforts to cut greenhouse gas emissions, it is crucial to address adaptation to the risks from vulnerability that are already “locked in.” This must include changing the way PIC hospitals are viewed. Safe and resilient hospitals in Pacific Islands Countries are like lighthouses in a storm. They are as essential as the roads, ports and airports that move relief supplies during a disaster. It is time to stop seeing them as luxury health development items and see them for the critical role they play in resilience building in one of the most risk vulnerable regions of the world.

Development partners, Ministries of Health and Governments must prioritize and commit to a systematic approach toward shoring up vulnerable hospitals before more are damaged or destroyed. This would require forming multinational coalitions to cover costs and design elements that are congruent with the location and that incorporate safety as well as smart design features.

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Examples of recent progress

A number of PICs have implemented adaptation of their vulnerable hospitals. Many countries like Tokelau, Tuvalu, RMI and Kiribati are restricted by their geographic limitations. Hospitals in atoll locations have undergone adaptation remodelling to protect hospital services. **Fenua Fala Hospital** located on the Fakaofu Island group of Tokelau is located 40 meters from the coastline at 8 meters elevation. The hospital serves roughly 500 people who live on Fakaofu. Coastal inundation and storm surge cause frequent flooding across the atoll. Relocation was not an option for Fenua Fala Hospital. In concert with New Zealand Aid Tokaleau's government made the decision to [rebuild the hospital on timber piles and cement ground beams](#). The architecture was built to withstand cyclones. A similar adaptation design was used in the rebuilding of **Nukunonu Hospital** also in Tokelau in 2013 for approximately US\$4.3 million. [The new building](#) has a storage tank as its foundation and the two-story building is concrete framed to withstand cyclones. The second story allows for a safe place for medical records and valuable equipment to be stored should flooding impact the lower level. This hospital building was built adjacent to the old hospital building.



Google Earth image Fenua Fala hospital (left), the new [Fenua Fala hospital](#) near completion.



Google Earth image of Nukunonu hospital (left), the new 2 story [Nukunonu hospital](#) built adjacent to old building shown in green.

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One example of relocation as adaptation is the original **Nui'iu Hospital** on Lifuka in Tonga, located at 19 meters from the coastline with an elevation of 5 meters. The hospital was damaged by Cyclone Ian in 2014. A new hospital was built inland at 1907 meters from coastline with an elevation of 61 meters reducing its vulnerability. Renamed **Princess Fusipala Hospital** this hospital serves the population of Lifuka and Foa Islands, approximately 6,470 people. That relocation cost US\$2.1 million and was funded by the Asia Development Bank and the government of Tonga. **Niue Hospital** on Niue, is the only hospital serving the country. Originally known as Lord Liverpool Hospital it was built in 1960s on a cliffside 84m from the coastline. The hospital was destroyed by Cyclone Ofa in 1990. It was rebuilt in the same location for US\$2.7 million dollars and destroyed again by Cyclone Heta storm surge and wave action in 2004. A temporary field hospital had to be set up until the new hospital, **Niue Fooo Hospital**, was completed in 2006. The relocation cost was US\$23 million and was funded by NZAID, DFAT and the EU.



Google Earth images of Tonga's original Nui'iu Hospital (left) and the new Princess Fusipala Hospital (right)

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Google Earth image of the original Niue hospital in blue and the new Niue Foonu hospital in red (left), 2004 [damage to the original Niue hospital from Cyclone Heta](#) (right)

Why urgent action is needed now

While there are examples of progress in relocating and adaptive redesigning of hospitals in PICs a number other Pacific Island hospitals remain highly vulnerable and without adequate funding sources to assist in reducing their risk of damage or destruction. The table below summarizes the most vulnerable hospitals based upon location less than 100 meters from a hydrological threat, elevation less than 10 meters above sea level and a population catchment that serves more than 30% of the population.

country	hospital	<100m hydrologic threat	<10m elevation	>30% pop	Adaptation
Kiribati	Betio Hospital, South Tarawa	yes	yes	53	plans for relocation MFAT
Kiribati	Tungaru Central Hospital	yes	yes	100	no plans found
Palau	Belau National Hospital	yes	yes	100	plans for relocation
SI	National Referral Hospital	yes	yes	100	plans for relocation
Tokelau	Lomaloma Hospital, Atafu	yes	yes	37	plans for seawall NZAI
Tokelau	St Joseph's Hospital, Fenua Fala Fakaofu	yes	yes	36	rebuilt pilings 2019
Tokelau	St Joseph's Hospital, Nukononu, NRH	yes	yes	33	rebuilt pilings 2013, 2 stories
RMI	Leroj Atama Medical Center, Majuro	yes	yes	64	renovation planning JICA
RMI	Leroj Kitlang Kabua Health Center, Ebeye, Kwajalein	yes	yes	38	New roof 2020
Tuvalu	Princess Margaret Hospital, Funafuti	yes	yes	100	Coastal adaptation project 2021

The most vulnerable hospitals in Pacific Islands based upon three criteria: location <100 meters from a hydrological threat, elevation <10m above sea level, serves more than 30% of the country's population. The hospitals in red are currently vulnerable. The hospitals in black have addressed or are in the process of addressing their vulnerability through adaptation.

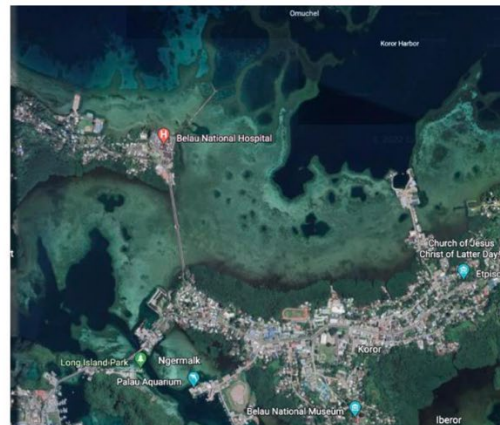
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Some countries, Kiribati, have incorporated hospital relocation into Health Infrastructure Strengthening Plans while others, such as Palau and RMI have included hospital relocation as part of their Compact of Free Association negotiations.



Google Earth view of Tungaru Central hospital on Southeast Tarawa (left), TCH buildings (right)



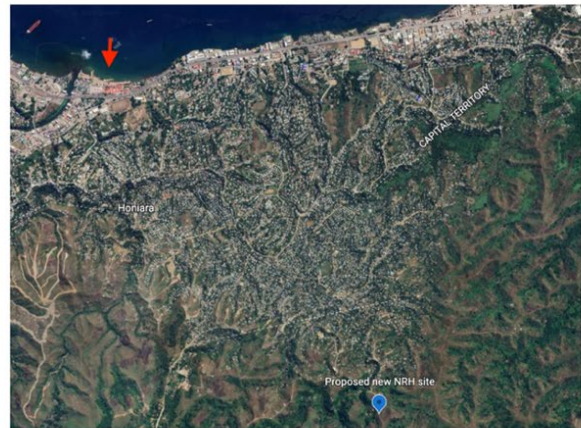
Google Earth view of Belau hospital (left), causeways connecting the 3 main islands and the hospital (right)

The National Referral Hospital (NRH) on Guadalcanal in Solomon Islands is the largest highly vulnerable hospital in the Pacific Region. NRH has 380 beds. It serves a dual purpose as a community hospital for 161,197 people living on Guadalcanal and as the nation's only referral hospital it provides advanced medical, surgical and obstetrical care for 686,878 people living across the archipelago of over 900 islands. NRH is located 11 meters from the coastline, 140 meters from the Mataniko River and just 1.8 meters above sea level. NRH has a history of being impacted by storm surge and flooding following heavy precipitation. In [2014 tropical storm Ita](#) caused massive flooding on northern Guadalcanal killing 22 people, mainly women and children. Recent heavy rain has flooded the hospital resulting in interruptions to care. A vulnerability assessment using the [PAHO Safety Index for Hospitals](#) was conducted by the MOH and the WHO following the 2014 flood. The assessment found the location highly

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vulnerable and safety issues in a number of areas. In 2016 a gabion seawall was constructed as a temporary measure while a hospital relocation committee was formed. A new location site has been identified.



Google Earth view of the National Referral Hospital (NRH) (left), Proposed relocation site blue marker, with current location of NRH marked by red arrow (right).

During the pandemic and natural disasters Pacific Island hospitals have served their people. Overtime these vulnerable hospitals will not become less vulnerable. They will become more vulnerable as the rate of sea-level rise in the Pacific Region is 3 times the global rate and as heavy precipitation and cyclones are projected to increase in intensity.

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Recommendations to be considered by the Heads of Health

Recommendations for governments

1. Commit to amplifying and prioritizing hospitals as critical infrastructure along with roads, bridges, ports, and airports, that needs to be addressed.
2. Advocate for more funding to be allocated for adaptation as it pertains to health and critical infrastructure within your country.
3. Recognize and give weight to hospitals spanning two critical sectors that are negatively impacted by severe weather events and rising sea levels when discussing priorities.

Recommendations for development partners

1. Address adaptation ODA underfunding
2. Commit to recognizing and supporting programs that address the unique threats Pacific Islands face.
3. Support and implement the UN Multi-dimensional Vulnerability Index and the COP 27 Loss and Damage Agreement.