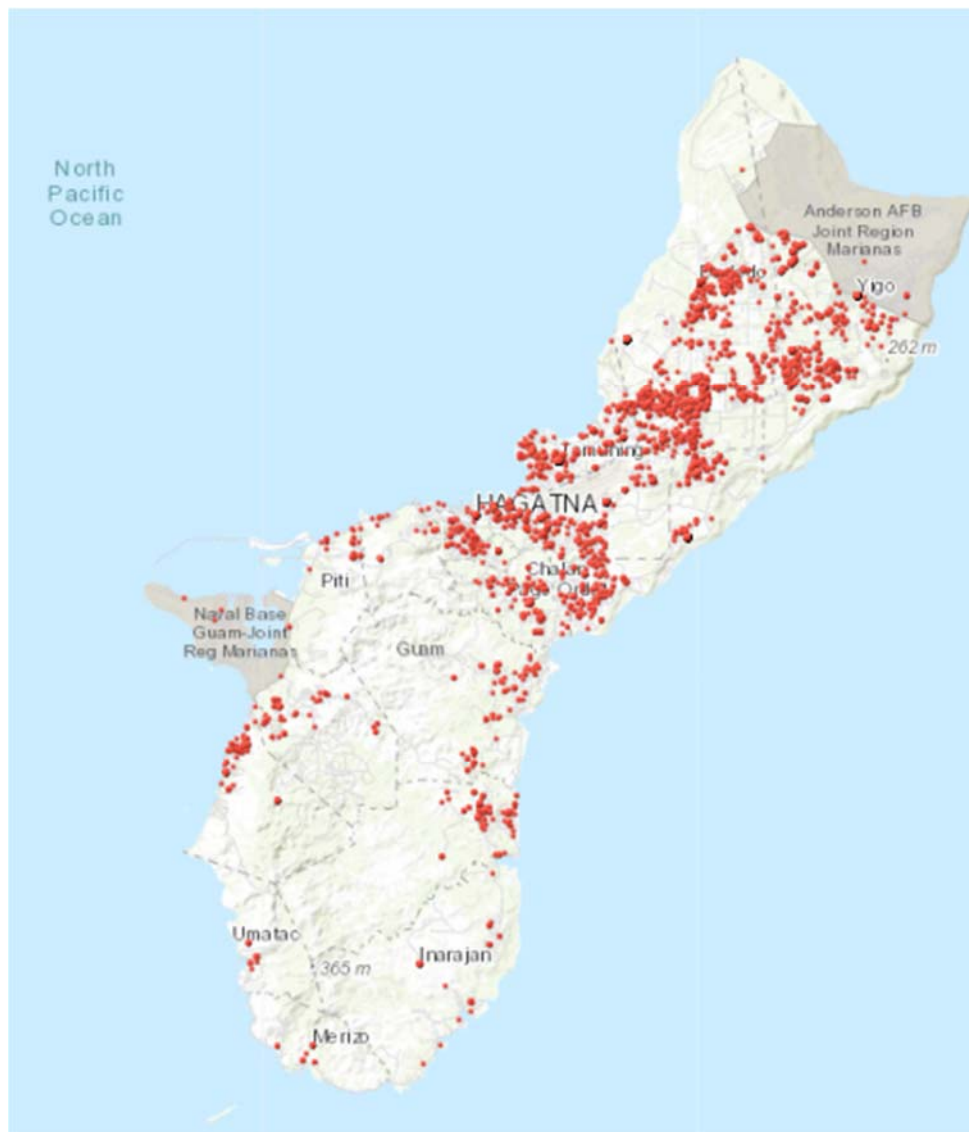




## GUAM COVID-19

### Surveillance Summary Report 12/31/2020

DPHSS - Office of Epidemiology and Research<sup>1</sup>



**Figure 1. Total COVID-19 cases on Guam from March 12-December 30, 2020 by village<sup>2</sup>.**

Table 1 provides the number and proportion of COVID-19 cases and deaths by village and compares this with the village proportion in Guam's estimated 2020 population. All post office boxes (POB) and private mail boxes (PMB) that were provided in lieu of physical addresses were excluded from the analysis.

**Table 1. COVID-19 cases by village from March 12 to December 11, 2020**

VILLAGE	CASES	%	DEATHS	%	ESTIMATED 2020 POPULATION	%
Agana Heights	39	0.7	3	2.9	4,022	2.4
Agat	92	1.7	2	1.9	5,194	3.1
Asan-Maina	29	0.5	3	2.9	2,257	1.3
Barrigada	344	6.4	7	6.7	9,374	5.6
Chalan Pago	145	2.7	1	1.0	7,206	4.3
Dededo	1,599	29.6	39	37.1	47,471	28.2
Hagatna (Agana)	54	1.0	0	0.0	1,100	0.7
Inarajan	42	0.8	3	2.9	2,401	1.4
Mangilao	617	11.4	8	7.6	16,046	9.5
Merizo	27	0.5	1	1.0	1,954	1.2
Mongmong-Toto-Maite	185	3.4	5	4.8	7,209	4.3
Piti	47	0.9	0	0.0	1,536	0.9
Santa Rita	99	1.8	1	1.0	6,426	3.8
Sinajana	67	1.2	3	2.9	2,738	1.6
Talofofo	82	1.5	1	1.0	3,222	1.9
Tamuning	938	17.4	8	7.6	20,792	12.4
Umatac	11	0.2	1	1.0	826	0.5
Yigo	857	15.9	21	20.0	21,694	12.9
Yona	126	2.3	2	1.9	6,845	4.1
Non-resident	14	0.3	1	1.0	NA	NA
Unknown	638	11.8	3	2.9	NA	NA
TOTAL	5,394	100.0	109	103.8	168,323	100.0
denominator (less unknowns and non-residents)	5,713		105		Data Source: Guam Statistical Yearbook, 2018,	

As can be noted from the tabular data, Guam's largest and most dense villages have the highest proportion of COVID-19 cases.

Guam's largest village, Dededo has a similar proportion of cases (29.6%) given the estimated 2020 population of Dededo (28.2%), yet Dededo has a higher proportion of deaths than we would expect (37.1%).

The village of Yigo has higher proportions of both cases (15.9%) and deaths (20%) than it's estimated 2020 population (12.9%).

The village of Tamuning has a higher proportion of cases (17.4%) and lower proportion of deaths (7.6%) than it's estimated 2020 population.

The village of Mangilao has a higher proportion of cases (11.4%) and lower proportion of deaths (7.6%) than it's estimated 2020 population (9.5%).

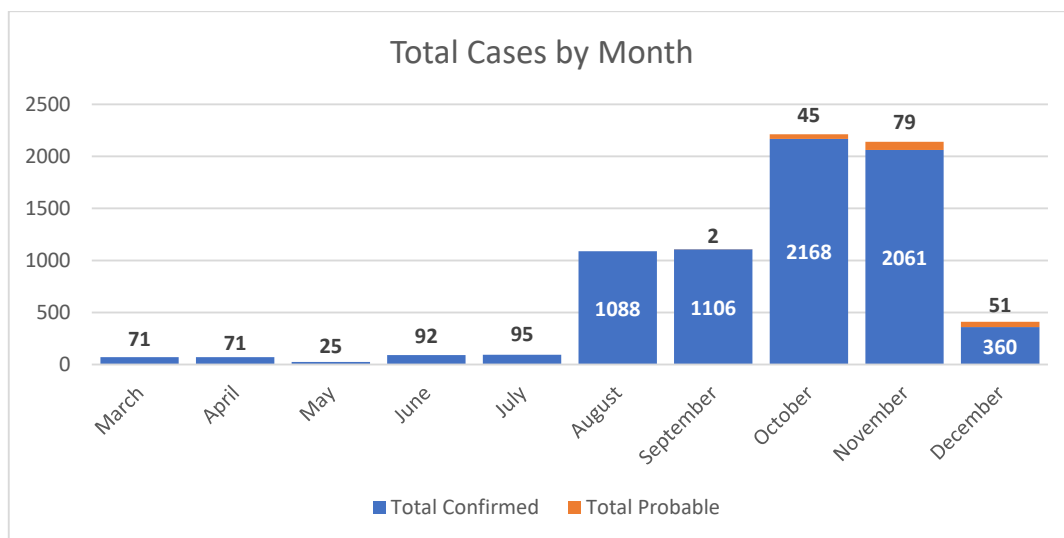
Guam's more rural and sparsely populated villages tend to have lower proportions of cases and deaths than their estimated populations in 2020 (e.g. Santa Rita, Chalan-Pago-Ordot and Yona).

### COVID-19 cases update: March 12-December 30, 2020<sup>3</sup>

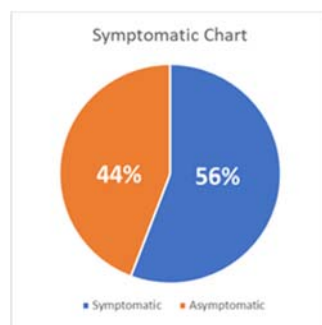
Data includes all cases up from March 12-December 30, 2020. The total number of cases as of 12/30/2020 comes to 7,314 cases: 7,137 confirmed and 177 probables.

Figure 4 represents length of recovery, in days, is calculated by taking the difference of the symptom onset date and the recovery date of a case. After analysis, the median of the data is 17 days, meaning that on average it will take around 17 days from symptom onset to recover from the virus.

**Figure 2. Total positive COVID-19 cases by month**



**Figure 3. COVID-19 symptoms for positive COVID-19 cases**



In Figure 2, the largest increase in cases begins in August and lasts through November. Also note that previous probable cases have received confirmatory testing and now have been classified as confirmed cases.

In Figure 3, out of all cases, excluding the unknowns, 56% of the cases reported showing symptoms while the other 44% reported being asymptomatic.

**Figure 4. Length of recovery for positive cases**

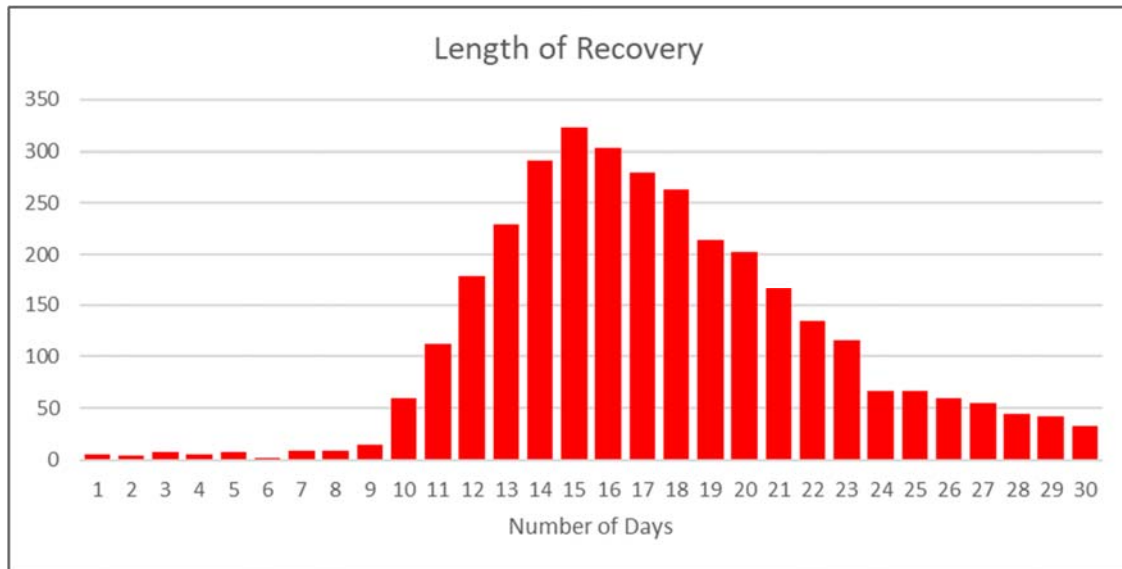


Figure 4 represents length of recovery, in days, is calculated by taking the difference of the symptom onset date and the recovery date of a case. After analysis, the median of the data is 17 days, meaning that on average it will take around 17 days from symptom onset to recover from the virus.

**Figure 5. Average hospitalized COVID-19 patients and daily cases, with death count by month**

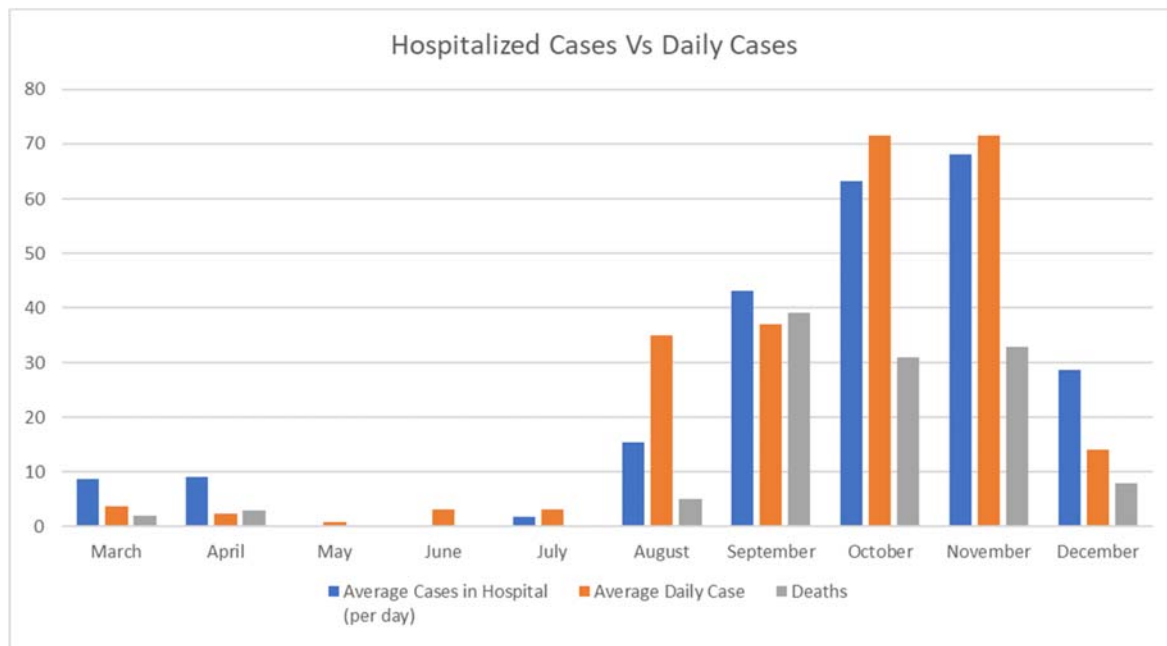


Figure 5. represents the average number of COVID-19 patients in the hospital, the average number of daily cases, and deaths counts per month.

In the first half of the year, we can see that cases were hospitalized for longer times. The trend then shifts to the average daily cases becoming significantly higher than the hospitalized cases in August. This correlates with higher numbers for those hospitalized in September since the lag time in incubation and admission into the hospital for the cases in August. As we, head into the new year cases are starting to go down and the hospital numbers also fall with it.

## Chronic diseases, Risk Factors and COVID-19

The subsequent data in this report includes COVID-19 cases from March 12, 2020 to December 11, 2020. There were 7,079 cases (6,942 probable and 137 confirmed) of whom 6,046 had complete information on chronic diseases, along with 113 deaths with known information during this time period.

Table 2 shows the prevalence estimates for chronic diseases in Guam's population from the 2019 CDC-BRFSS<sup>4</sup>, along with the proportion reporting chronic diseases among COVID-19 cases and among those who died of COVID-19 in 2020. The numerator is comprised of those who replied "yes" for a specific chronic disease (or from MD notes and/or on the death certificate).

**Table 2.**

<b>CHRONIC DISEASE &amp; RISK FACTOR SUMMARY</b>	<b>Guam COVID-19 cases (%)</b>	<b>Guam COVID-19 deaths (%)</b>	<b>GUAM 2019 CDC-BRFSS population prevalence estimates (%)</b>
<b>DIABETES</b> (excluding pregnancy related diabetes and pre-diabetes)	<b>8.7</b>	<b>50.0</b>	<b>11.7</b>
<b>CHRONIC RENAL DISEASE</b>	<b>1.2</b>	<b>18.6</b>	<b>2.9</b>
<b>CHRONIC LUNG DISEASE</b>	<b>3.9</b>	<b>7.1</b>	<b>4.2</b>
<b>CARDIOVASCULAR DISEASE</b>	<b>3.1</b>	<b>27.4</b>	<b>2.9</b>
<b>HYPERTENSION</b>	<b>11.9</b>	<b>57.5</b>	<b>30.3</b>
<b>OBESITY (BMI &gt; 30)</b>	<b>3.1</b>	<b>13.3</b>	<b>33.6</b>
<b>CURRENT SMOKING</b>	<b>9.0</b>	<b>0.9</b>	<b>23.4</b>
<b>FORMER SMOKING</b>	<b>8.3</b>	<b>1.8</b>	<b>17.2</b>

The estimated proportion of Guam's population with a diagnosis of diabetes, from the BRFSS was 11.7% in 2019. Among COVID-19 cases, this is lower at 8.7%, but this is within a reasonable range given that the BRFSS does not provide estimates for those under

18 years. The proportion of people who have died who also have a diagnosis of diabetes as an underlying condition comprises 50% of all deaths.

The estimated proportion of Guam's population with chronic renal (kidney) disease is 2.9%. Among cases this is lower at 1.2% but this is within a reasonable range given that the BRFSS does not provide estimates for those under 18 years. Among people who died of COVID-19 chronic renal disease is significantly higher at 18.6% (likely due to the concomitant high proportion of COVID-19 deaths among people with diabetes who also have ESRD-end stage renal disease).

The estimated proportion of Guam's population with chronic lung disease (asthma or chronic obstructive pulmonary disease) was 4.2% in 2019. Among cases this is similar (3.9%) and within a reasonable range compared to the BRFSS population estimates. Among those who died of COVID-19, chronic lung disease is proportionately higher at 7.1%, which could be expected since COVID-19 is a novel respiratory viral infection, and people with chronic lung disease would be more susceptible to adverse outcomes.

The estimated proportion of Guam's population with cardiovascular disease is estimated to be 2.9% (coronary heart disease), which is similar to the proportion among cases at 3.1%. However, among those who died from COVID-19, a significantly higher proportion (27.4%) also had a diagnosis of cardiovascular disease.

The estimated proportion of Guam's population with hypertension is 30.3%, which is much lower among Guam COVID-19 cases (11.9%) and much greater among those who died of COVID-19 (57.5%).

Regarding risk factors for chronic diseases, the estimated proportion of Guam's population with obesity (having a Body Mass Index or BMI >30) is estimated to be one-third of the population (33.6%). However, among cases (3.1%) and deaths (13.3%) this is much lower. For current smoking, the estimate for Guam's population is 23.4% but this is reportedly much lower among COVID-19 cases (9.0%) and deaths (less than 1%). Former smoking among cases (8.3%) and deaths (8.3%) is similarly lower than the BRFSS population estimate of 17.2%.

Current analysis of chronic diseases and risk factors shows that among COVID-19 cases, generally people with a diagnosed condition are more likely to report it (diabetes, asthma/COPD, hypertension) but there is underreporting of risk factors (obesity, tobacco use) among both cases and deaths.

Death certificates (and MD notes) provide more information on chronic conditions but risk factors continue to be underreported (i.e. obesity, smoking). Among COVID-19 deaths 9 had reports of morbid obesity on the death certificate (8%).

The reason for underreporting of risk factors is likely the stigma associated with current smoking and obesity. One potential solution would be to include height and weight obtain height and weight data to calculate BMI on morbidity reports and death certificates.

## Guam COVID-19 Related Mortality Analysis From March 12-December 11, 2020

All deaths with complete information from March 12 – December 11, 2020 were examined in this analysis. Deaths on Guam due to COVID-19 were examined based on information taken from the DPHSS case listing of positive cases, any notes from the hospital where the person died and the death certificate<sup>5</sup>. The mortality analysis covers deaths with complete information from March 12-December 11, 2020.

**Table 3.**

Includes immediate, underlying and contributory causes of deaths combined	# Chamorros (n=33)	% among Chamorros with this as one or more causes of death	# Filipinos (n=33)	% among Filipinos with this as one or more causes of death	# Micronesians (n=39)	% among Micronesians with this as one or more causes of death
Respiratory [e.g. ARDS, respiratory failure, and pneumonia]	31	93.9	29	87.9	29	74.4
Cardiovascular [e.g. cardiac arrest, cardiopulmonary arrest]	10	30.3	8	24.2	21	53.8
Hypertension	10	30.3	7	21.2	10	25.6
Complications of COVID-10 infection	2	6.1	7	21.2	14	35.9
Diabetes mellitus (or complications)	9	27.3	8	24.2	15	38.5
Critical bleeding conditions	2	6.1	6	18.2	3	7.7
Renal (kidney conditions), including ESRD	9	27.3	3	9.1	7	17.9
Multi-organ failure	2	6.1	1	3.0	2	5.1
Sepsis	2	6.1	2	6.1	2	5.1
Infections [e.g. bacteremia]	3	9.1	1	3.0	4	10.3
Morbid obesity	7	21.2	1	3.0	2	5.1
Tobacco	0	0.0	0	0.0	1	2.6
Cancer	1	3.0	1	3.0	1	2.6
Dementia	2	6.1	1	3.0	0	0.0
Chronic lung disease	2	6.1	0	0.0	0	0.0
Other chronic diseases	0	0.0	0	0.0	0	0.0
Other	3	9.1	4	12.1	8	20.5

The mortality analysis provides a comparison of mortality between all deaths and mortality causes among Guam's three major ethnic groups: Chamorro Filipino and Other Pacific Islanders (Chuukese, Pohnpeian, Yapese, Palauan).

The vast majority of entries in the death certificates among all COVID-19 patients are for respiratory conditions for all cause(s) of death [e.g. ARDS due to COVID-19, respiratory failure or pneumonia].

The second most common entries in the death certificates among all COVID-19 patients are complications of COVID-19 infections, and cardiovascular diseases or events and hypertension.

All three groups have diabetes listed as a cause of death among COVID-19 deaths.

Chamorros and Micronesians are more likely to have renal conditions (including ESRD) as a cause of death as well as infections.

Chamorros are more likely to have morbid obesity listed as a cause of death.

Filipinos have more entries in their death certificates related to cardiovascular events, complications of COVID-19 and critical bleeding conditions.

Filipinos have less entries in their death certificates related to hypertension, morbid obesity and renal failure.

Micronesians are more likely to have other conditions listed on their death certificates.

Summary reports and any accompanying mortality analysis will be updated as time permits and death certificate information becomes available.

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## Endnotes

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<sup>1</sup>Data on the daily and total number of COVID-19 cases are provided Monday through Friday except on holidays and are available on the DPHSS website: <http://dphss.guam.gov/covid-19/>. Detailed data on cases, recent trends, case breakdown by age, sex, ethnicity, village, symptom onset and epi-links (household, workplace, community or healthcare), testing and data definitions are also available on the DPHSS COVID-19 dashboard. These reports are updated on Fridays.

Daily case counts and the dashboard demographics compiled by Vince Campo, Research and Statistical Systems Analyst: [vincecampo1@gmail.com](mailto:vincecampo1@gmail.com) (671) 300-6208.

<sup>2</sup> GIS map with cases by location compiled by Patrick P. Sotto, Covid-19 Response Coordinator: [patrick.sotto@dphss.guam.gov](mailto:patrick.sotto@dphss.guam.gov) (671) 300-6214.

<sup>3</sup> Case data updated compiled by Vince Campo, Research and Statistical Systems Analyst: [vincecampo1@gmail.com](mailto:vincecampo1@gmail.com) (671) 300-6208.

<sup>4</sup>Centers for Disease Control and Prevention (CDC) Behavioral Risk Factor Surveillance System (BRFSS): <https://www.cdc.gov/brfss/index.html>

<sup>5</sup> Note there is a lag time from notification of the death to receipt of death certificate of approximately 2 weeks. Having the MD notes and DPHSS case listing, along with the death certificates results in additional relevant information.



**Figure 6. Some key examples of historical disease outbreaks on the Island of Guam, with significant impact on the population:**

YEAR	DISEASE	RESULT
1856	Smallpox	The day before the American schooner “Frost” arrived from Manila, the body of a young man who had died of smallpox was thrown overboard. Although the military surgeon recommended to the Governor that all those on board be <b>quarantined</b> for at least three days, Silvestre Torres Palomo, a prominent Guamanian, and his servant debarked the next day. The servant was the first of 3,463 persons to die of smallpox (181 additional persons died of “complications”) during the 9 month epidemic leaving only 4,724 residents on the island.
1878	Measles	Nearly every child and many adults affect, mortality was 20%.
1889	Measles	Mortality was approximately 16%.
1913	Measles	6,884 cases, 43 deaths. <b>All schools were closed and all public gatherings were forbidden for a period of several months.</b>
1918	<b>Pandemic influenza</b>	Pandemic influenza resulted in 853 deaths, or 5% of the pre-epidemic population. <b>The Governor ordered schools closed, public gatherings prohibited and recommendations were made for people to move to the country, and enforcement by police department with penalties. After the first death, the Governor prohibited house to house visiting, prohibited large gatherings unless in the open air, where gauze masks were required. All cases of respiratory illnesses were required to be reported to the Health Officer and yellow flags marked houses with cases of influenza. People with ranches were advised to move to their ranches. All Governors orders were enforced by the Health Officer and police, with penalties.</b>
1934	Measles	2,100 cases, 152 deaths.
1948	Measles	5,000 cases, 13 deaths and several cases of post-measles encephalitis.
1934	Measles	2,100 cases, 152 deaths.
1957	Poliomyelitis	The outbreak was aborted by the administration of 25,324 inoculations of Salk polio vaccine.
1976	Influenza	3,655 cases reported.
2020	Pandemic novel coronavirus	<a href="https://dphss.guam.gov/covid-19/">https://dphss.guam.gov/covid-19/</a>

Source: History of Health on Guam (2010, Editor-Robert L. Haddock) and the Office of Epidemiology and Research, DPHSS.