HISTORICAL SUMMARY OF REPORTED NEW CASES OF NOTIFIABLE DISEASES AND INCIDENCE PER 100,000 POPULATION, GUAM 1968-2018

Office of Epidemiology and Research

Department of Public Health and Social Services

Government of Guam

March 2020

Sections

Background 3
Figure 1. Population of Guam and Intercensal Growth Rate, 1910-2010 and 2020 Estimate 4

Methods 5

Limitations 5

Sexually Transmitted Diseases 6
Figure 2. Gonorrhea new cases and incidence rate per 100,000 population – Guam, 1968-2018 7
Figure 3. Chlamydia new cases and incidence rate per 100,000 population – Guam, 1992-2018 8
Figure 4. Syphilis new cases and incidence rate per 100,000 population – Guam, 1968-2018 9

Tuberculosis and Hansen's Disease 10
Figure 5. Tuberculosis new cases and incidence rate per 100,000 population – Guam, 1968-2018 11
Figure 6. Hansen's disease new cases and incidence rate per 100,000 population – Guam, 1968-2018 12

Multiple-Drug Resistant Infections 13
Figure 7. MRSA new cases and incidence rate per 100,000 population – Guam, 1995-2018 14
Figure 8. New cases of other Multiple Drug Resistant Organisms (not including MRSA) – Guam, 2009-2018 15

Dengue Fever 13
Figure 9. Dengue new cases and incidence rate per 100,000 population – Guam, 1988-2018 16

Leptospirosis 13
Figure 10. Leptospirosis new cases and incidence rate per 100,000 population – Guam, 1968-2018 17

Salmonellosis and Shigellosis 18
Figure 11. Salmonella new cases and incidence rate per 100,000 population – Guam, 1968-2018 19
Figure 12. Shigellosis new cases and incidence rate per 100,000 population – Guam, 1968-2018 20

Influenza, Varicella, Measles, Pertussis and Mumps 18
Figure 13. Influenza new cases and incidence rate per 100,000 population – Guam, 1968-2018 21
Figure 14. Varicella (chickenpox) new cases and incidence rate per 100,000 population – Guam, 1968-2018 22
Figure 15. Measles (*Rubeola*) new cases and incidence rate per 100,000 – Guam, 1968-2018 23
Figure 16. Pertussis new cases and incidence rate per 100,000 population – Guam, 1968-2018 24
Figure 17. Mumps new cases and incidence rate per 100,000 population – Guam, 1968-2018 25

Scabies, Conjunctivitis, and Streptococcal Sore Throat 26
Figure 18. Scabies new cases and incidence rate per 100,000 population – Guam, 1979-2018 27
Figure 19. Conjunctivitis new cases and incidence rate per 100,000 population – Guam, 1971-2018 28
Figure 20. Streptoccocal sore throat new cases and incidence rate per 100,000 population – Guam, 1968-2018 29

Summary 30

Acknowledgements: 31

Table 1: Guam Ethnic Population by Census Year 32

Appendix A: Historical Summary of Reported Cases of Notifiable Diseases, Guam 1968-2018 33
Appendix B: Historical Summary of Notifiable Diseases, Incidence per 100,000, Guam 1968-2018 37

Background

The purpose of this report is to provide the community with a historical summary of reported cases of the notifiable infectious diseases on Guam based on available data for the period 1968-2018. The overall intent is to illustrate any discernable patterns in infectious diseases over the past 50 years, as well as examine recent trends. Infectious diseases of interest are graphed.

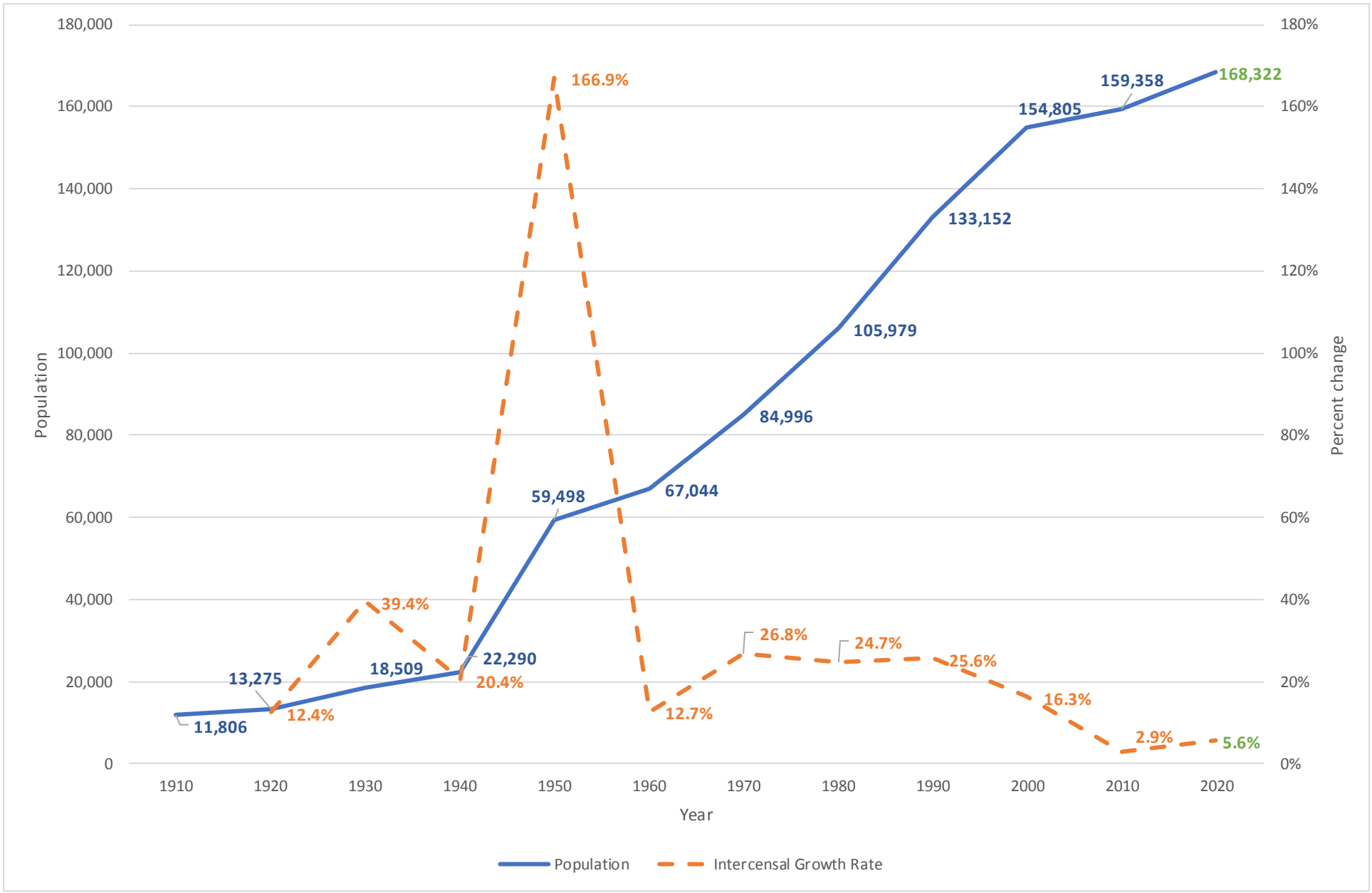
The U.S. unincorporated territory of Guam in the Western Pacific had an estimated population of 165,777 in 2018, which was 41.1% Chamorro, 29% Filipino, 7.8% Chuukese (from the Federated States of Micronesia), 7.8% White, 5.5% other Pacific Islanders (mainly other Micronesians), and 8.7% other groups.[1] Guam's population included approximately 12,000 active-duty military personnel and their dependents in 2010,[2] as well as numerous other military personnel who are being deployed elsewhere and come to Guam for short stays in transit; Guam's military population estimate for 2018 is approximately 15,000 military personnel and their dependents.[3] Guam has a slightly higher proportion of males (51%) than females (49%).

Guam's population has more than doubled since 1960. However, the rate of growth has slowed dramatically since the turn of the century. A population increase barely registered between the 2000 and 2010 censuses, at just 0.36% growth.

Guam's population has steadily increased not only as a result of natural increase (high fertility rates), but from continued immigration of Filipinos, who were recruited as skilled laborers to rebuild the island in large numbers beginning after the war.[4] Guam has also experienced increased in-migration from the Federated States of Micronesia (mainly Chuuk), as well as from other U.S. Affiliated Pacific Islands (USAPI, e.g. the Republic of Palau), that intensified after the Compact of Free Association (COFA) established that residents of the USAPI could travel freely throughout the U.S.[5] Not only do immigrants from the Philippines and migrants from the USAPI come to Guam, but many people travel back and forth to their home island or country. The Philippines and the USAPI regions have high rates of infectious diseases that impacted Guam in the past and will continue to do so in the future.

Guam's main infectious disease challenges include: sexually transmitted diseases, tuberculosis, Hansen's disease, multi-drug resistant infections (mainly MRSA), as well as increased risk for arboviral diseases, which are endemic in numerous countries in the Asia-Pacific region (i.e. dengue fever). Hepatitis B and C are also known problems, but the data have not been verified for accuracy in the annual summaries and in the current Hepatitis Registry. Guam also has high rates of streptococcal sore throat, pertussis, shigellosis, leptospirosis, conjunctivitis, and scabies.[6]

Figure 1. Population of Guam and Intercensal Growth Rate, 1910-2010 and 2020 Estimate



Methods

All data were compiled from hard and electronic copies of existing morbidity reports from the Annual Summary of Notifiable Diseases from 1968-2018, Guam DPHSS, Office of Epidemiology and Research. These are new cases of infectious diseases that are reported to the Centers for Disease Control and Prevention each year through the National Notifiable Diseases Surveillance System (CDC-NNDSS), while other diseases of immediate concern are reported as necessary.[7] Guam also compiles data on additional infectious diseases in its population. Morbidity reports were tallied by hand until 1992 when the data were computerized.[8] Guam incidence rates were calculated using the reported U.S. Census data for all Census years. Population estimates from the Guam State Data Center, Bureau of Statistics and Plans were used for intercensal years prior to 2010 and the Guam Statistical Yearbook-2016 for the intercensal years 2011-2018.[1] If available, comparable U.S. incidence rates for specific infectious diseases were obtained directly from the CDC-MMWR and the searchable MMWR historical CDC stacks.[9] All U.S. data exclude U.S. territories. For some infectious diseases, comparisons with Hawaii are included.[10] Some of the notifiable infectious diseases have been graphed or compared with the U.S. overall (or Hawaii). All tabular data are listed in Appendix A (cases) and Appendix B (incidence rate per 100,000). Not all case counts are shown in the graphs, but all are available in Appendix A. Data on sexually transmitted diseases, tuberculosis, and Hansen's disease were verified with the corresponding DPHSS program(s). The data for 2000-2016 for chlamydia was obtained from the CDC,[11] since there were inconsistencies in the Annual Summaries for this time period. Data for 2018 are preliminary and currently being verified.

Limitations

The main limitations of these data are the lack of reporting (e.g. from smaller clinics) and lack of timely reporting (e.g. from the military), even though it is required by law for all health care providers to report specified infectious diseases to the DPHSS.[12] From 1968-1992, all data were compiled by hand and tallied at the DPHSS, with each case of infectious disease having hard copy morbidity reports and follow-up records. In recent years, morbidity reports can come in by phone, fax, or mail and can include hard copies, faxed copies, and electronic submissions (including secure email, safe access or Health Language 7 [HL7] file exchange, as well as manual entry into the National Electronic Disease Surveillance System [NEDSS] Base System [NBS]). It is anticipated that as more clinics submit reports electronically, timely reporting could become less of a problem. However, it is important to note that many morbidity reports come in by phone, and these morbidity reports are generated at DPHSS for appropriate follow-up.

An additional limitation is the compilation of data on hepatitis B and C cases. Guam appears to have high rates of hepatitis B and C compared to the U.S.; however, from 2009-2016, reported 'new' cases were included in the Guam annual summaries if they had not yet been included in the Hepatitis Registry (with data beginning in 1980). A comparison of hepatitis B and C cases recorded in the annual reports and in the current Hepatitis Registry by year provided conflicting numbers of cases, indicating that the annual summary counts are inaccurate. Since the number of annually reported cases may include chronic cases and therefore not accurately reflect new acute cases, hepatitis B and C are not included in this report. The DPHSS is in the process of updating and verifying the Hepatitis Registry. From 2017 onward, only new (acute) cases of hepatitis B and C are reported in the annual summaries.

Sexually Transmitted Diseases

For sexually transmitted diseases, as can be noted from Figure 1 (gonorrhea), Guam has generally followed the overall U.S. pattern, with high rates peaking in the 1970's and then decreasing. Guam peaked later, in the 1980's, and then experienced a decrease. In both the U.S. and Guam, rates have started to increase since 2014. Gonorrhea rates were slightly lower in Guam compared to the U.S. in 2018 (122.0 per 100,000 on Guam versus 170.6 per 100,000); however, the number of gonorrhea cases continued to rise from 99 cases in 2014 to 225 in 2018, a 127 percent increase.

Guam has very high rates of chlamydia (Figure 2), along with increasing numbers of syphilis cases (Figure 3; including congenital syphilis, not shown). The incidence rate of new chlamydia cases in 2017 was 675.5 per 100,000, which was higher than the U.S. rate of 524.6 per 100,000.[13] Guam's military population is a major contributor to the high rates of sexually transmitted infections. The DPHSS is currently reviewing the data to compare the cases and incidence rates of military and civilian STDs for the years these data are available.

Up until the year 2000, Guam's syphilis rate was lower than the U.S., but it is now higher and has increased in recent years. Guam has had 19 reported cases of congenital syphilis since 2001, whereas from 1968 to 2000, a span of 32 years, there was only one case of congenital syphilis reported on Guam (in 1969).

Figure 2. Gonorrhea new cases and incidence rate per 100,000 population – Guam, 1968-2018

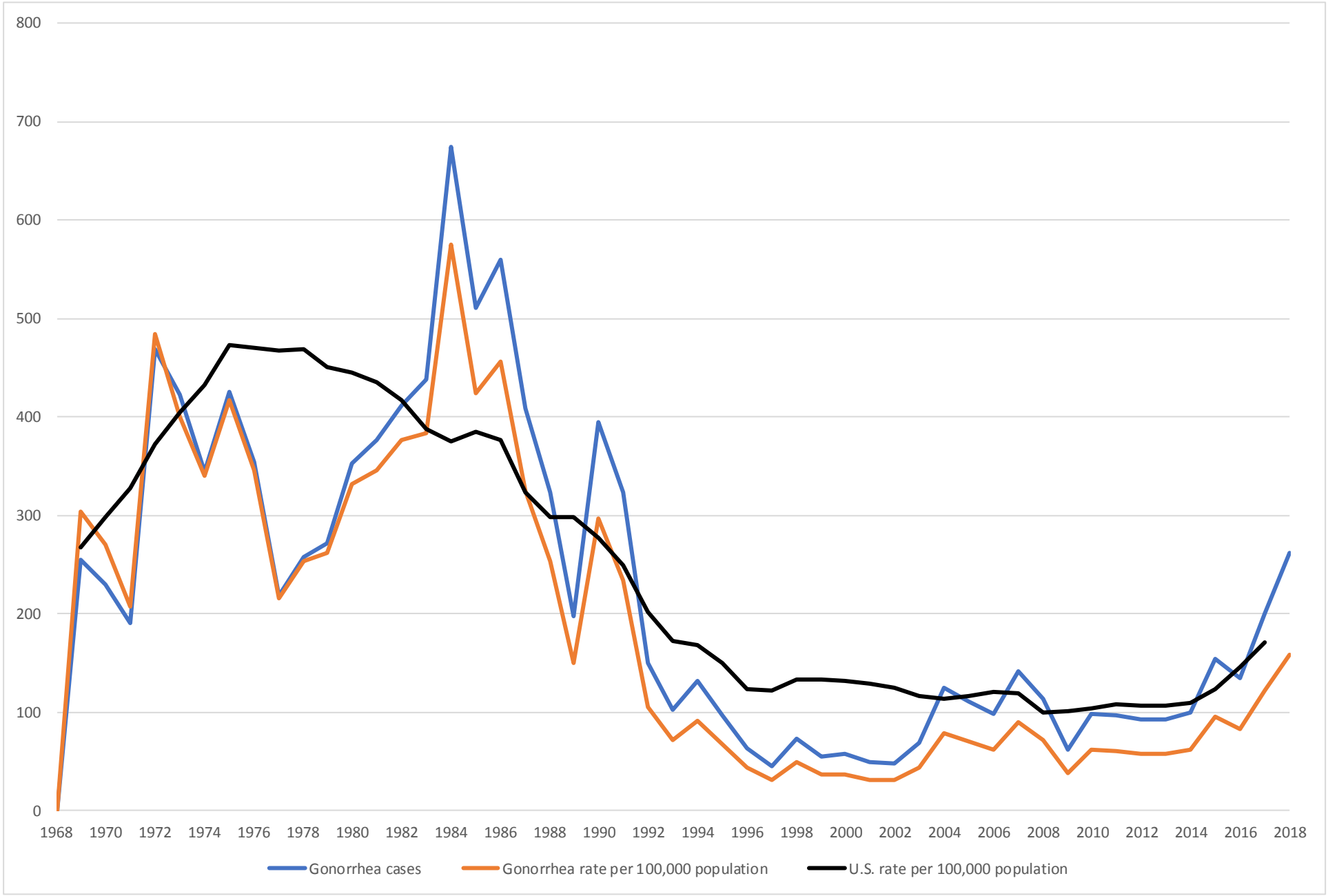


Figure 3. Chlamydia new cases and incidence rate per 100,000 population – Guam, 1992-2018

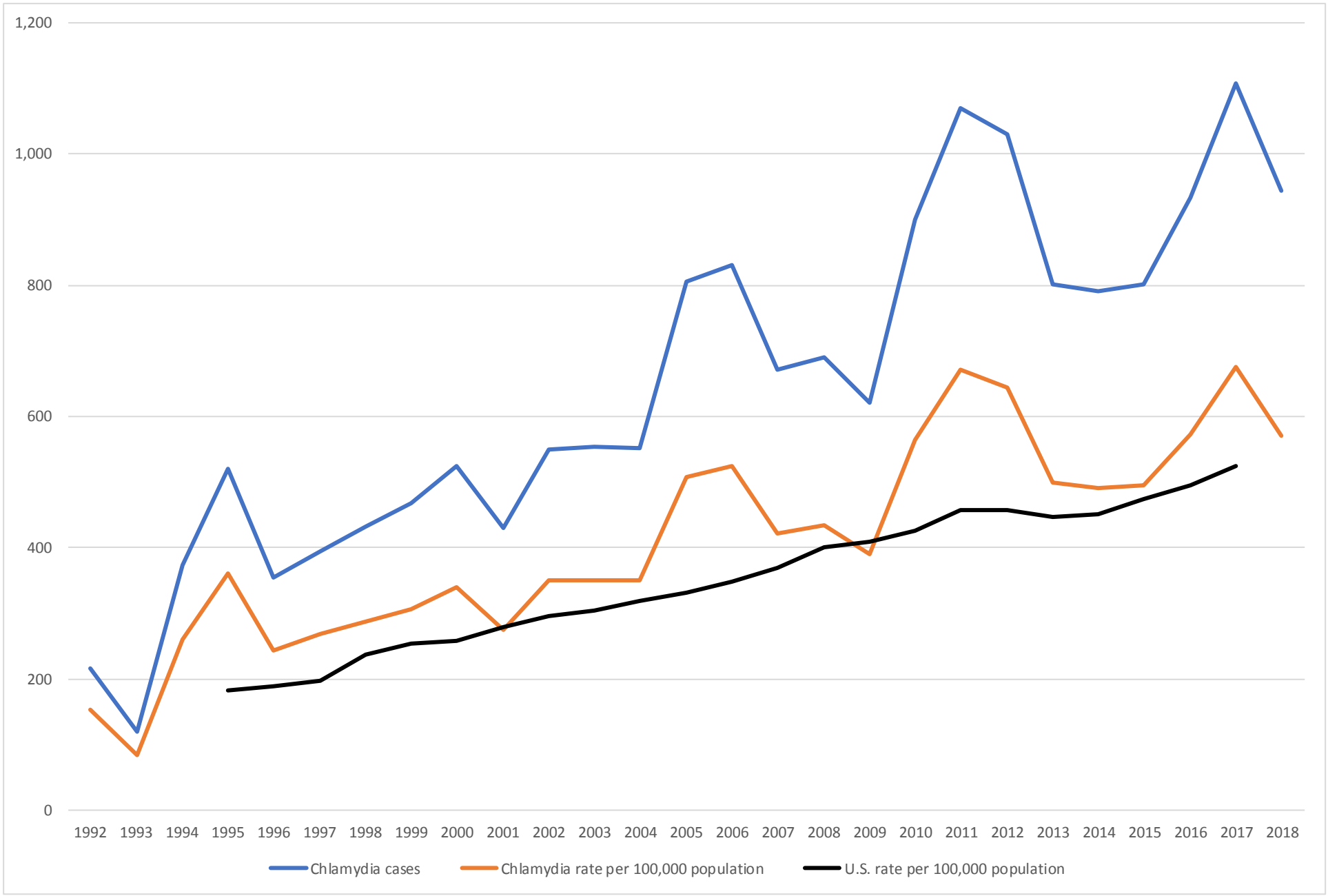
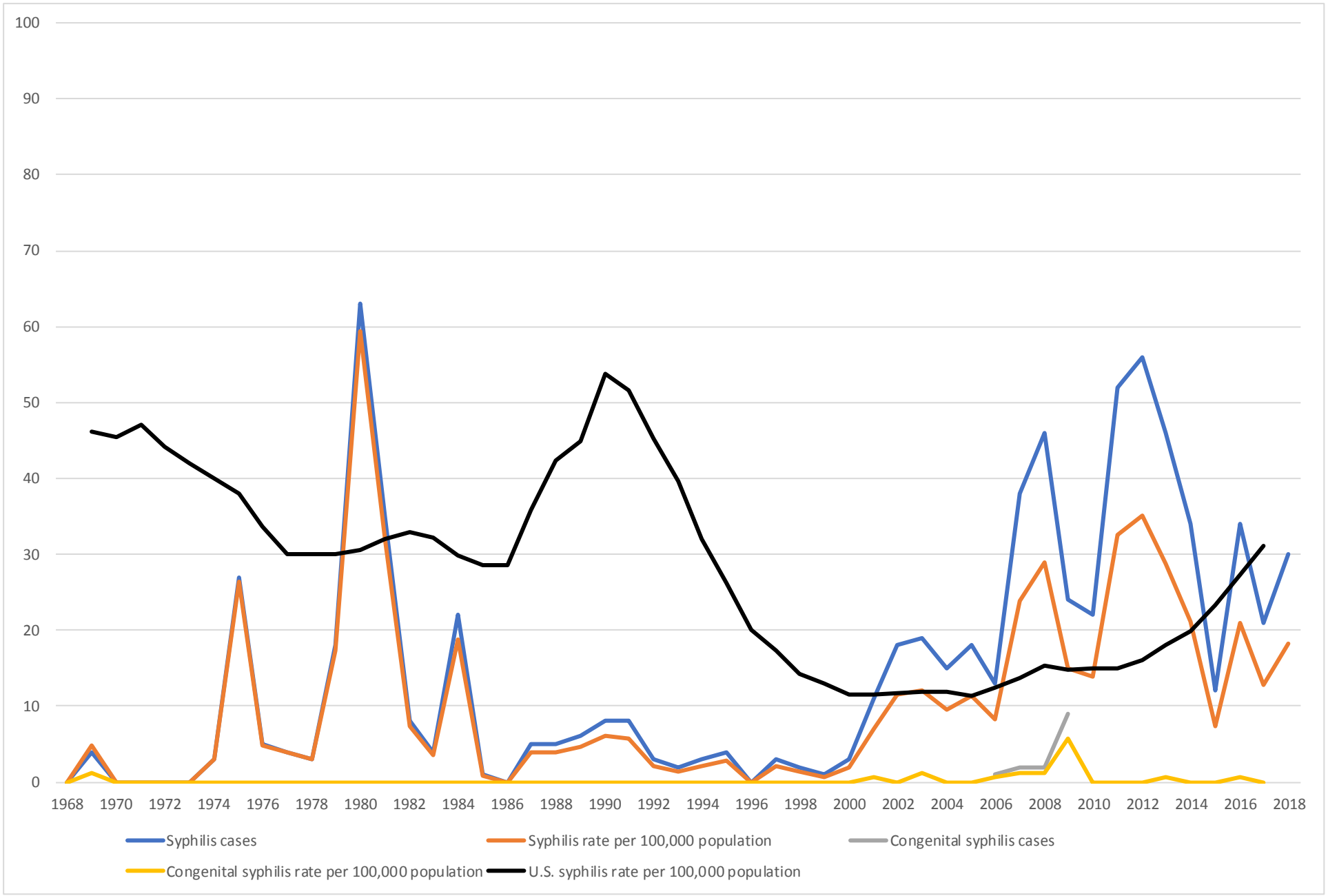


Figure 4. Syphilis new cases and incidence rate per 100,000 population – Guam, 1968-2018



Tuberculosis and Hansen's Disease

Guam has the highest rates of tuberculosis (Figure 4) and Hansen's disease (Figure 5) in the U.S. for its small population, although Guam is not ranked in official CDC reports[14] and the state of Hawaii does have similarly high rates of both tuberculosis and Hansen's disease.[15] This is a result of the high rates of tuberculosis not only among local Chamorro and Filipino residents, but also among immigrants to Guam from the Philippines and migrants from the USAPI (mainly the Federated States of Micronesia). The incidence of tuberculosis in the Philippines is 554 per 100,000 population, 480 per 100,000 population in the Marshall Islands, and 165 per 100,000 in the Federated States of Micronesia in 2017.[16]

From 2011-2018, Guam had a total of 558 new cases of tuberculosis diagnosed: 247 were among Filipinos (44.3%), followed by 152 Chamorros (27.2%) and 139 Other Pacific Islanders (24.9%), the majority of whom were from Micronesia.

Guam's high rate of Hansen's disease is a direct result of migrants from the Federated States of Micronesia (mainly Chuuk State). Persons born in Oceania had the highest rate of Hansen's disease diagnosis during the period 1994-2011, with an average annual rate of 556.9 cases per million population, more than 10 times the rate observed for any other region in the U.S. Ninety-seven percent of those diagnosed during the period 1994-2011 from Oceania were born in the Federated States of Micronesia or the Marshall Islands, and almost half of these persons were diagnosed in Hawaii.[17] It is likely most others from the USAPI were diagnosed on Guam.

On Guam from 2009-2018, there were a total of 129 new cases of Hansen's disease diagnosed: 3 were Chamorro (2.3%), 5 were Filipino (3.9%), 1 was Marshallese (Republic of the Marshall Islands-RMI; 0.8%), 1 was Palauan (Republic of Palau-ROP; 0.8%), and 119 were from the Federated States of Micronesia (FSM; 92.2%). Of the 119 cases from FSM, the majority were from Chuuk State (68.9%), with another 23.3% from Pohnpei, 3.9% from Yap State, and 1.6% from Kosrae State.

Figure 5. Tuberculosis new cases and incidence rate per 100,000 population – Guam, 1968-2018

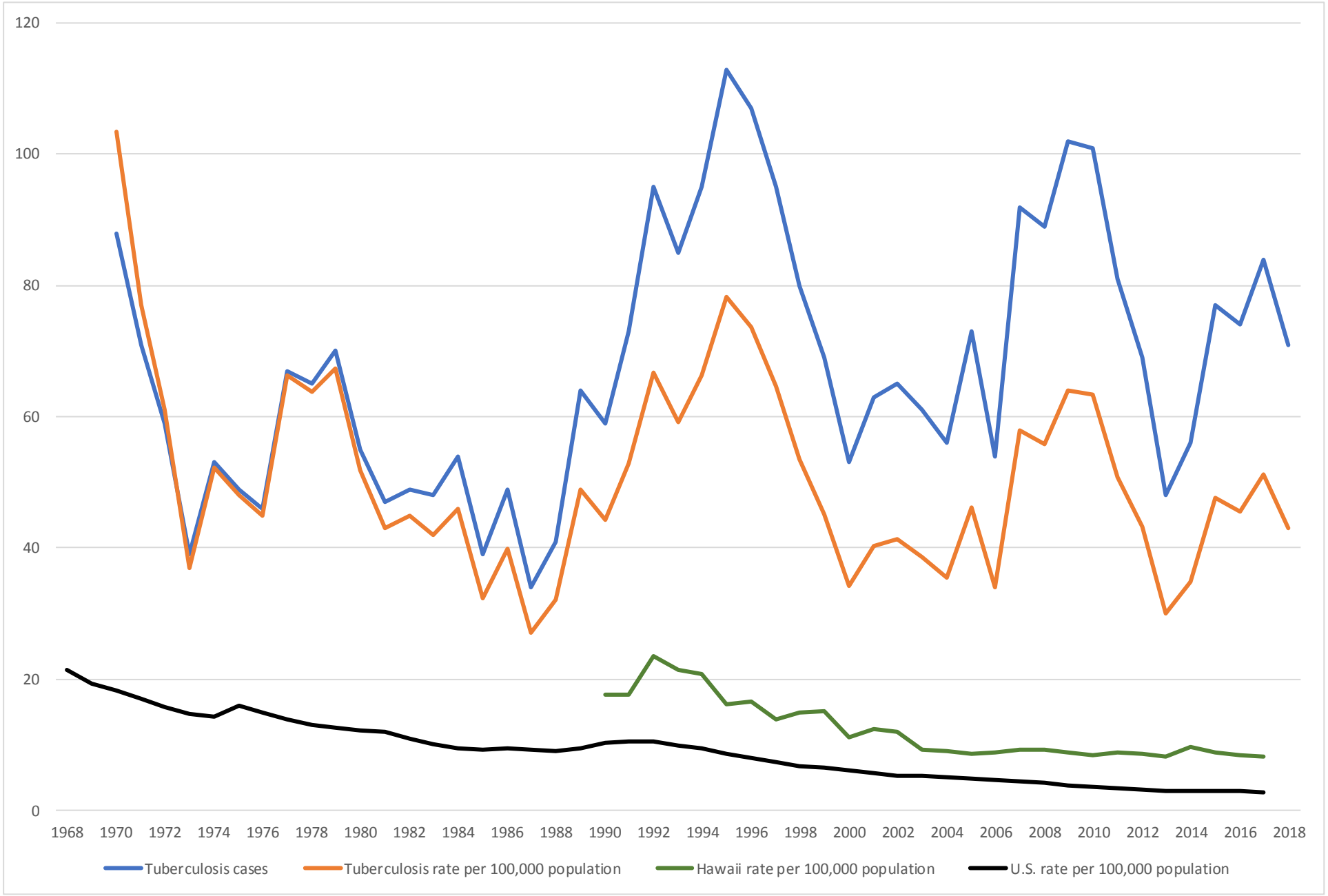
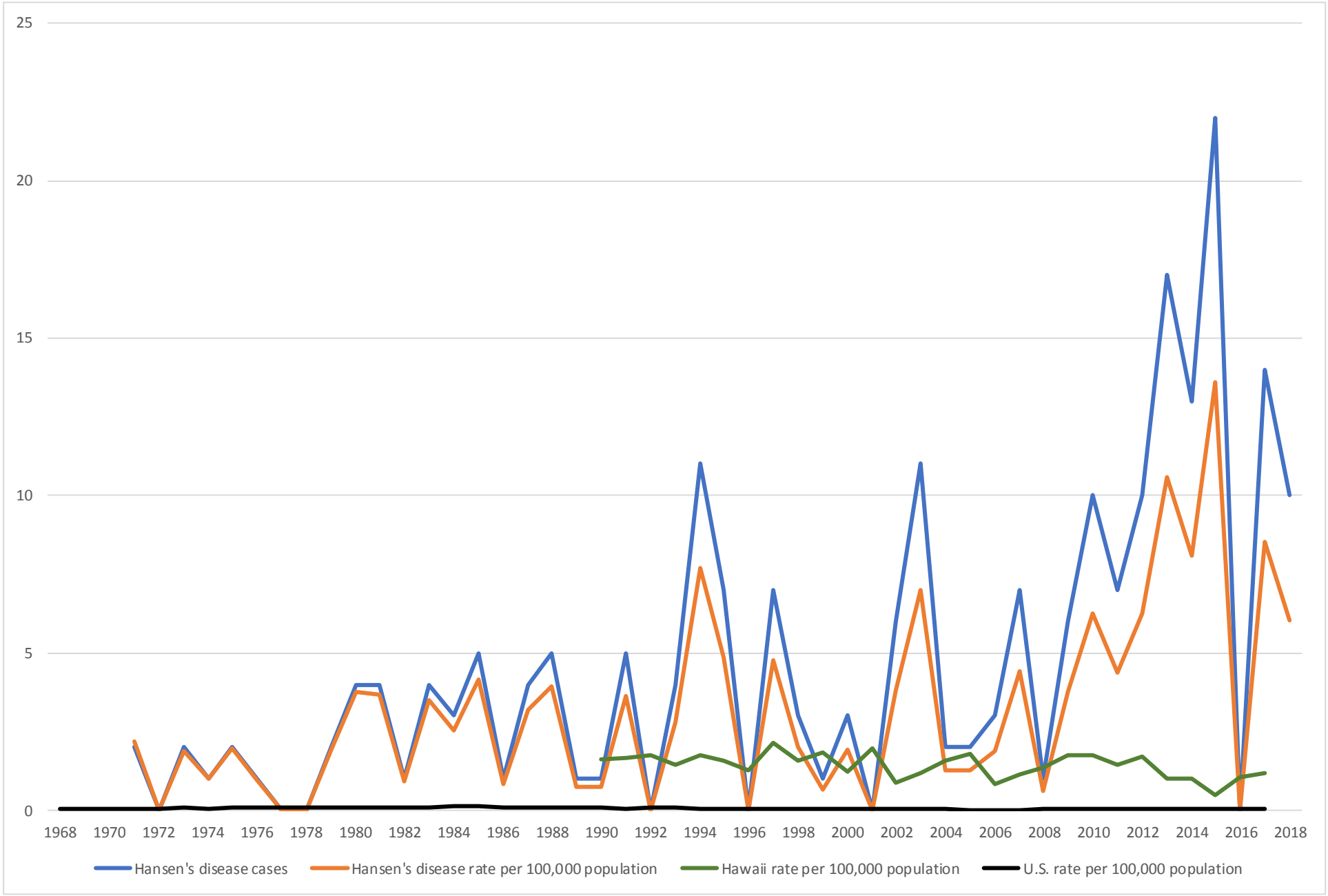


Figure 6. Hansen's disease new cases and incidence rate per 100,000 population – Guam, 1968-2018



Multiple-Drug Resistant Infections

Multiple resistant infections pose another challenge for Guam. Multiple resistant organisms have been reported by health providers to the Guam DPHSS since 2009, and methicillin-resistant *Staphylococcus aureus* (MRSA) since 1996. Comparison with the U.S. was not made since the CDC-MMWR only reports specifically Vancomycin-intermediate and Vancomycin-resistant *Staphylococcus aureus*. Overall patterns on Guam show a significant increase since 2009 for MRSA, which accounts for the vast majority of drug-resistant organisms (Figure 6), as well as increases for *Acinobacter, Escherichia* and *Pseudomonas* (Figure 7). *Klebsiella* was also on the increase from 2009-2015 but has decreased in recent years.

Dengue Fever

Guam has high rates of dengue fever for its small population (Figure 8), although all 42 cases in the 30 years from 1988-2018 were contracted off-island (mainly in the Philippines). Guam is at risk for dengue fever infections since dengue is endemic in places where Guam's immigrants (Philippines) and migrants (USAPI) come from, and where there is back-and-forth travel.

Leptospirosis

Until the mid-1990's, there was very little leptospirosis observed on Guam. After that point, Guam has seen several peaks in leptospirosis cases (2004, 2001, and 2015), and Guam's rate is currently higher than the U.S. and even Hawaii, for its small population (Figure 9).

Figure 7. MRSA new cases and incidence rate per 100,000 population – Guam, 1995-2018

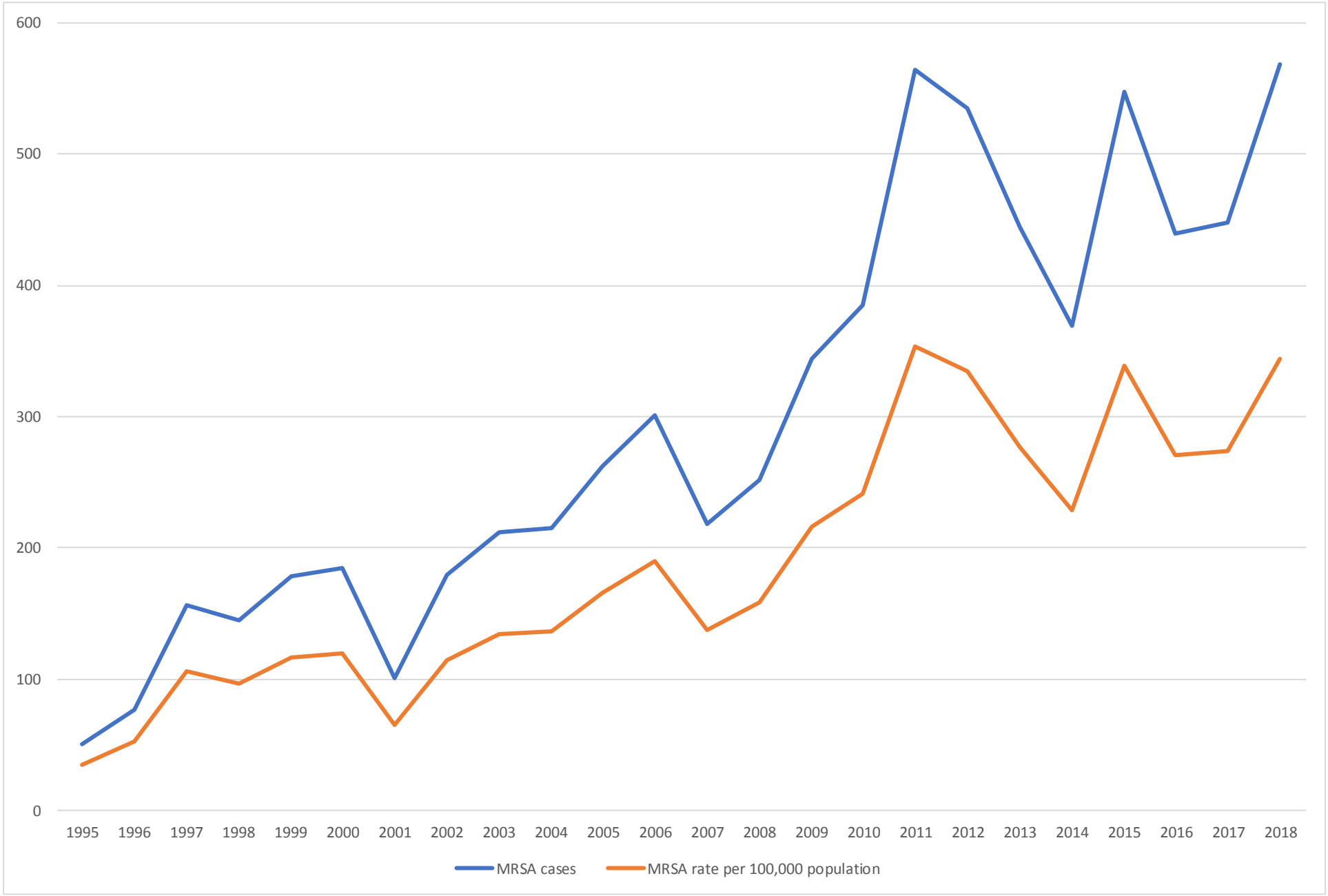


Figure 8. New cases of other Multiple Drug Resistant Organisms (not including MRSA) – Guam, 2009-2018

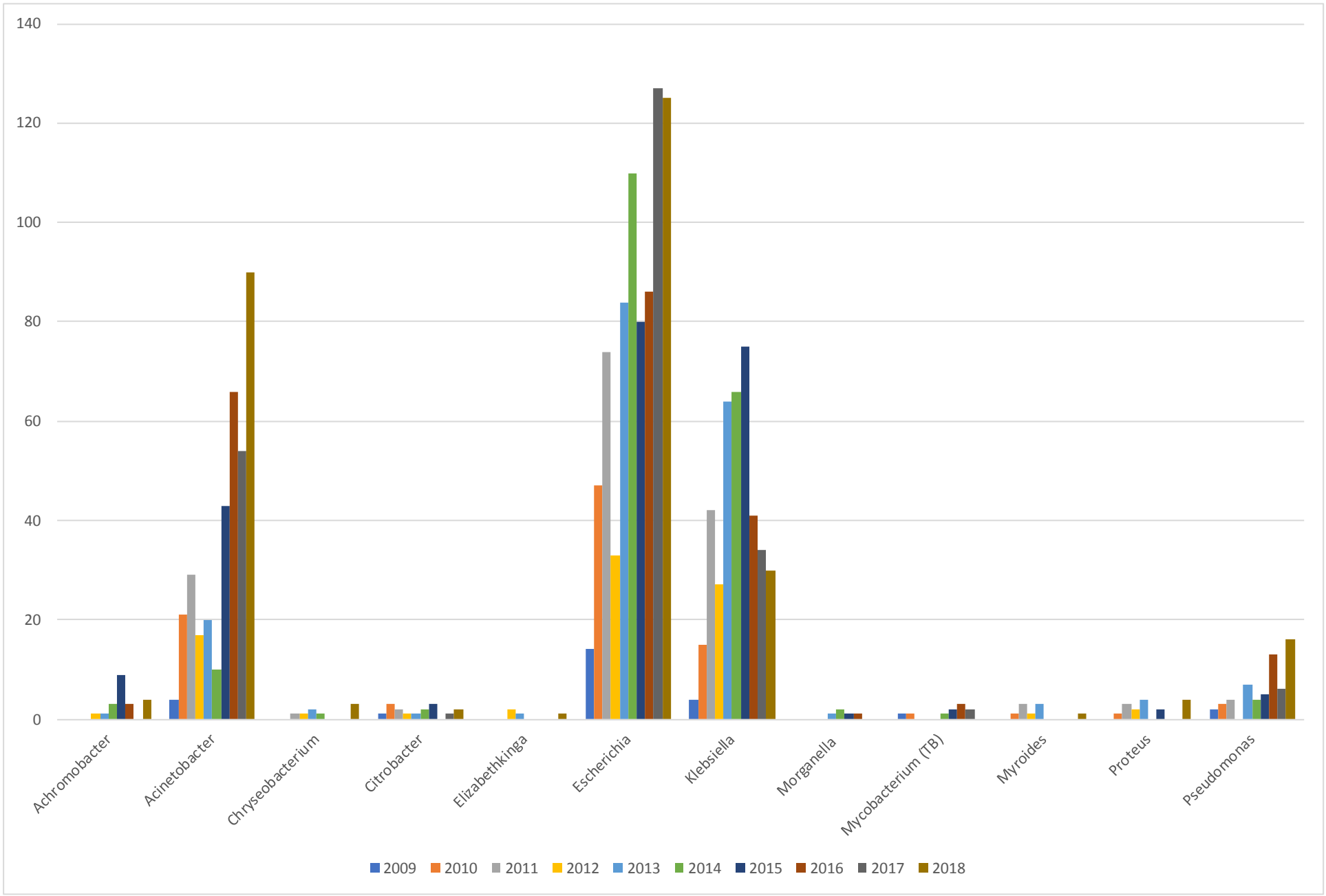


Figure 9. Dengue new cases and incidence rate per 100,000 population – Guam, 1988-2018

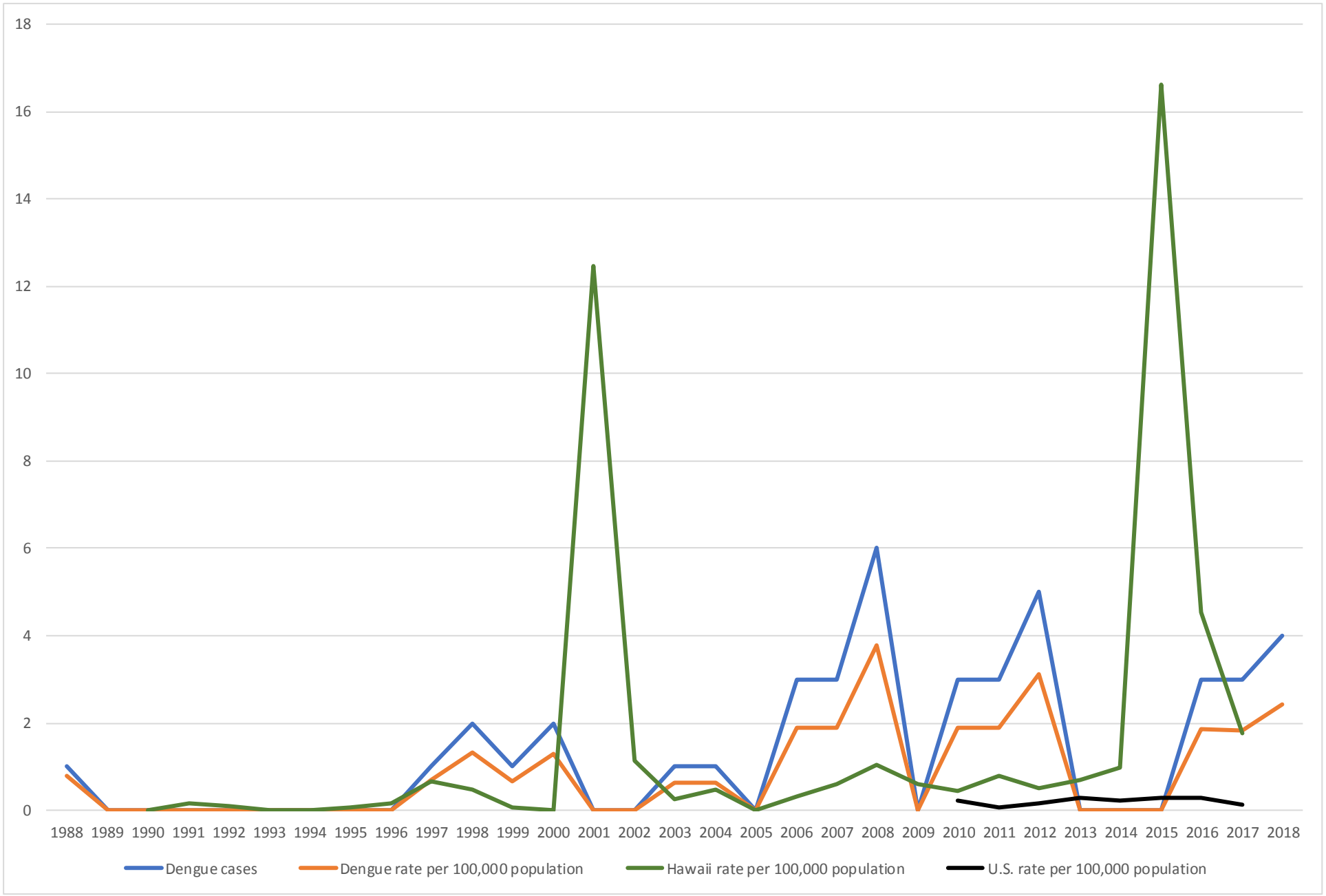
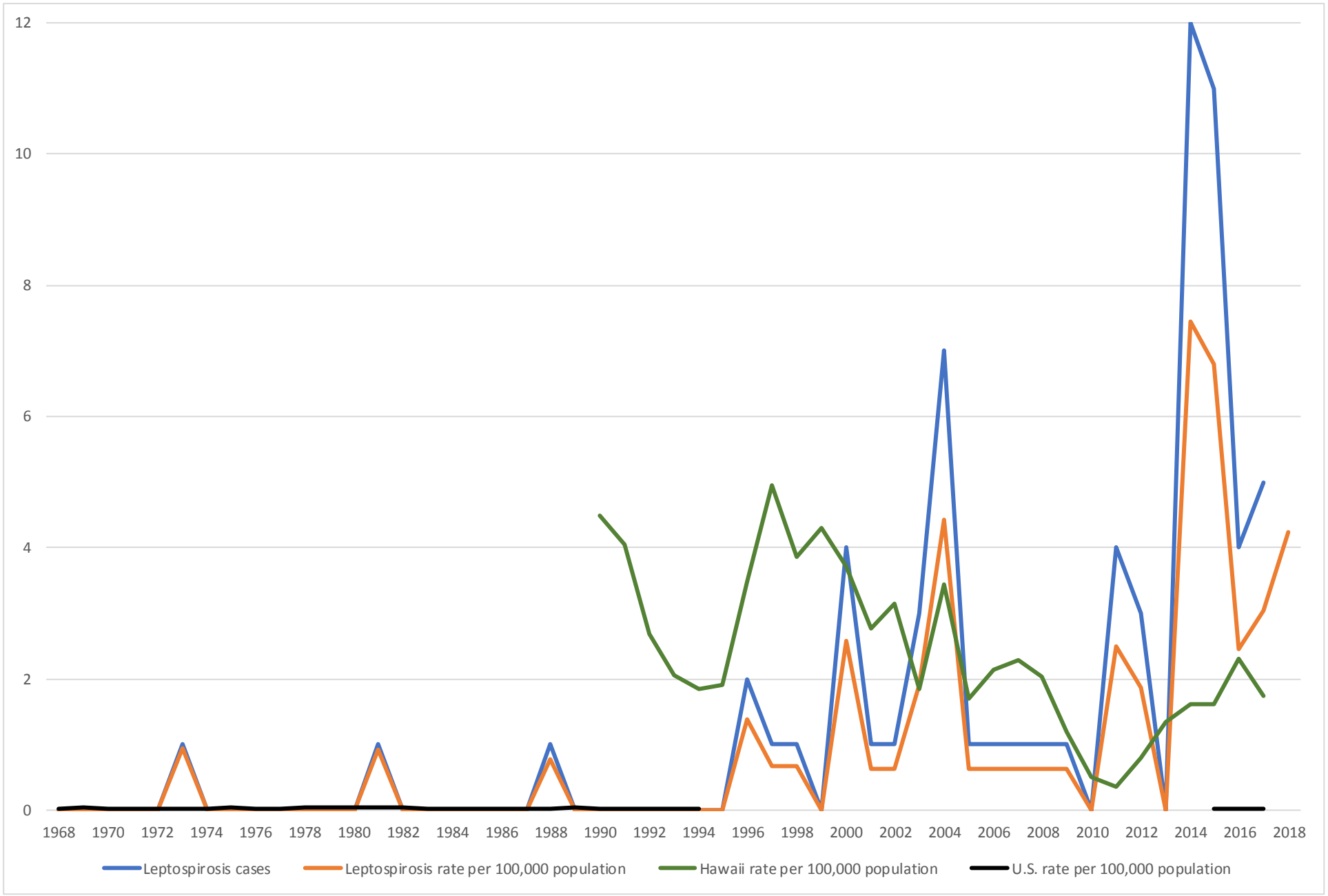


Figure 10. Leptospirosis new cases and incidence rate per 100,000 population – Guam, 1968-2018



Salmonellosis and Shigellosis

From the mid-1970's until the mid-1990's, Guam experienced high numbers of *Salmonella* infections (Figure 10). Investigations about the problem suggested that it was not primarily a result of contaminated food.[18] Based on extensive investigations throughout the 1980's and 1990's, the evidence suggested that there were three primary modes of *Salmonella* infection on Guam, determined mainly by differential exposure by age: (1) infant infections via passive contact with dust and dust aerosols in the home, (2) active contact among older children through play or touching pets, and (3) accidental contact among adults (including food poisoning).[19] Additional studies also suggested there was a positive association between increased rainfall on Guam and incidence of *Salmonella* infections that were seasonal, suggesting environmental soil contamination from small animals (e.g. lizards, toads).[20] Guam's current rate of *Salmonella* infections is similar to the U.S.

Guam also experienced high rates of *Shigella* infections in the mid-1980's to the early 1990's and has shown notable decreases since then, although there has been a recent surge after 2015 (Figure 10).

Influenza, Varicella, Measles, Pertussis and Mumps

Guam's influenza incidence rate shows numerous peaks throughout the 1970's and 1980's (Figure 12), decreasing in the mid-1990's, with a recent surge in the past few years.

The incidence rate for varicella (chicken pox) on Guam is slightly higher than the U.S. rate (Figure 13). From the 1980's the varicella rate increased until it peaked in 1995. Since then, the rate has been decreasing, except for a surge in the early 2000's.

Guam's incidence of measles has decreased since 1996. Prior to 1996, there were numerous peaks, particularly in 1984, 1991, and 1994 (Figure 14). The incidence of pertussis on Guam prior to 1997 was lower than the U.S. rate, and there has been a recent increase since then with several peaks in 1997, 2006, and 2015.

Guam's incidence of mumps shows only two notable peaks in 1974 and 2010 (Figure 15).

Figure 11. Salmonella new cases and incidence rate per 100,000 population – Guam, 1968-2018

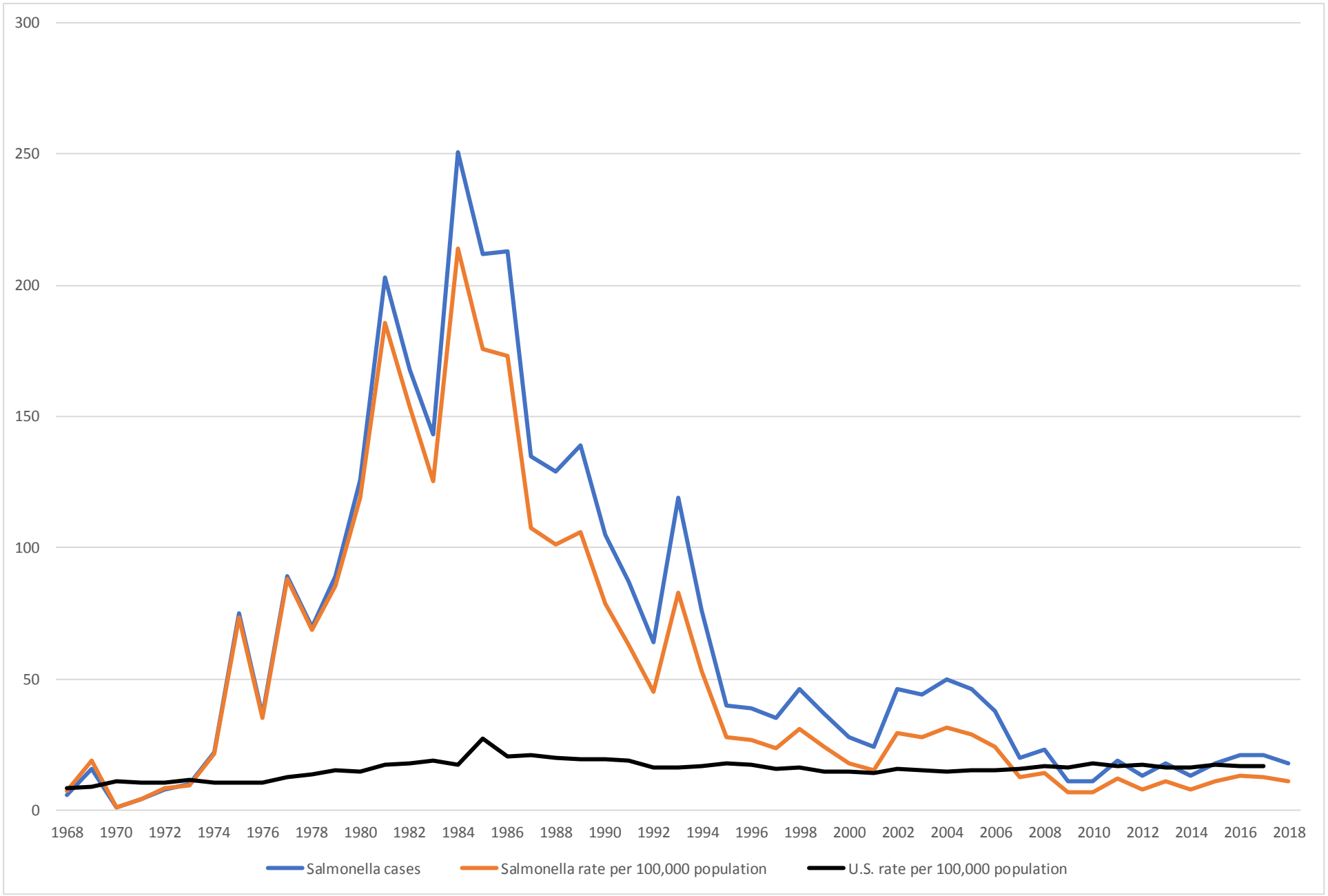


Figure 12. Shigellosis new cases and incidence rate per 100,000 population – Guam, 1968-2018

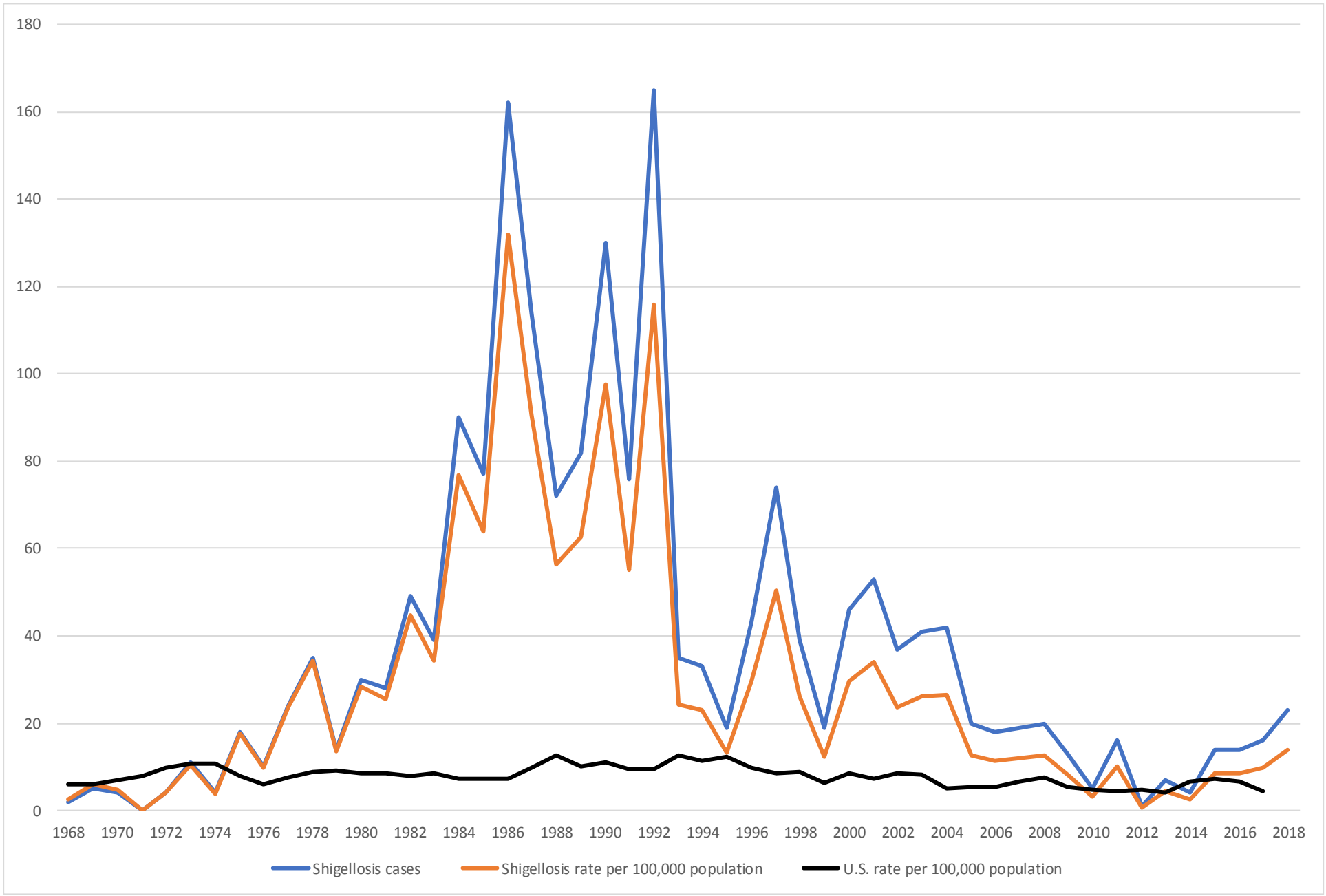


Figure 13. Influenza new cases and incidence rate per 100,000 population – Guam, 1968-2018

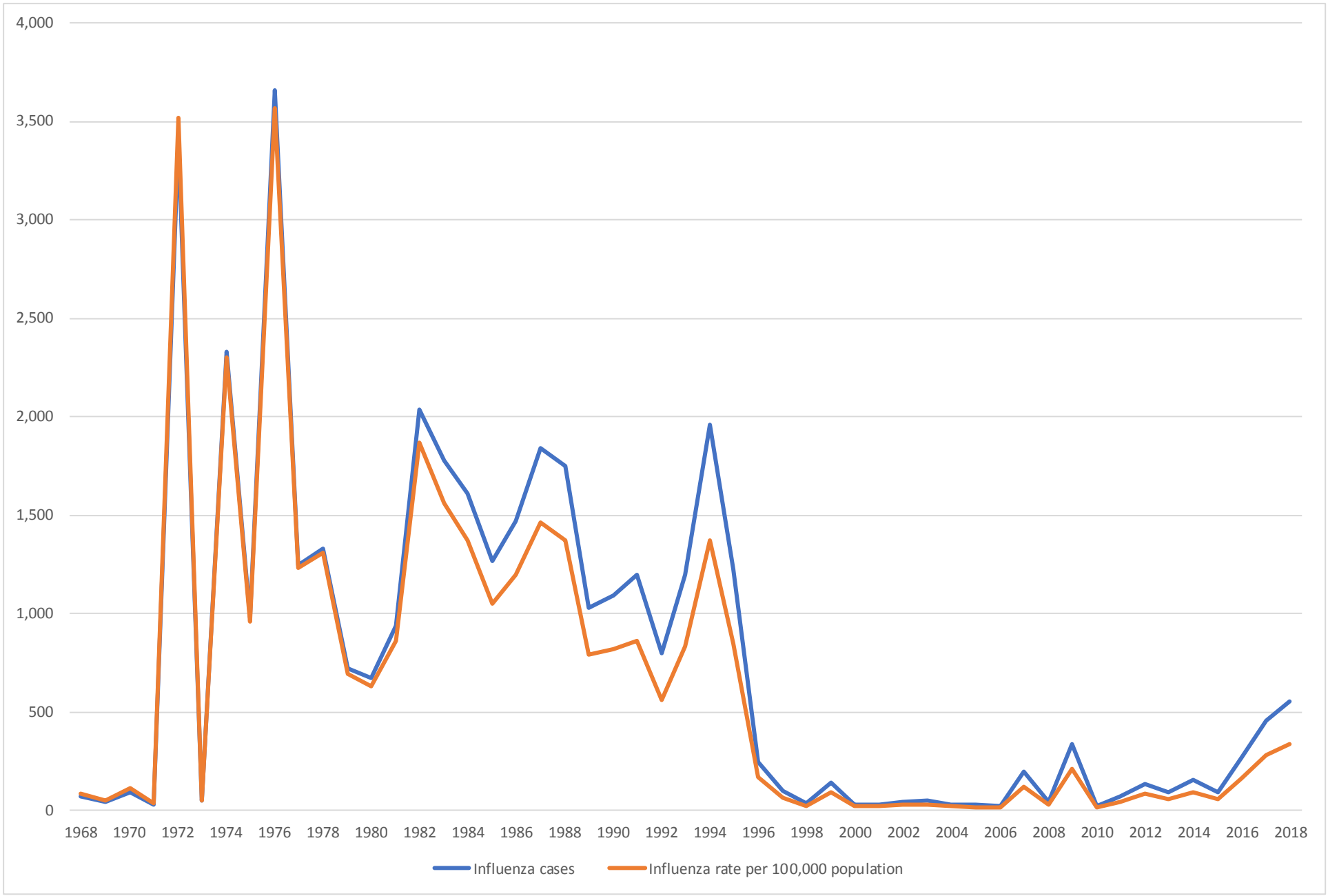


Figure 14. Varicella (chickenpox) new cases and incidence rate per 100,000 population – Guam, 1968-2018

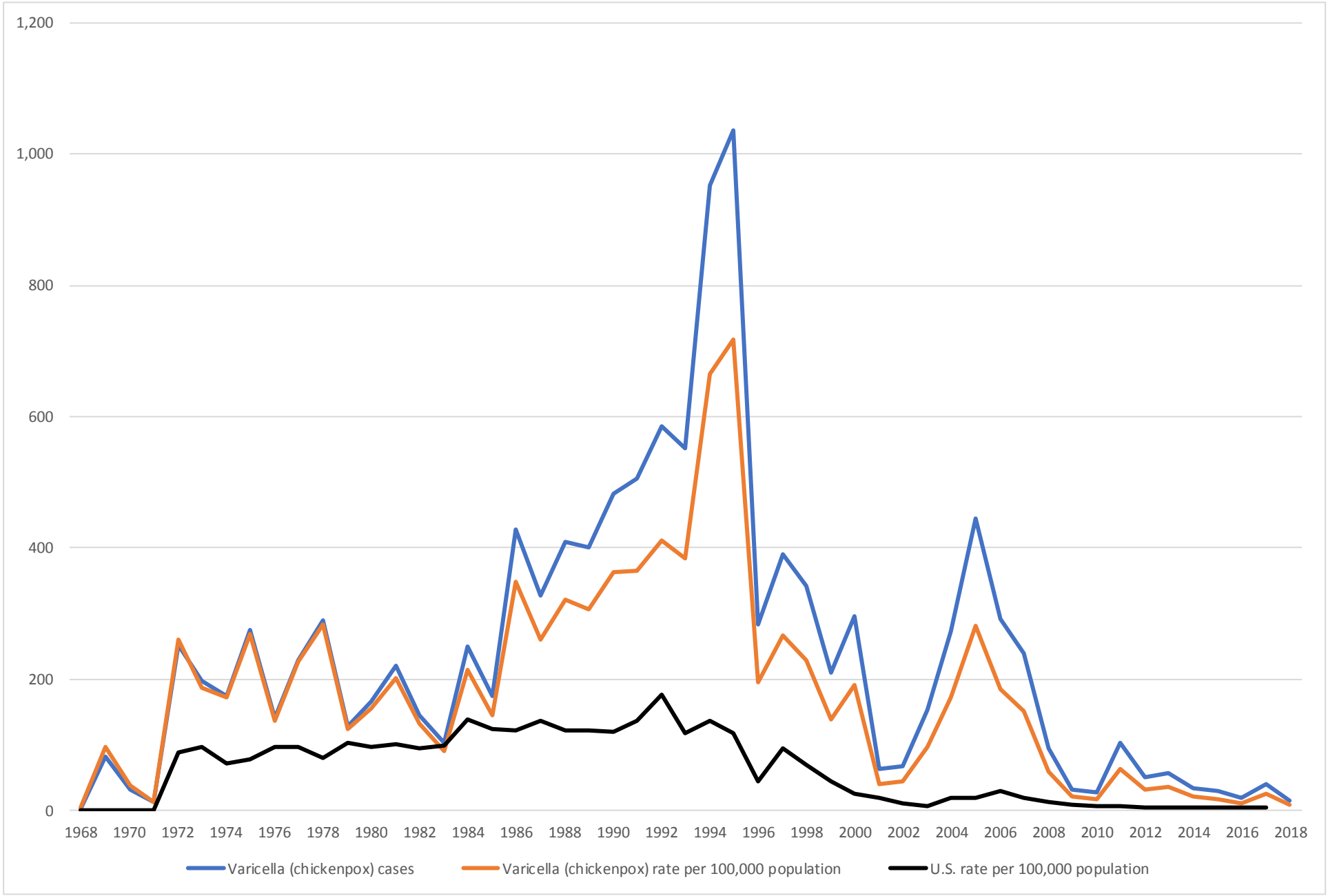


Figure 15. Measles (*Rubeola*) new cases and incidence rate per 100,000 – Guam, 1968-2018

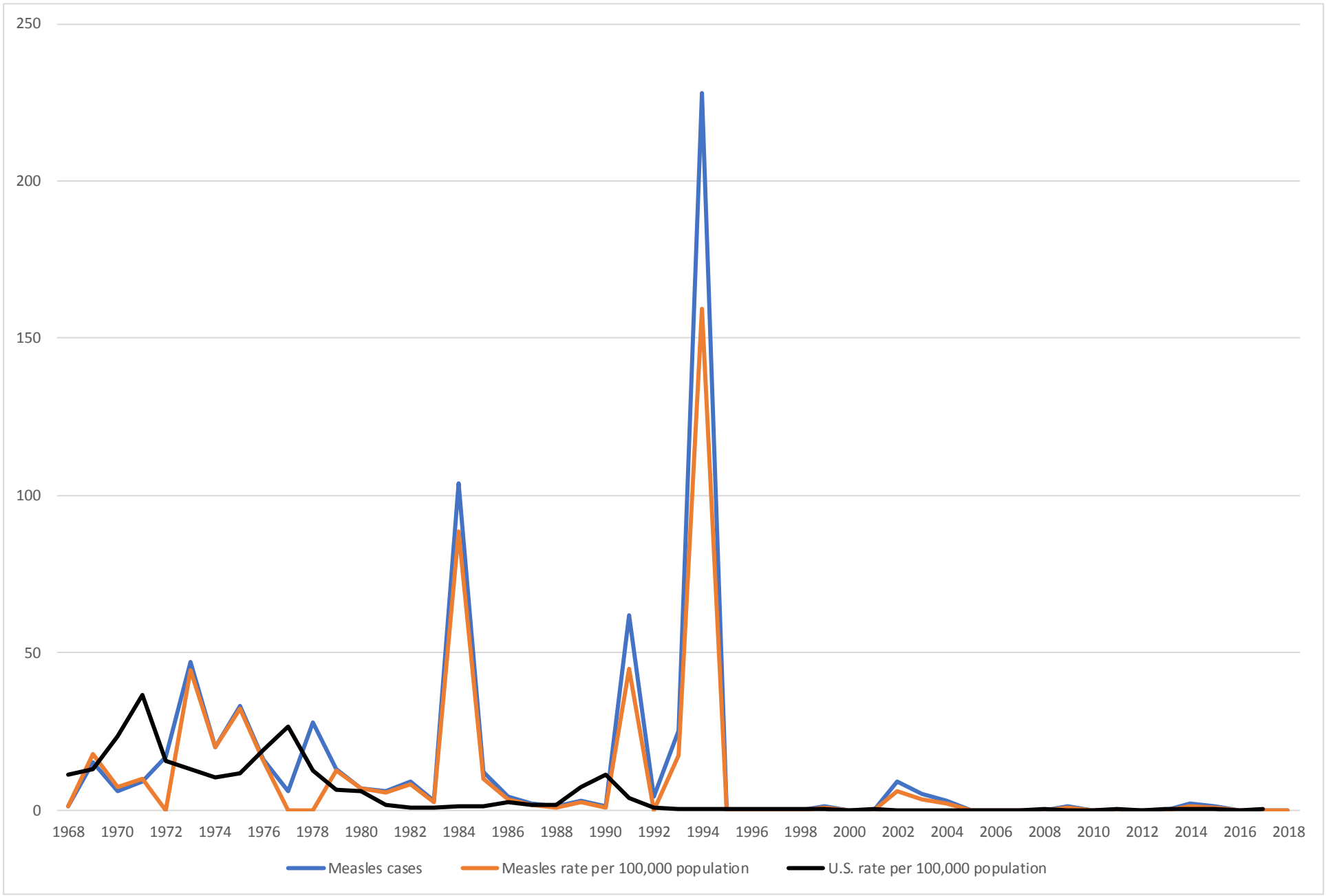


Figure 16. Pertussis new cases and incidence rate per 100,000 population – Guam, 1968-2018

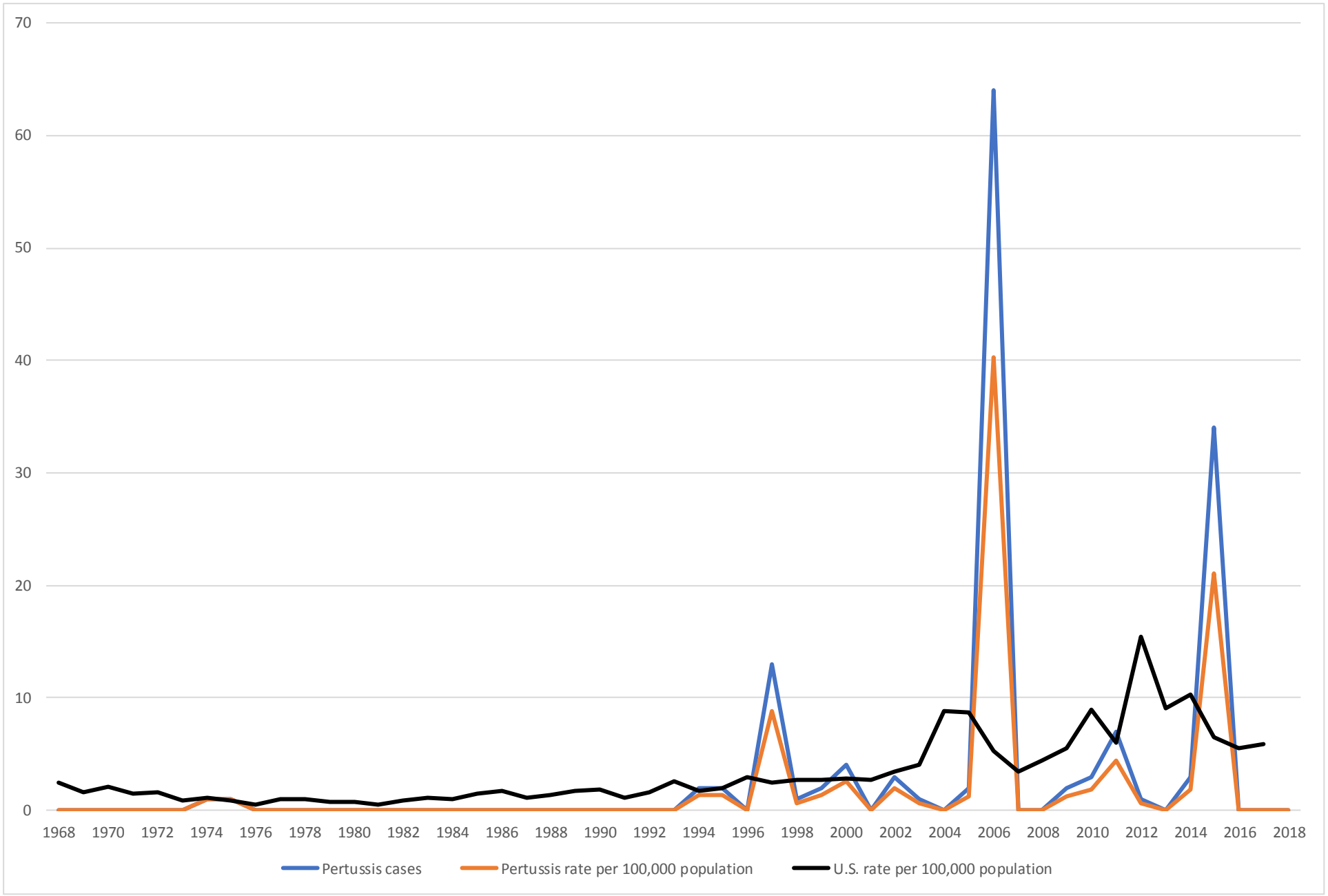
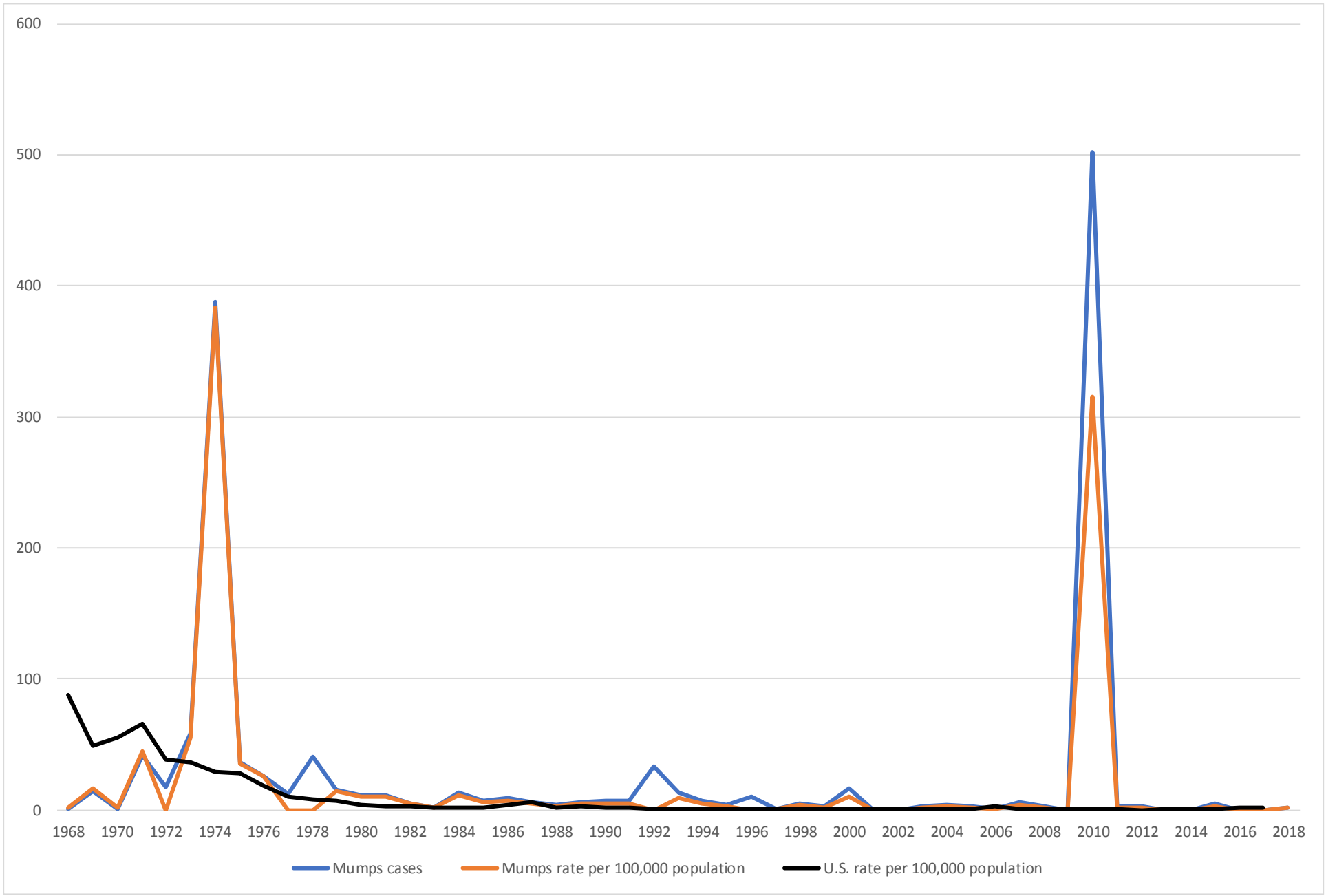


Figure 17. Mumps new cases and incidence rate per 100,000 population – Guam, 1968-2018



Scabies, Conjunctivitis, and Streptococcal Sore Throat

Scabies and conjunctivitis are included here, as they have been and continue to be a significant source of infections among children on Guam, along with Streptococcal sore throat, although these infections are not reportable to the CDC. Scabies incidence was quite high in the late 1970's, then decreased. Incidence increased during 1999-2002 and then decreased again. In recent years beginning in 2013-2014 to 2015-2016, the incidence of scabies increased and has recently decreased again (Figure 16).

Conjunctivitis infections are fairly common on Guam, but rates have not recently been as high as the 1970's to the 1990's (Figure 17).

Streptococcal sore throat is very common on Guam, but incidence rates have decreased since the high rates of the mid-1970's (Figure 18).

Figure 18. Scabies new cases and incidence rate per 100,000 population – Guam, 1979-2018

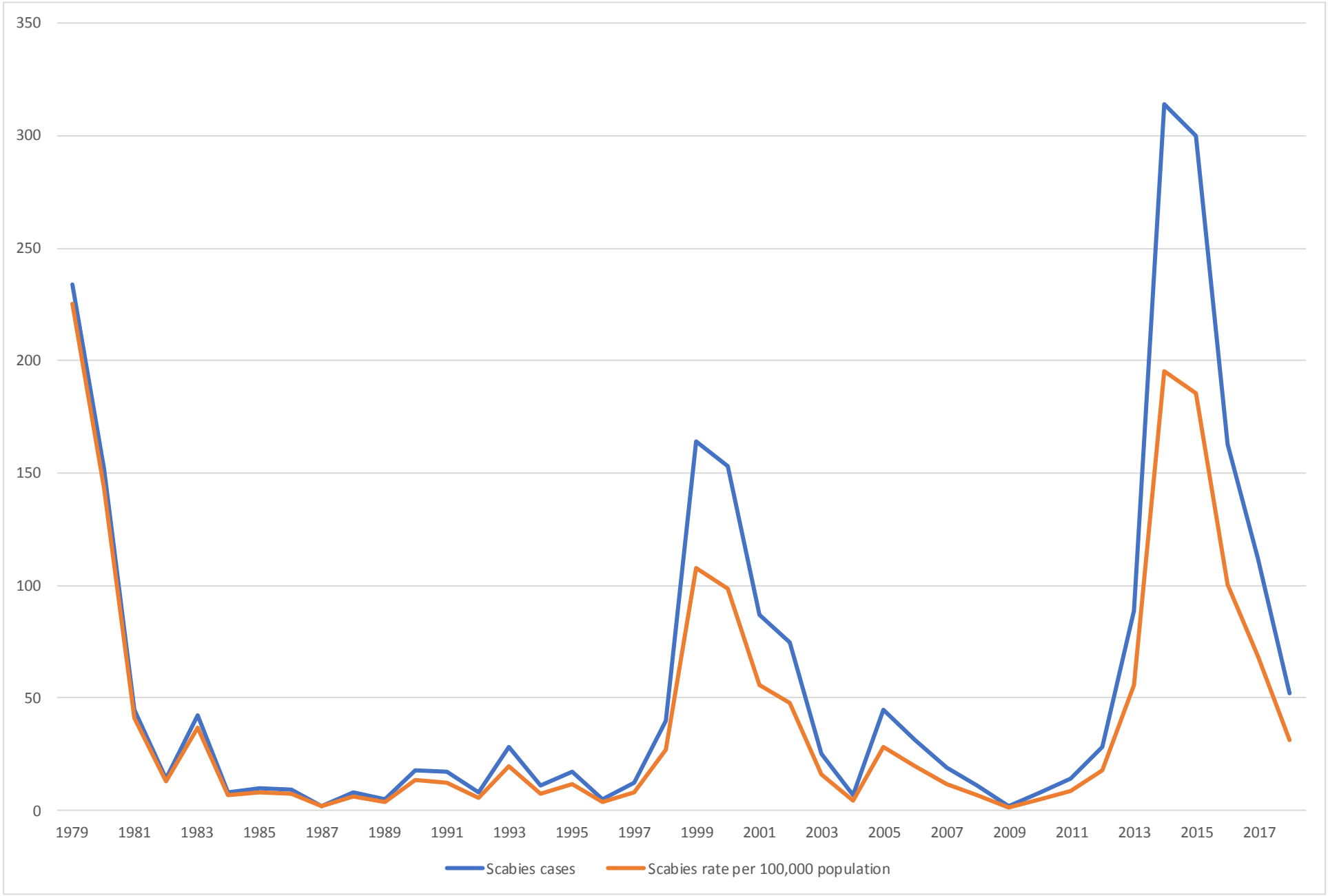


Figure 19. Conjunctivitis new cases and incidence rate per 100,000 population – Guam, 1971-2018

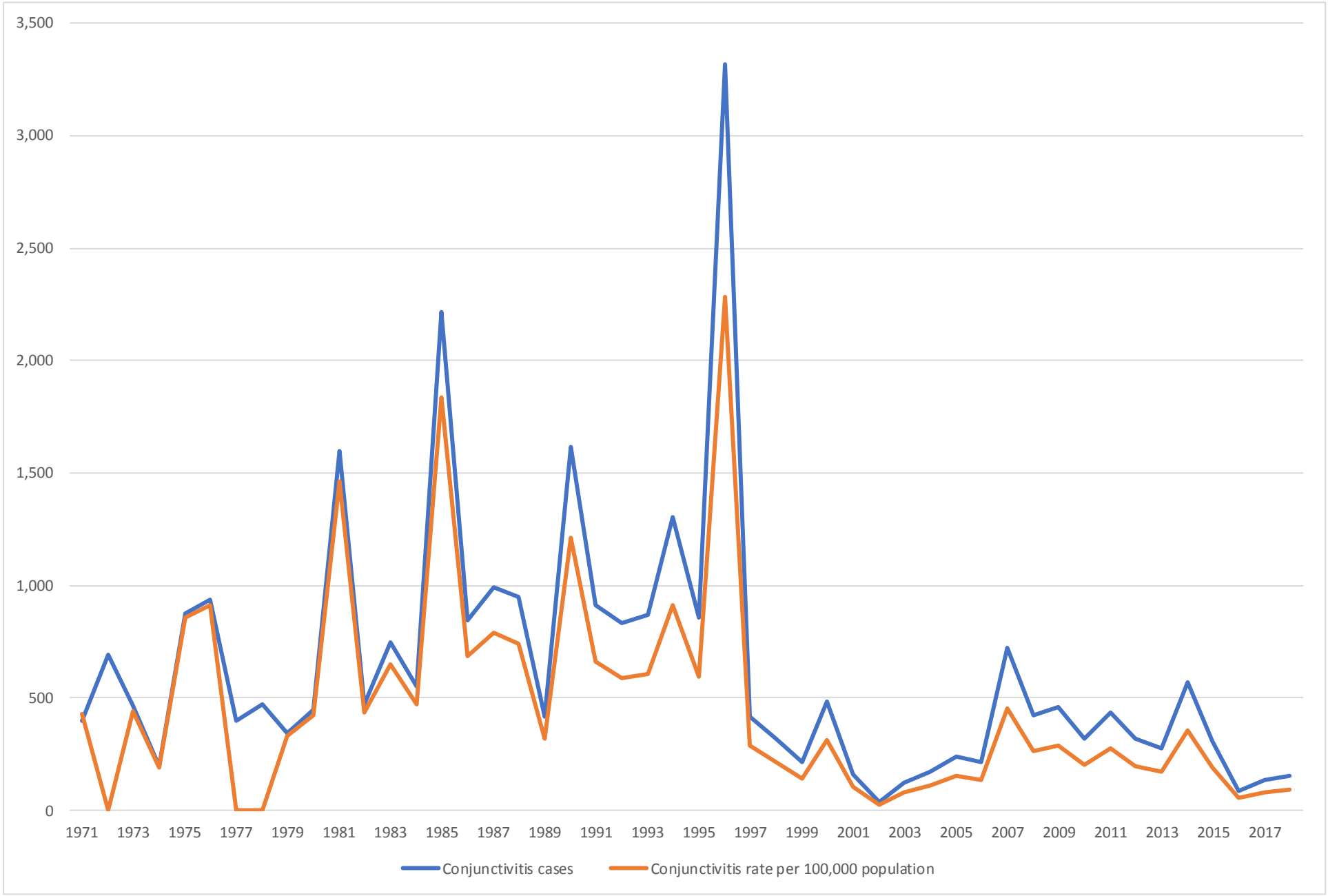
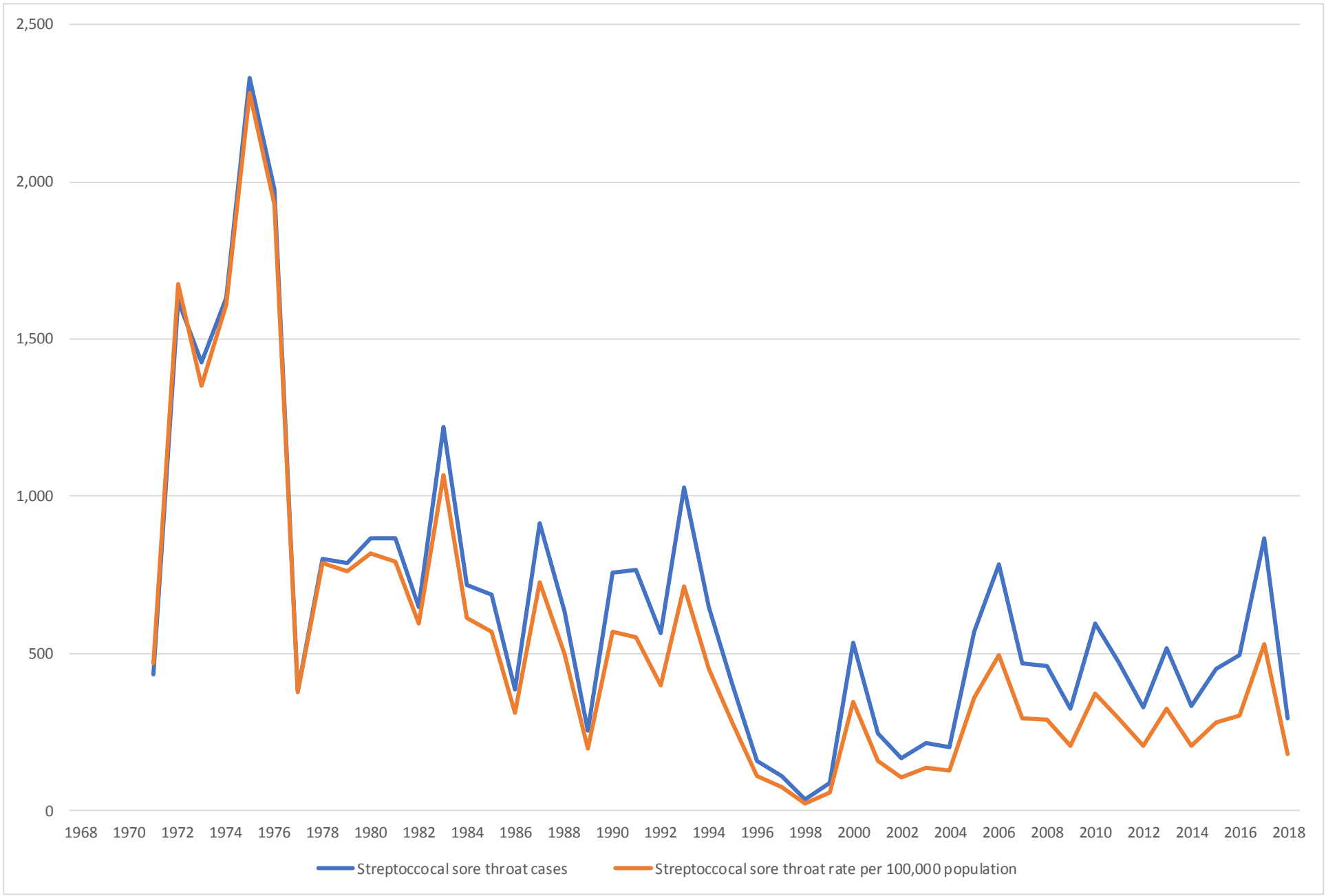


Figure 20. Streptoccocal sore throat new cases and incidence rate per 100,000 population – Guam, 1968-2018



Summary

Guam's main infectious disease challenges include: sexually transmitted diseases, tuberculosis, Hansen's disease, multi-drug resistant infectious (mainly MRSA), as well as increased risk for arboviral diseases, which are endemic in numerous countries in the Asia-Pacific region (i.e. dengue fever). Hepatitis B and C are also known problems, but the data have not been verified for accuracy in the annual summaries and in the current Hepatitis Registry. Guam also has high rates of Streptoccocal sore throat, pertussis, shigellosis, leptospirosis, conjunctivitis, and scabies.[21] Occasional peaks in infectious diseases like pertussis and mumps suggest the ongoing need for immunization coverage in the population.

Guam currently has CDC-funded programs to address (1) sexually transmitted diseases, (2) tuberculosis and Hansen's disease (3) vector control and food-borne illnesses, and (4) vaccine preventable infectious diseases. For the growing problem of multi-drug resistant infections, as well as other general communicable diseases, Guam is currently equipped to conduct active surveillance, yet investigative resources are limited. It is likely Guam will need to plan for potential scenarios of communicable disease outbreaks, including arboviral infections in the future, as well as plan for how to address increasing multi-drug resistant infections.

Acknowledgements:

For assistance with recent programmatic data, we thank La Donna Engichy, Health Sciences student, University of Guam (2019 volunteer); Alice M. Cuenca, Communicable Disease Control Coordinator II, Tuberculosis/Hansen's Disease Control Program; and Vince Aguon, Acting Supervisor, STD/HIV/Viral Hepatitis Program.

Authors and affiliations:

Ann Pobutsky, PhD – Territorial Epidemiologist, Guam Department of Public Health and Social Services
Stephanie Kern-Allely, MPH – CSTE Applied Epidemiology Fellow, Guam Department of Public Health and Social Services
Stephanie O'Connor – Emory University intern, Guam Department of Public Health and Social Services
Grace Valencia – CDC Coordinator I, Epidemiology and Laboratory Capacity Program, Guam Department of Public Health and Social Services

Suggested citation: Pobutsky, A., Kern-Allely, S., O'Connor, S., & Valencia, G. Government of Guam, Department of Public Health and Social Services, Office of Epidemiology and Research. Historical Summary of Reported Cases of Notifiable Diseases and Incidence per 100,000 population, Guam, 1968-2018. Mangilao, Guam, September 2019.

For more information about the data and information in this report, contact:

Ann Pobutsky, PhD
Territorial Epidemiologist
Office of Epidemiology and Research
Government of Guam
Department of Public Health and Social Services
123 Chalan Kareta, Mangilao, Guam 96913
Telephone: (671) 735-7283
Email: ann.pobutsky@dphss.guam.gov

Table 1: Guam Ethnic Population by Census Year

	1980 US CENSUS COUNT (%)	1990 US CENSUS COUNT (%)	2000 US CENSUS COUNT (%)	2010 US CENSUS COUNT (%)	GUAM STATE DATA CENTER 2020 ESTIMATE (%)
TOTAL POPULATION	**105,979 (98.6)**	**133,152 (100)**	**154,805 (100)**	**159,358 (100)**	**169,322 (100)**
Total Micronesian	**1,662 (1.6)**	**4,872 (4.1)**	**11,094 (8.3)**	**18,286 (12.7)**	**19,485 (12.7)**
SINGLE ETHNIC GROUP	94,839 (89.5)	120,203 (90.3)	133,252 (86.1)	144,429 (90.6)	152,913 (90.3)
CHAMORRO	44,299 (41.8)	49,935 (41.5)	57,297 (43)	59,381 (41.1)	62,721 (41)
FILIPINO	22,447 (21.2)	30,043 (22.6)	40,729 (30.6)	41,944 (29)	44,303 (29)
WHITE	8,442 (8)	19,160 (15.9)	10,509 (7.9)	11,321 (7.8)	11,958 (7.8)
CAROLINIAN	34 (0)	135 (0.1)	123 (0.1)	242 (0.2)	256 (0.2)
CHUUKESE	97 (0.1)	1,919 (1.4)	6,229 (4.7)	11,230 (7.8)	11,962 (7.8)
KOSRAEAN	40 (0)	101 (0.1)	292 (0.2)	425 (0.3)	449 (0.3)
MARSHALLESE	40 (2.4)	71 (0.1)	257 (0.2)	315 (0.2)	333 (0.2)
PALAUAN	1,335 (1.3)	1,858 (1.5)	2,141 (1.6)	2,563 (1.8)	2,777 (1.8)
POHNPEIAN	69 (0.1)	589 (0.5)	1,366 (1)	2,248 (1.6)	2,374 (1.6)
YAPESE	47 (0)	199 (0.2)	686 (0.5)	1,263 (0.9)	1,334 (0.9)
OTHER PI	517 (0.5)	1,637 (1.4)	648 (0.5)	915 (0.6)	966 (0.6)
OTHER ASIAN	6,200 (5.9)	9,238 (7.7)	9,600 (7.2)	9,437 (6.5)	9,968 (6.5)
OTHER SINGLE ETHNIC	10,395 (9.8)	538 (0.4)	3,375 (2.5)	3,145 (2.2)	3,512 (2.3)
MULTIPLE ETHNIC GROUPs	3,390 (3.2)	12,877 (9.7)	21,553 (13.9)	14,929 (9.4)	15,769 (9.3)
OTHER/Unknown	7,150 (6.7)	72 (0.1)	1,807 (1.2)	404 (0.3)	427 (0.3)

Appendix A: Historical Summary of Reported Cases of Notifiable Diseases, Guam 1968-2018

GUAM POPULATION (Census) and (Estimates)	**83,800**	**83,700**	**84,996**	**92,287**	**96,755**	**105,550**	**101,302**	**102,110**	**102,478**	**101,167**	**101,960**	**103,941**	**105,979**	**109,166**	**109,275**	**114,080**	**117,296**	**120,615**	**122,880**	**125,724**	**127,545**	**130,947**	**133,152**	**138,159**	**142,326**	**143,825**
CASES	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**
Acinetobacter baumannii	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AIDS	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	2	1	1	1	2	3	1	2
Amebiasis	3	0	3	4	8	5	2	6	2	1	4	4	1	2	1	1	3	0	2	0	0	0	0	0	1	0
Brucellosis	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Campylorbacteriosis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chickenpox (varicella)	3	81	32	12	251	198	175	275	140	229	289	129	165	221	144	102	250	175	428	328	410	401	483	506	586	553
Chlamydia	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	217	120
Clostridium difficile	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0	0
Conjunctivitis	0	0	0	396	691	464	195	876	937	400	471	345	445	1597	473	744	552	2216	845	991	948	415	1615	915	833	870
Dengue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Diptheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encephalitis	0	0	15	8	0	0	0	1	4	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Fish poisoning (ciguatera)	0	0	0	3	0	5	14	28	31	6	6	10	10	5	3	21	22	29	9	5	15	4	11	6	2	6
Fish poisoning (Scrombroid)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	2	34	11	15	3	11
Food poisoning	6	0	0	26	119	44	54	55	165	106	51	44	51	47	29	21	49	70	72	57	87	92	67	109	86	99
Giardiasis	---	---	---	---	---	---	---	---	---	---	---	---	---	41	2	4	8	3	3	5	27	10	18	7	3	5
Gonorrhea	0	254	230	191	469	422	344	426	354	218	258	272	352	377	412	438	674	511	560	409	323	197	395	323	150	102
Hand food and mouth	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Hansen's disease	0	0	0	2	0	2	1	2	1	0	0	2	4	4	1	4	3	5	1	4	5	1	1	5	0	4
Hepatitis A	5	24	56	99	35	80	311	115	58	37	46	42	49	14	2	6	16	24	20	6	8	8	13	6	8	3
Hepatitis B	0	0	0	19	2	18	25	13	14	27	14	18	5	7	6	8	10	9	12	8	16	4	6	3	8	6
Hepatitis C	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Hepatitis, viral (untyped)	---	---	---	---	---	---	160	48	25	33	45	72	80	21	10	10	26	14	21	11	2	10	9	3	9	0
Herpes simplex, Type 2	---	---	---	---	---	---	---	---	---	---	---	---	---	0	0	1	2	2	3	7	5	13	20	6	11	18
HIV	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8	10
HPV	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Influenza	70	44	94	31	3407	52	2332	982	3655	1247	1332	720	669	936	2038	1780	1606	1267	1472	1838	1751	1032	1090	1194	800	1199
Kawasaki syndrome	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0	0
Kiebsiella pneumonia, MDR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

GUAM POPULATION (Census) and (Estimates)	**143,157**	**144,190**	**145,324**	**146,799**	**149,724**	**152,590**	**154,805**	**156,337**	**157,061**	**157,579**	**158,024**	**158,398**	**158,711**	**158,967**	**159,169**	**159,323**	**159,358**	**159,600**	**159,914**	**160,378**	**161,001**	**161,785**	**162,742**	**163,875**	**165,177**
CASES 1994-2018	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Acinetobacter baumannii	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	21	27	15	20	10	42	62	54	70
AIDS	11	2	8	5	8	8	1	9	4	9	0	0	0	4	6	2	6	6	7	1	6	3	2	5	3
Amebiasis	1	4	1	0	3	5	1	0	0	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Brucellosis	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Campylorbacteriosis	---	12	23	8	16	15	13	10	18	33	29	16	21	14	8	7	4	9	7	7	5	4	8	9	11
Chickenpox (varicella)	952	1036	283	390	342	210	297	63	68	153	273	445	292	239	95	32	28	102	50	57	33	29	19	40	15
Chlamydia	374	520	355	394	432	468	525	431	550	554	553	805	832	671	690	622	900	1,071	1,031	802	791	801	934	1107	944
Clostridium difficile	0	0	0	0	0	0	0	0	0	0	4	10	45	12	13	38	21	23	17	23	30	74	17	9	14
Conjunctivitis	1305	855	3315	419	320	216	482	159	40	125	171	240	212	721	420	458	321	437	316	278	568	306	87	133	155
Dengue	0	0	0	1	2	1	2	0	0	1	1	0	3	3	6	0	3	3	5	0	0	0	3	3	4
Diptheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Encephalitis	0	0	0	0	0	0	0	0	0	0	2	0	0	0	---	---	---	---	---	---	---	---	---	---	0
Fish poisoning (ciguatera)	22	5	1	9	1	7	7	5	5	4	0	4	4	2	3	0	0	0	0	0	2	0	0	0	0
Fish poisoning (Scrombroid)	23	5	2	5	2	0	6	3	15	8	7	5	5	4	2	0	1	6	4	7	1	0	1	2	0
Food poisoning	56	122	132	73	35	75	50	14	53	64	47	50	209	35	18	27	0	0	20	40	5	2	0	0	0
Giardiasis	10	10	6	1	9	23	17	9	7	2	5	11	5	2	0	3	3	0	2	2	1	1	0	0	0
Gonorrhea	131	96	63	45	73	55	57	49	48	68	125	111	98	142	113	61	98	96	92	92	99	154	134	200	261
Hand food and mouth	---	---	---	---	---	---	---	---	0	0	0	0	9	---	0	1	0	49	3	129	12	18	0	3	1
Hansen's disease	11	7	0	7	3	1	3	0	6	11	2	2	3	7	1	6	10	7	10	17	13	22	0	14	10
Hepatitis A	23	0	7	22	1	1	1	2	1	2	1	2	1	0	7	7	4	43	22	31	22	48	2	3	8
Hepatitis B	5	5	1	3	2	4	10	2	1	10	12	18	4	3	20	57	77	120	66	75	56	113	136	157	67
Hepatitis C	---	6	5	3	1	2	3	0	0	5	9	8	0	1	10	49	61	70	61	71	68	138	49	1	90
Hepatitis, viral (untyped)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Herpes simplex, Type 2	24	8	19	18	17	9	28	31	7	19	29	18	16	8	7	11	20	30	41	37	39	36	31	22	92
HIV	9	12	8	11	16	10	7	28	4	2	2	7	3	6	5	4	9	6	11	3	6	11	3	8	14
HPV	---	---	---	---	---	---	---	---	---	---	39	96	89	46	---	22	34	41	77	56	21	46	37	40	23
Influenza	1962	1226	248	95	32	137	28	31	43	49	29	27	20	194	45	337	23	71	136	92	152	92	268	458	552
Kawasaki syndrome	1	1	1	0	2	0	0	0	0	0	0	0	0	0	1	2	0	0	2	0	2	0	1	0	1
Kiebsiella pneumonia, MDR	---	---	---	---	---	---	---	---	0	0	0	0	0	0	0	0	14	39	27	64	66	75	49	34	32

GUAM POPULATION (Census) and (Estimates)	83,800	83,700	84,996	92,287	96,755	105,550	101,302	102,110	102,478	101,167	101,960	103,941	105,979	109,166	109,275	114,080	117,296	120,615	122,880	125,724	127,545	130,947	133,152	138,159	142,326	143,825
CASES (continued) 1968-1993	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**
Legionellosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Leptospirosis	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0
Malaria	0	159	52	83	2	0	2	1	1	0	0	0	4	3	2	3	1	2	2	0	0	3	3	3	3	3
Measles *Rubeola*	1	15	6	9	17	47	20	33	16	6	28	13	7	6	9	3	104	12	4	2	1	3	1	62	4	25
Meningitis, aseptic	0	10	2	4	10	11	8	5	5	4	1	0	9	6	2	9	7	6	3	0	70	19	6	5	10	7
Meningitis, other	0	0	0	0	0	11	21	15	8	21	12	12	20	12	13	12	7	12	7	12	12	11	8	3	11	11
Meningococcal disease	2	1	3	16	13	0	3	3	0	1	1	1	1	1	2	3	1	2	2	5	0	0	4	3	4	1
MRSA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mumps	1	14	1	41	17	58	388	36	26	12	40	15	11	11	5	2	13	7	9	6	4	6	7	7	33	13
Pertussis	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Respiratory syncytial virus	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Rheumatic fever, active	34	0	0	0	0	0	9	10	12	5	3	13	4	2	0	2	3	4	1	0	0	0	0	0	0	0
Rubella	---	---	---	---	---	---	---	---	---	---	---	---	---	3	2	0	4	4	5	---	---	---	---	---	---	---
Salmonellosis	6	16	1	4	8	10	22	75	36	89	70	89	126	203	168	143	251	212	213	135	129	139	105	87	64	119
Scabies	0	0	0	0	0	0	0	0	0	0	66	234	152	45	14	42	8	10	9	2	8	5	18	17	8	28
Scarlet fever	0	912	806	0	0	0	2	9	2	1	11	8	2	0	0	0	0	1	3	4	2	5	0	11	25	6
Shigellosis	2	5	4	0	4	11	4	18	10	24	35	14	30	28	49	39	90	77	162	114	72	82	130	76	165	35
Streptococcal sore throat	0	0	0	432	1622	1424	1630	2330	1975	382	801	789	867	864	649	1219	719	688	384	914	635	256	755	764	564	1026
Strep disease, invasive	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Strep disease, other	0	0	0	0	0	0	0	0	2	4	12	19	70	68	95	98	81	151	155	133	114	88	395	125	139	0
Syphillis, all stages total (+ congenital)	0	4	0	0	0	0	3	27	5	4	3	18	63	35	8	4	22	1	0	5	5	6	8	8	3	2
Toxoplasmosis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	0	0	0	0	0	0	0
Tuberculosis	0	0	88	71	59	39	53	49	46	67	65	70	55	47	49	48	54	39	49	34	41	64	59	73	95	85
Typhoid fever	1	0	0	0	0	0	2	0	0	1	0	1	1	0	0	0	0	3	1	0	2	4	0	0	2	4
Vancomycin resis. *Enterococcus*	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Vibriosis (all types)-cholera	0	0	0	0	0	0	2	117	2	22	26	23	21	22	26	24	32	31	40	35	48	32	26	76	21	28

GUAM POPULATION (Census) and (Estimates)	**143,157**	**144,190**	**145,324**	**146,799**	**149,724**	**152,590**	**154,805**	**156,337**	**157,061**	**157,579**	**158,024**	**158,398**	**158,711**	**158,967**	**159,169**	**159,323**	**159,358**	**159,600**	**159,914**	**160,378**	**161,001**	**161,785**	**162,742**	**163,875**	**165,177**
CASES (continued) 1994-2018	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Legionellosis	1	1	1	0	2	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Leptospirosis	0	0	2	1	1	0	4	1	1	3	7	1	1	1	1	1	0	4	3	0	12	11	4	5	7
Malaria	0	2	0	0	2	1	2	1	0	1	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0
Measles *Rubeola*	228	0	0	0	0	1	0	0	9	5	3	0	0	0	0	1	0	0	0	0	2	1	0	0	0
Meningitis, aseptic	13	10	3	1	2	1	2	0	2	2	13	4	2	4	8	0	1	0	2	2	2	3	0	0	1
Meningitis, other	8	3	2	11	0	2	1	0	0	0	5	4	1	2	2	1	3	4	1	6	4	5	2	0	0
Meningococcal disease	2	2	5	3	2	1	2	0	1	0	1	1	1	0	0	2	0	0	0	1	6	0	0	1	0
MRSA	---	50	77	156	145	178	185	101	179	212	215	262	301	218	252	344	385	565	535	445	369	548	440	448	554
Mumps	7	4	10	1	5	3	16	0	0	3	4	3	1	6	3	0	502	3	3	0	0	5	0	0	2
Pertussis	2	2	0	13	1	2	4	0	3	1	0	2	64	0	0	2	3	7	1	0	3	34	0	0	0
Respiratory syncytial virus	---	---	---	---	---	---	---	---	0	---	---	---	---	---	0	0	0	77	0	0	0	36	40	0	56
Rheumatic fever, active	0	0	0	0	0	0	0	0	8	4	9	6	1	3	3	0	0	0	4	0	1	2	0	0	1
Rubella	---	---	---	---	---	---	---	---	0	1	1	0	0	0	1	0	0	2	0	0	0	0	0	0	2
Salmonellosis	76	40	39	35	46	37	28	24	46	44	50	46	38	20	23	11	11	19	13	18	13	18	21	21	18
Scabies	11	17	5	12	40	164	153	87	75	25	7	45	31	19	11	2	8	14	28	89	314	300	163	112	52
Scarlet fever	13	7	2	4	4	9	18	13	9	13	5	13	18	11	5	2	7	12	8	25	5	8	6	2	1
Shigellosis	33	19	43	74	39	19	46	53	37	41	42	20	18	19	20	13	5	16	1	7	4	14	14	16	23
Streptococcal sore throat	646	404	158	108	35	86	533	247	165	216	202	567	781	466	458	325	593	471	328	516	331	451	494	864	294
Strep disease, invasive	3	8	10	1	9	3	8	1	0	0	0	4	2	14	12	15	4	14	13	18	19	2	0	0	0
Strep disease, other	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	90	158	74	83	74	38	180	0	176
Syphillis, all stages total (+ congenital)	3	4	0	3	2	1	3	11	18	19	15	18	13	38	46	24	22	52	56	46	34	12	34	21	30
Toxoplasmosis	0	0	1	0	0	0	0	1	0	1	1	0	1	0	0	0	1	0	0	0	0	0	0	0	0
Tuberculosis	95	113	107	95	80	69	53	63	65	61	56	73	54	92	89	102	101	81	69	48	56	77	74	84	71
Typhoid fever	1	1	1	2	0	0	2	0	0	3	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Vancomycin resis. *Enterococcus*	3	8	10	1	9	6	10	1	7	4	9	17	16	8	15	12	28	26	46	36	26	35	11	11	22
Vibriosis (all types)-cholera	22	14	11	7	22	9	9	4	11	4	16	7	4	2	3	2	3	2	1	1	1	0	0	1	2

Appendix B: Historical Summary of Notifiable Diseases, Incidence per 100,000, Guam 1968-2018

GUAM POPULATION (Census) and (Estimates)	83,800	83,700	84,996	92,287	96,755	105,550	101,302	102,110	102,478	101,167	101,960	103,941	105,979	109,166	109,275	114,080	117,296	120,615	122,880	125,724	127,545	130,947	133,152	138,159	142,326	143,825
INCIDENCE	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**
Acinetobacter baumannii	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
AIDS	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.8	1.6	0.8	0.8	0.8	1.5	2.2	0.7	1.4
Amebiasis	3.6	0	3.5	4.3	8.3	4.7	2.0	5.9	2.0	1.0	3.9	3.8	0.9	1.8	0.9	0.9	2.6	0	1.6	0	0	0	0	0	0.7	0
Brucellosis	0	0	0	0	0	0	0	0	0	0	0	0	50.5	0.0	0.0	0.0	50.4	0	0.0	0	0	0	0	0	0	0
Campylorbacteriosis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chickenpox (varicella)	3.6	96.8	37.6	13.0	259.4	187.6	172.8	269.3	136.6	226.4	283.4	124.1	155.7	202.4	131.8	89.4	213.1	145.1	348.3	260.9	321.5	306.2	362.7	366.2	411.7	384.5
Chlamydia	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	152.5	83.4
Clostridium difficile	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0.0	0.0
Conjunctivitis	0	0	0	429.1	714.2	439.6	192.5	857.9	914.3	395.4	461.9	331.9	419.9	1462.9	432.9	652.2	470.6	1837.3	687.7	788.2	743.3	316.9	1212.9	662.3	585.3	604.9
Dengue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Diptheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Encephalitis	0	0	17.6	8.7	0	0	0	1.0	3.9	1.0	0	0	0	0	0	0	0	0	0	0	0.8	0.0	0.8	0	0	0
Fish poisoning (ciguatera)	0	0	0	3.3	0.0	4.7	13.8	27.4	30.3	5.9	5.9	9.6	9.4	4.6	2.7	18.4	18.8	24.0	7.3	4.0	11.8	3.1	8.3	4.3	1.4	4.2
Fish poisoning (Scrombroid)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.2	1.6	26.0	8.3	10.9	2.1	7.6
Food poisoning	7.2	0	0	28.2	123.0	41.7	53.3	53.9	161.0	104.8	50.0	42.3	48.1	43.1	26.5	18.4	41.8	58.0	58.6	45.3	68.2	70.3	50.3	78.9	60.4	68.8
Giardiasis	---	---	---	---	---	---	---	---	---	---	---	---	---	37.6	1.8	3.5	6.8	2.5	2.4	4.0	21.2	7.6	13.5	5.1	2.1	3.5
Gonorrhea	0	303.5	270.6	207.0	484.7	399.8	339.6	417.2	345.4	215.5	253.0	261.7	332.1	345.3	377.0	383.9	574.6	423.7	455.7	325.3	253.2	150.4	296.7	233.8	105.4	70.9
Hand food and mouth	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Hansen's disease	0	0	0	2.2	0	1.9	1.0	2.0	1.0	0	0	1.9	3.8	3.7	0.9	3.5	2.6	4.1	0.8	3.2	3.9	0.8	0.8	3.6	0.0	2.8
Hepatitis A	6.0	28.7	65.9	107.3	36.2	75.8	307.0	112.6	56.6	36.6	45.1	40.4	46.2	12.8	1.8	5.3	13.6	19.9	16.3	4.8	6.3	6.1	9.8	4.3	5.6	2.1
Hepatitis B	0.0	0.0	0.0	20.6	2.1	17.1	24.7	12.7	13.7	26.7	13.7	17.3	4.7	6.4	5.5	7.0	8.5	7.5	9.8	6.4	12.5	3.1	4.5	2.2	5.6	4.2
Hepatitis C	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Hepatitis, viral (untyped)	---	---	---	---	---	---	157.9	47.0	24.4	32.6	44.1	69.3	75.5	19.2	9.2	8.8	22.2	11.6	17.1	8.7	1.6	7.6	6.8	2.2	6.3	0
Herpes simplex, Type 2	---	---	---	---	---	---	---	---	---	---	---	---	---	0	0	0.9	1.7	1.7	2.4	5.6	3.9	9.9	15.0	4.3	7.7	12.5
HIV	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0	0
HPV	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Influenza	83.5	52.6	110.6	33.6	3521.3	49.3	2302.0	961.7	3566.6	1232.6	1306.4	692.7	631.3	857.4	1865.0	1560.3	1369.2	1050.4	1197.9	1461.9	1372.8	788.1	818.6	864.2	562.1	833.7
Kawasaki syndrome	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0	0
Kiebsiella pneumonia, MDR	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

GUAM POPULATION (Census) and (Estimates)	83,800	83,700	84,996	92,287	96,755	105,550	101,302	102,110	102,478	101,167	101,960	103,941	105,979	109,166	109,275	114,080	117,296	120,615	122,880	125,724	127,545	130,947	133,152	138,159	142,326	143,825
INCIDENCE	**1968**	**1969**	**1970**	**1971**	**1972**	**1973**	**1974**	**1975**	**1976**	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**
Legionellosis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	0	0	0	0	0
Leptospirosis	0	0	0	0	0	0.9	0	0	0	0	0	0	0	0.9	0	0	0	0	0	0	0.8	0	0	0	0	0
Malaria	0	190.0	61.2	89.9	2.1	0.0	2.0	1.0	1.0	0.0	0.0	0.0	3.8	2.7	1.8	2.6	0.9	1.7	1.6	0.0	0.0	2.3	2.3	2.2	2.1	2.1
Measles *Rubeola*	1.2	17.9	7.1	9.8	17.6	44.5	19.7	32.3	15.6	5.9	27.5	12.5	6.6	5.5	8.2	2.6	88.7	9.9	3.3	1.6	0.8	2.3	0.8	44.9	2.8	17.4
Meningitis, aseptic	0	11.9	2.4	4.3	10.3	10.4	7.9	4.9	4.9	4.0	1.0	0.0	8.5	5.5	1.8	7.9	6.0	5.0	2.4	0.0	54.9	14.5	4.5	3.6	7.0	4.9
Meningitis, other	0	0	0	0	0	10.4	20.7	14.7	7.8	20.8	11.8	11.5	18.9	11.0	11.9	10.5	6.0	9.9	5.7	9.5	9.4	8.4	6.0	2.2	7.7	7.6
Meningococcal disease	2.4	1.2	3.5	17.3	13.4	0	3.0	2.9	0	1.0	1.0	1.0	0.9	0.9	1.8	2.6	0.9	1.7	1.6	4.0	0	0	3.0	2.2	2.8	0.7
MRSA	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Mumps	1.2	16.7	1.2	44.4	17.6	55.0	383.0	35.3	25.4	11.9	39.2	14.4	10.4	10.1	4.6	1.8	11.1	5.8	7.3	4.8	3.1	4.6	5.3	5.1	23.2	9.0
Pertussis	0	0	0	0	0	0	1.0	1.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Respiratory syncytial virus	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Rheumatic fever, active	40.6	0	0	0	0	0	8.9	9.8	11.7	4.9	2.9	12.5	3.8	1.8	0	1.8	2.6	3.3	0.8	0	0	0	0	0	0	0
Rubella	---	---	---	---	---	---	---	---	---	---	---	---	---	2.7	1.8	0.0	3.4	3.3	4.1	---	---	---	---	---	---	---
Salmonellosis	7.2	19.1	1.2	4.3	8.3	9.5	21.7	73.5	35.1	88.0	68.7	85.6	118.9	186.0	153.7	125.4	214.0	175.8	173.3	107.4	101.1	106.1	78.9	63.0	45.0	82.7
Scabies	0	0	0	0	0	0	0	0	0	0	64.7	225.1	143.4	41.2	12.8	36.8	6.8	8.3	7.3	1.6	6.3	3.8	13.5	12.3	5.6	19.5
Scarlet fever	0.0	1089.6	948.3	0	0	0	2.0	8.8	2.0	1.0	10.8	7.7	1.9	0	0	0	0	0.8	2.4	3.2	1.6	3.8	0.0	8.0	17.6	4.2
Shigellosis	2.4	6.0	4.7	0.0	4.1	10.4	3.9	17.6	9.8	23.7	34.3	13.5	28.3	25.6	44.8	34.2	76.7	63.8	131.8	90.7	56.5	62.6	97.6	55.0	115.9	24.3
Streptococcal sore throat	0	0	0	468.1	1676.4	1349.1	1609.1	2281.9	1927.2	377.6	785.6	759.1	818.1	791.5	593.9	1068.5	613.0	570.4	312.5	727.0	497.9	195.5	567.0	553.0	396.3	713.4
Strep disease, invasive	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Strep disease, other	0	0	0	0	0	0	0	0	2.0	4.0	11.8	18.3	66.1	62.3	86.9	85.9	69.1	125.2	126.1	105.8	89.4	67.2	296.7	90.5	97.7	0
Syphillis, all stages total	0	4.8	0	0	0	0	3.0	26.4	4.9	4.0	2.9	17.3	59.4	32.1	7.3	3.5	18.8	0.8	0.0	4.0	3.9	4.6	6.0	5.8	2.1	1.4
Toxoplasmosis	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	0	0	0	0	0	0.0	0.0
Tuberculosis	0	0	103.5	76.9	61.0	36.9	52.3	48.0	44.9	66.2	63.8	67.3	51.9	43.1	44.8	42.1	46.0	32.3	39.9	27.0	32.1	48.9	44.3	52.8	66.7	59.1
Typhoid fever	1.2	0	0	0	0	0	2.0	0	0	1.0	0	1.0	0.9	0	0	0	0	2.5	0.8	0	1.6	3.1	0	0	1.4	2.8
Vancomycin resis. *Enterococcus*	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Vibriosis (all types)-cholera	0	0	0	0	0	0	2.0	114.6	2.0	21.7	25.5	22.1	19.8	20.2	23.8	21.0	27.3	25.7	32.6	27.8	37.6	24.4	19.5	55.0	14.8	19.5

GUAM POPULATION (Census) and (Estimates)	143,157	144,190	145,324	146,799	149,724	152,590	154,805	156,337	157,061	157,579	158,024	158,398	158,711	158,967	159,169	159,323	159,358	159,600	159,914	160,378	161,001	161,785	162,742	163,875	165,177
INCIDENCE	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Acinetobacter baumannii	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13.2	16.9	9.4	12.5	6.2	26.0	38.1	33.0	42.4
AIDS	7.7	1.4	5.5	3.4	5.3	5.2	0.6	5.8	2.5	5.7	0	0	0	2.5	3.8	1.3	3.8	3.8	4.4	0.6	3.7	1.9	1.2	3.1	2
Amebiasis	0.7	2.8	0.7	0.0	2.0	3.3	0.6	0	0	1.3	0	0	0	0	0	0.6	0	0	0	0.6	0	0	0	0	0
Brucellosis	0	0	0	0	0	0	0	50.0	0.0	0.0	0	0	0	0	0	49.8	0	0	0	0	0	0	0	0	49.6
Campylorbacteriosis	---	8.3	15.8	5.4	10.7	9.8	8.4	6.4	11.5	20.9	18.4	10.1	13.2	8.8	5.0	4.4	2.5	5.6	4.4	4.4	3.1	2.5	4.9	5.5	6.7
Chickenpox (varicella)	665.0	718.5	194.7	265.7	228.4	137.6	191.9	40.3	43.3	97.1	172.8	280.9	184.0	150.3	59.7	20.1	17.6	63.9	31.3	35.5	20.5	17.9	11.7	24.4	9.1
Chlamydia	261.3	360.6	244.3	268.4	288.5	306.7	339.1	275.7	350.2	351.6	349.9	508.2	524.2	422.1	433.5	390.4	564.8	671.1	644.7	500.1	491.3	495.1	573.9	675.5	571.5
Clostridium difficile	0	0	0	0	0	0	0	0	0	0	2.5	6.3	28.4	7.5	8.2	23.9	13.2	14.4	10.6	14.3	18.6	45.7	10.4	5.5	8.5
Conjunctivitis	911.6	593.0	2281.1	285.4	213.7	141.6	311.4	101.7	25.5	79.3	108.2	151.5	133.6	453.6	263.9	287.5	201.4	273.8	197.6	173.3	352.8	189.1	53.5	81.2	93.8
Dengue	0	0	0	0.7	1.3	0.7	1.3	0	0	0.6	0.6	0.0	1.9	---	3.8	0.0	1.9	1.9	3.1	0.0	0.0	0.0	1.8	1.8	2.4
Diptheria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.6	0.0	0.0	0.0	0.6
Encephalitis	0	0	0	0	0	0	0	0	0	0	1.3	0.0	0.0	0.0	---	---	---	---	---	---	---	---	---	---	0.0
Fish poisoning (ciguatera)	15.4	3.5	0.7	6.1	0.7	4.6	4.5	3.2	3.2	2.5	0.0	2.5	2.5	1.3	1.9	0	0	0	0	0	1.2	0	0	0	0
Fish poisoning (Scrombroid)	16.1	3.5	1.4	3.4	1.3	0.0	3.9	1.9	9.6	5.1	4.4	3.2	3.2	2.5	1.3	0	0.6	3.8	2.5	4.4	0.6	0	0.6	1.2	0.0
Food poisoning	39.1	84.6	90.8	49.7	23.4	49.2	32.3	9.0	33.7	40.6	29.7	31.6	131.7	22.0	11.3	16.9	0	0	12.5	24.9	3.1	1.2	0	0	0.0
Giardiasis	7.0	6.9	4.1	0.7	6.0	15.1	11.0	5.8	4.5	1.3	3.2	6.9	3.2	1.3	0.0	1.9	1.9	0	1.3	1.2	0.6	0.6	0	0	0
Gonorrhea	91.5	66.6	43.4	30.7	48.8	36.0	36.8	31.3	30.6	43.2	79.1	70.1	61.7	89.3	71.0	38.3	61.5	60.2	57.5	57.4	61.5	95.2	82.3	122.0	158.0
Hand food and mouth	---	---	---	---	---	---	---	---	0	0	0	0	5.7	---	0	0.6	0	30.7	1.9	80.4	7.5	11.1	0.0	1.8	0.6
Hansen's disease	7.7	4.9	0.0	4.8	2.0	0.7	1.9	0.0	3.8	7.0	1.3	1.3	1.9	4.4	0.6	3.8	6.3	4.4	6.3	10.6	8.1	13.6	0.0	8.5	6.1
Hepatitis A	16.1	0.0	4.8	15.0	0.7	0.7	0.6	1.3	0.6	1.3	0.6	1.3	0.6	0.0	4.4	4.4	2.5	26.9	13.8	19.3	13.7	29.7	1.2	1.8	4.8
Hepatitis B	3.5	3.5	0.7	2.0	1.3	2.6	6.5	1.3	0.6	6.3	7.6	11.4	2.5	1.9	12.6	35.8	48.3	75.2	41.3	46.8	34.8	69.8	83.6	95.8	40.6
Hepatitis C	---	3.5	0.7	2.0	1.3	2.6	6.5	1.3	0.6	6.3	7.6	11.4	2.5	1.9	12.6	35.8	48.3	75.2	41.3	46.8	34.8	69.8	83.6	95.8	40.6
Hepatitis, viral (untyped)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Herpes simplex, Type 2	16.8	5.5	13.1	12.3	11.4	5.9	18.1	19.8	4.5	12.1	18.4	11.4	10.1	5.0	4.4	6.9	12.6	18.8	25.6	23.1	24.2	22.3	19.0	13.4	55.7
HIV	1.7	1.7	2.4	5.6	3.9	9.9	15.0	4.3	7.7	12.5	12.5	16.8	5.5	13.1	12.3	11.4	5.9	18.1	19.8	4.5	12.1	18.4	11.4	10.1	5.0
HPV	---	---	---	---	---	---	---	---	---	---	24.7	60.6	56.1	28.9	---	13.8	21.3	25.7	48.2	34.9	13.0	28.4	22.7	24.4	13.9
Influenza	1370.5	850.3	170.7	64.7	21.4	89.8	18.1	19.8	27.4	31.1	18.4	17.0	12.6	122.0	28.3	211.5	14.4	44.5	85.0	57.4	94.4	56.9	164.7	279.5	334.2
Kawasaki syndrome	0.7	0.7	0.7	0	1.3	0	0	0	0	0	0	0	0	0	0.6	1.3	0	0	1.3	0	1.2	0	0.6	0	0.6
Kiebsiella pneumonia, MDR	---	---	---	---	---	---	---	---	0	0	0	0	0	0	0	0	8.8	24.4	16.9	39.9	41.0	46.4	30.1	20.7	19.4

GUAM POPULATION (Census) and (Estimates)	143,157	144,190	145,324	146,799	149,724	152,590	154,805	156,337	157,061	157,579	158,024	158,398	158,711	158,967	159,169	159,323	159,358	159,600	159,914	160,378	161,001	161,785	162,742	163,875	165,177
INCIDENCE (continued)	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**
Legionellosis	0.7	0.7	0.7	0	1.3	0	0	0	0	0.6	0	0	0	0	0	0	0.6	0	0	0	0	0	0	0	0
Leptospirosis	0	0	1.4	0.7	0.7	0	2.6	0.6	0.6	1.9	4.4	0.6	0.6	0.6	0.6	0.6	0.0	2.5	1.9	0.0	7.5	6.8	2.5	3.1	4.2
Malaria	0.0	1.4	0	0	1.3	0.7	1.3	0.6	0.0	0.6	0.0	0.0	1.9	0.6	0	0	0	0	0	0	0	0	0	0	0
Measles *Rubeola*	159.3	0.0	0	0	0.0	0.7	0.0	0	5.7	3.2	1.9	0	0	0	0	0.6	0	0	0	0	1.2	0.6	0	0	0
Meningitis, aseptic	9.1	6.9	2.1	0.7	1.3	0.7	1.3	0	1.3	1.3	8.2	2.5	1.3	2.5	5.0	0	0.6	0	1.3	1.2	1.2	1.9	0	0	0.6
Meningitis, other	5.6	2.1	1.4	7.5	0	1.3	0.6	0	0.0	0.0	3.2	2.5	0.6	1.3	1.3	0.6	1.9	2.5	0.6	3.7	2.5	3.1	1.2	0	0
Meningococcal disease	1.4	1.4	3.4	2.0	1.3	0.7	1.3	0	0.6	0.0	0.6	0.6	0.6	0.0	0.0	1.3	0.0	0.0	0.0	0.6	3.7	0	0	0.6	0
MRSA	---	34.7	53.0	106.3	96.8	116.7	119.5	64.6	114.0	134.5	136.1	165.4	189.7	137.1	158.3	215.9	241.6	354.0	334.6	277.5	229.2	338.7	270.4	273.4	335.4
Mumps	4.9	2.8	6.9	0.7	3.3	2.0	10.3	0.0	0.0	1.9	2.5	1.9	0.6	3.8	1.9	0.0	315.0	1.9	1.9	0	0	3.1	0	0	1.2
Pertussis	1.4	1.4	0	8.9	0.7	1.3	2.6	0.0	1.9	0.6	0.0	1.3	40.3	0.0	0.0	1.3	1.9	4.4	0.6	0	1.9	21.0	0	0	0.0
Respiratory syncytial virus	---	---	---	---	---	---	---	---		---	---	---	---	---	0	0	0	48.2	0	0	0	22.3	24.6	0	33.9
Rheumatic fever, active	0	0	0	0	0	0	0	0	5.1	2.5	5.7	3.8	0.6	1.9	1.9	0	0	0	2.5	0	0.6	1.2	0	0	0.6
Rubella	---	---	---	---	---	---	---	---	0.0	0.6	0.6	0.0	0.0	0.0	0.6	0	0	1.3	0	0	0	0	0	0	1.2
Salmonellosis	53.1	27.7	26.8	23.8	30.7	24.2	18.1	15.4	29.3	27.9	31.6	29.0	23.9	12.6	14.5	6.9	6.9	11.9	8.1	11.2	8.1	11.1	12.9	12.8	10.9
Scabies	7.7	11.8	3.4	8.2	26.7	107.5	98.8	55.6	47.8	15.9	4.4	28.4	19.5	12.0	6.9	1.3	5.0	8.8	17.5	55.5	195.0	185.4	100.2	68.3	31.5
Scarlet fever	9.1	4.9	1.4	2.7	2.7	5.9	11.6	8.3	5.7	8.2	3.2	8.2	11.3	6.9	3.1	1.3	4.4	7.5	5.0	15.6	3.1	4.9	3.7	1.2	0.6
Shigellosis	23.1	13.2	29.6	50.4	26.0	12.5	29.7	33.9	23.6	26.0	26.6	12.6	11.3	12.0	12.6	8.2	3.1	10.0	0.6	4.4	2.5	8.7	8.6	9.8	13.9
Streptococcal sore throat	451.3	280.2	108.7	73.6	23.4	56.4	344.3	158.0	105.1	137.1	127.8	358.0	492.1	293.1	287.7	204.0	372.1	295.1	205.1	321.7	205.6	278.8	303.5	527.2	178.0
Strep disease, invasive	2.1	5.5	6.9	0.7	6.0	2.0	5.2	0.6	0	0	0	2.5	1.3	8.8	7.5	9.4	2.5	8.8	8.1	11.2	11.8	1.2	0	0	0
Strep disease, other	0	0	0	0	0	0	0	0	2.5	0	0	0	0	0	0	0	56.5	99.0	46.3	51.8	46.0	23.5	110.6	0.0	106.6
Syphillis, all stages total	2.1	2.8	0	2.0	1.3	0.7	1.9	7.0	11.5	12.1	9.5	11.4	8.2	23.9	28.9	15.1	13.8	32.6	35.0	28.7	21.1	7.4	20.9	12.8	18.2
Toxoplasmosis	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.6	0.0	0.6	0.6	0.0	0.6	0	0	0	0.6	0	0	0	0	0	0	0	0
Tuberculosis	66.4	78.4	73.6	64.7	53.4	45.2	34.2	40.3	41.4	38.7	35.4	46.1	34.0	57.9	55.9	64.0	63.4	50.8	43.1	29.9	34.8	47.6	45.5	51.3	43.0
Typhoid fever	0.7	0.7	0.7	1.4	0	0	1.3	0	0	1.9	0.6	0.6	0	0	0	0	0	0	0	0	0	0	0	0	0
Vancomycin resis. *Enterococcus*	2.1	5.5	6.9	0.7	6.0	3.9	6.5	0.6	4.5	2.5	5.7	10.7	10.1	5.0	9.4	7.5	17.6	16.3	28.8	22.4	16.1	21.6	6.8	6.7	13.3
Vibriosis (all types)-cholera	15.4	9.7	7.6	4.8	14.7	5.9	5.8	2.6	7.0	2.5	10.1	4.4	2.5	1.3	1.9	1.3	1.9	1.3	0.6	0.6	0.6	0	0	0.6	1.2

[1] Guam State Data Center, Bureau of Statistics and Plans, Guam Population Estimates Municipality by Sex: 1960 to 2010 (August 2013) and Table 23-04. Population Projections by Age and Sex by 5-year Age Group, Guam 2010 to 2020. Guam Statistical Yearbook-2016, (2017). Available at: http://bsp.guam.gov/wp-bsp-content/uploads/2018/01/GuamStatistcalYearbook_2016.pdf

[2] Calvin Saruwatari, Guam State Data Center (2017). Military population by Decennial Census by CDP or Federal Lands.

[3] The 2018 military population estimate is based on enrollment of military personnel and their dependents at the three military health facilities on Guam. Occupational Health Physician/Director of Public Health/Public Health Emergency Officer/ Chief Medical Informatics Officer, U.S. Naval Hospital, Guam, personal communication, 2/11/19.

[4] Pobutsky A and E Neri (March 2018). Recent patterns of Filipino migration to the island of Guam: U.S. military colonialism and its aftermath. Philippine Studies: Historical and Ethnographic Viewpoints. University of the Philippines at Loa Banos.

[5] United States Department of the Interior. About the Compact of Free Association. Available at: http://www.uscompact.org/about/cofa.php

[6] Office of Epidemiology and Research, Guam Department of Public Health and Social Services. Annual Summaries of Notifiable Diseases, 1968-2018.

[7] Guam together with other 22 health departments in the United States uses a CDC-developed integrated information system, National Electronic Disease Surveillance System (NEDSS) Base System also known as NBS that helps local, state, and territorial public health departments manage reportable disease data in order to have the capacity to send notifiable disease data to CDC. Since 2017, the Guam DPHSS Bureau of Communicable Disease Control's (BCDC), Epidemiology & Laboratory Capacity (ELC) Program, receives data on all reportable conditions and these are reported to the CDC-NNDSS annually.

[8] David A., K-M Chen, RL Taitano, S Safabakhsh, R Wittenbach-Santos and S Sison. (2010). A History of Health on Guam (Ed. R.L. Haddock). Cruz Publications.

[9] Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Reports. Available at: https://www.cdc.gov/mmwr/mmwr_nd/index.html and https://stacks.cdc.gov/cbrowse/?parentId=cdc:101&pid=cdc:101.

[10] Hawaii State Department of Health, Historical Summary of Reported Cases of Notifiable Diseases 1990-2017. Available at: https://health.hawaii.gov/docd/files/2018/06/Disease-Summary-Table-1990_2017_Hawaii.pdf

[11] CDC AtlasPlus website https://www.cdc.gov/nchhstp/atlas/index.htm?s_cid=bb-od-atlasplus_002

[12] Under the authority conveyed in Title 10, Guam code Annotated, Chapter 3, Article3, Sections 3302, 3303, 3304, 3307, and 3308, health care facilities and laboratories are required to report all Guam Class I and II infectious disease cases (including ALL "suspect" cases) to the DPHSS.

[13] Centers for Disease Control and Prevention. Sexually Transmitted Disease Surveillance, 2017. National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention. Available at: https://www.cdc.gov/std/stats17/2017-STD-Surveillance-Report_CDC-clearance-9.10.18.pdf

[14] Centers for Disease Control and Prevention (2018). Reported Tuberculosis in the United States. National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention. Available at: https://www.cdc.gov/tb/statistics/reports/2017/2017_Surveillance_FullReport.pdf.

[15] Hawaii State Department of Health, Historical Summary of Reported Cases of Notifiable Diseases 1990-2017. Available at: https://health.hawaii.gov/docd/files/2018/06/Disease-Summary-Table-1990_2017_Hawaii.pdf

[16] World Health organization. Global Tuberculosis Report-2017. Available at: https://www.who.int/tb/publications/global_report/gtbr2017_main_text.pdf

[17] Centers for Disease Control and Prevention. MMWR Vol. 63, No. 43 October 31, 2014. Incidence of Hansen's Disease, United States, 1994-2011. Available at: https://www.cdc.gov/mmwr/pdf/wk/mm6343.pdf

[18] Haddock RL, Nocon FA, Santoas EA ad Taylor EG. Reservoirs and vehicles of Salmonella infection on Guam. Environment International 1990; 16:11-16.

[19] David A., K-M Chen, RL Taitano, S Safabakhsh, R Wittenbach-Santos and S Sison. (2010). A History of Health on Guam (Ed. R.L. Haddock). Cruz Publications. Refer to pages 144-147.

[20] Haddock, RL, Nocon FS. The source of Salmonella contamination of soil on Guam. Journal of Environmental Health, 1993; 56:17.

[21] Office of Epidemiology and Research, Guam Department of Public Health and Social Services. Annual Summaries of Notifiable Diseases, 1968-2018.