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Executive Summary:

For the past decade, there has been a steady erosion of public health and reference microbiology testing services on Guam. The result is increased dependence on commercial laboratories, high testing expenses, insufficient operating resources, delays in test results impacting patients and public health, and an inability to generate data important to clinicians and public health decision makers. Regional stakeholders and officials are in agreement as to the necessity of reestablishing a capable public health laboratory on Guam. In fact, in early 2000s, the Pacific Island Health Officers Association (PIHOA) and Secretariat of the Pacific Community (SPC) designated Guam a Level 2 regional laboratory because of their robust capabilities relative to other jurisdictions. In order to evaluate the future of the Guam Central Laboratory, three options have been analyzed in this document. The recommended option goes beyond the construction of a new public health laboratory facility for the Guam Department of Public Health and Social Services. The recommended option requires a long term commitment, from the government of Guam, to provide the resources to sustain the infrastructure investment. Doing so, will ensure the facility and its’ staff can serve Guam and the region well into the future. The option is viable at this time; because construction funding is available, government officials and stakeholders have taken actions that demonstrate commitment, and the existing laboratory staff is competent and motivated. This is a rare opportunity to solve this longstanding vulnerability. Therefore, decision makers are encouraged to proceed with the design, construction, and commissioning of a new laboratory facility.

Section 1: Background

On February 25, 2010, the Deputy Secretary of Defense chaired an Economic Adjustment Committee (EAC) meeting and directed the development of a Guam infrastructure funding plan associated with the Guam military realignment and planned personnel buildup. The EAC divided this task into development of a civilian infrastructure list and a socioeconomic project assessment. The Federal Team for the socioeconomic project assessment was comprised of subject matter experts from the Departments of Agriculture, Defense, Education, Interior, Justice, Health and Human Services, and Housing and Urban Development, as well as the Office of Management and Budget and the Council on Environmental Quality. Organization and deliberation meetings were held, between March and July 2010, culminating with a meeting with the Governor of Guam in San Francisco on August 11, 2010 and a Federal Team visit to Guam, from August 24 to September 2, 2010.

A Guam Public Health Laboratory project was one of the six Department of Defense Economic Adjustment Committee (EAC) team recommended projects for fiscal year 2011 or 2012 funding. The EAC subsequently received an appropriation of $13 million to fund this project. The project focused on enhancing Guam’s existing
public health department laboratory to ensure they would be capable of biosafety level 2/3 testing, and would provide detection and protection capabilities for island residents, visitors, and buildup construction workers. Expanded biosafety level 2/3 testing would eliminate the need to send most samples off island to get actionable results, to Hawaii State Laboratories or to the Centers for Disease Control and Prevention in Atlanta, GA. The project would also enhance preparedness for hazards (e.g., pandemic, MERS coronavirus, Ebola) and bioterrorism (e.g., anthrax, plague, etc.) and response capability; while improving public health inspections, by ensuring capabilities for presently unavailable surveillance analyses and response.

Section 2: Situation Analysis

During the recent assessments phase, there was an expressed desire, within the Guam medical laboratory community, for adequate public health laboratory services on Guam to serve the region’s needs. Several existing challenges or impediments must be addressed for the desire to become a reality. The Department of Health and Social Services capabilities and capacities have deteriorated over a protracted period of time, especially in the area of microbiology and rapid communicable disease testing services; which is attributed to numerous factors including an aging work force, un-replaced retirements, degeneration of funding, recruitment and retention challenges, and inability to honor debts for contracted laboratory services. This has left a severe void in analytical testing data, or at best delays by referring samples off-island for testing. Off-island shipment of samples is costly, logistically burdensome, and lengthy, which exacerbates microbiological procedure turnaround times and reporting of results, which are critical for effective disease control and surveillance. In addition, the traditional public health laboratory leadership role in training, testing expertise, and support of the surrounding laboratory operations has been dormant.

The U.S. Affiliated Pacific Islands (USAPI) consists of 10 additional laboratories located throughout the Pacific. The jurisdictions laboratory locations are Saipan, Marshal Islands (Majuro, Ebeye), Palau, American Samoa (including LBJ Tropical Medical Center and a clinical lab currently performing only waived testing), and the Federated States of Micronesia (FSM) on Chuuk, Pohnpei, Kosrae, and Yap. Laboratories on Saipan, American Samoa, and Guam are subject to US regulations enacted by the federal Clinical Laboratory Improvement Amendments. Several organizations, inclusive of CDC, PIHOA, Secretariat of the Pacific Community (SPC), and World Health Organization (WHO), have expended significant effort to assist these laboratories in laboratory quality assurance. The laboratories have organized themselves into an Association of USAPI Laboratories (AUL) to help with a quality management framework. All of the laboratories serve either primary care clinics or medical centers and therefore focus much more on clinical testing than public health surveillance, epidemiology, and response testing. For example, in American Samoa, the LBJ Hospital laboratory’s primary function is clinical support for inpatients and outpatients; while public health testing is relegated to a secondary priority.
None of the labs can dedicate much effort, if any, to performance of public health surveillance testing; such as vaccine preventable disease testing, foodborne illness testing (microbes, chemicals or toxins), water analysis, veterinary microbiology, or other environmental testing (air, soil). The Guam Environmental Protection Agency (Guam EPA) performs some limited environmental water tests. Palau, Chuuk, and Pohnpei each have the ability to do a rapid serology screen for leptospirosis. Chuuk and Pohnpei also have rapid serology screens for dengue. With few exceptions, these laboratories have the same or greater dependencies on distant reference laboratories as those located on Guam. Sending specimens out of the region, contributes to delays in results reporting and delays in follow-up actions; inclusive of epidemiological and outbreak response. Laboratories on Pohnpei and Kosrae only have two flights to Guam each week, so trans-shipments off Guam further exacerbate the delays (e.g., TB culture specimens are sent on to Hawaii for processing). This not only compounds the turnaround time, but may cause or contribute to sample stability problems. American Samoa, and Majuro, on the other hand, have flights directly to Hawaii, so specimens currently are not routed to Guam.

The Department of Defense’s recognition that communicable / infectious threats impacting the military personnel and their dependents (inside the fence) are indistinguishable from those that affect co-located civilian populations (outside the fence) is well founded and valid for these island environments and the geographical region. Public health threats are numerous. Control or containment of many of them can be greatly enhanced by analytical testing services. Examples include response to highly communicable diseases such as measles and influenza, investigating and eliminating sources of food-borne infection, control of vector-borne disease, and preparing for high consequence emerging diseases like Ebola. Also bioterrorism events involving “white powders” need to be quickly assessed using standardized laboratory protocols. Threats do not respect boundaries; a fact painfully evident during the economically and medically destructive spread of diseases such as SARS (CDC MMWR 2003) and pandemic H1N1 (CDC MMWR 2009). More recently, laboratory analytical services confirmed that the widespread cases of measles in the Philippines has triggered outbreaks in Guam, Chuuk, Kosrae, Pohnpei, and Hawaii (CDC genotyping provided to Hawaii State Laboratories) despite World Health Organization (WHO) resolution to eliminate the disease by 2012 (CDC MMWR 2013, CDC MMWR 2014).

Analytical testing also identified chikungunya in American Samoa (PROMED 2014) and Yap (Hawaii State Laboratory results) allowing those cases to be differentiated and not misdiagnosed as measles. This is critical because chikungunya control (mosquito abatement) is completely different from measles control (vaccination and contact tracing), even though the symptoms are similar and could be easily misdiagnosed and incorrectly treated.

Influenza surveillance is necessary to monitor trends, such as human cases of avian (H5, H7, and H9) flu and the impact of the H3 “drifted” virus, which has led to
widespread vaccine failures in the Northern Hemisphere during the 2014-2015 season.

A 2014 outbreak of dysentery on American Samoa was shown to have two causes, each having separate treatment and disease implications. Untreated dysentery disease caused by the parasite *Entamoeba* causes liver abscesses while bacterial dysentery caused by *Shigella* rapidly spreads among family members and close contacts. Even after both agents were shown to present, laboratory testing was still needed to differentiate cases.

Global trends include deadly Ebola virus disease, emerging drug resistance, resurgent syphilis and whooping cough, and novel agents like Middle East Respiratory Syndrome (MERS) coronavirus. Without adequate analytical testing (laboratory) support in the Pacific, clinicians and disease controllers do not know how these diseases are affecting their communities (in the broadest sense), which in turn create greater risk exposure to a broader regional community.

Two years before the 2001 East coast anthrax attacks, and in response to a series of hoax anthrax attacks, the CDC envisioned a national Laboratory Response Network (LRN) that would prepare for and respond to intentional and naturally occurring biological and chemical threats. The LRN has countered numerous infectious disease threats over the last 16 years including SARS coronavirus, avian influenza (H5, H7, H9), pandemic H1N1 influenza, and MERS coronavirus (CDC MMWR 2015). This coordinated network of standardized materials and methods has become a model system that other agencies strive to duplicate. The leveraging of bio threat capability to address other public health concerns is reflected in the 2015 National Snapshot of Public Health Preparedness (http://www.cdc.gov/phpr/pubs-links/2015/) that is published each year, with jurisdictions assessed by metrics for bio threats, chemicals, and foodborne disease capabilities (E.coli O157 and Listeria). Guam and the USAPI jurisdictions have no LRN capability, which contrasts with every one of the 50 states. As an example, by leveraging the LRN, other networks (National Animal Health Laboratory Network, Food Emergency Response Network, etc.), and the expertise of scientists at the CDC, the Hawaii State Laboratories has enhanced its capabilities to detect geographical threats (dengue, chikungunya, rat lungworm), and threats from imported products (melamine, *Salmonella*). They have also provided a forward projection platform for early detection, warning, response, and containment of problems in the Pacific (e.g., threat letters, measles, mumps, chikungunya, dysentery, and food-borne disease outbreaks). The geographic isolation that led Hawaii developing these capabilities also applies directly to Guam. Guam is over 1000 miles further away from Hawaii than Hawaii is from the West coast. Flights are much less frequent. Goods and services are procured from Australia, Asia, and Oceania because they are impractical to obtain from the U.S. or the Americas. Enhancing the testing responsiveness on the island not only serves the community, but the new capacity is integral to enhancing a public health early detection, warning, and containment system that is critical to the U.S.A. and international community. Guam is the gateway to the U.S. in the Western Pacific.
The continued deterioration of laboratory capacity on the island and in the region leads to an incubator of hazards that could negatively affect the population, that by virtue of free travel throughout much of the region; will eventually impact Hawaii and the mainland U.S. Look no further than the loss of containment of chikungunya in the Caribbean and its impact on Puerto Rico, and the Gulf Coast states as a perfect example (CDC MMWR 2014). The same virus has established itself in the South Pacific, including Yap in 2013 and American Samoa in 2014 where investigators thought they were battling measles until laboratory testing revealed the true cause. By strengthening the public health laboratory services in Guam, the national and global health is strengthened.

To correct the current state of inadequate public health laboratory services within the Guam regional laboratory system, action must be taken soon with or without the support of the Economic Adjustment Committee (EAC) program of assistance to minimize morbidity and mortality to local populations.

Section 3: Solution Options for Providing Laboratory Service

Three options for providing public health laboratory services for Guam and the USAPI jurisdictions were considered. The first is continuing the current practice of off-island referral of testing. The second is to remodel existing space at the Guam Department of Public Health and Social Services facility located in Mangilao, Guam. The third option is to construct a new stand-alone public health laboratory facility.

**Option 1: Status Quo: The “do nothing option”.**

**Pros:** The least expensive option in the short term. There is no capital outlay required and no new sustainability issues for Guam. Given adequate resources for personnel and operations (other than facility), there is the potential for the laboratory to regain its leadership role in lab science to a limited degree.

**Cons:** Grossly under-resourced, the current state of public health laboratory services is unacceptable by all measures other than some limited potential. As described above, it has failed to provide all the necessary public health surveillance analyses, which has contributed to the lengthy delays for test results. Status quo would continue to sustain or compound the lengthy test turn around times. The lack of epidemiological testing would leave the regional population at risk for communicable disease and only become a higher risk exposure following the military build-up.

**Option 2: Renovating lab space at the existing DPHSS facility.**

**Pros:** Acquisition of a new site and the associated site preparation is not necessary.

**Cons:** Difficult to develop a budget estimate without additional planning and a more comprehensive design, since the design would not be limited to laboratory. Unknown or unforeseen complications may arise during the remodel process that could prove cost ineffective or infeasible to remediate (e.g., asbestos). These would almost certainly result in delays. The building, constructed in the early 70s, would
need to be brought up to current building code and safety standards in its entirety, even though the laboratory would be a portion of the building. The laboratory is undersized and is currently located in the midst of several clinics, which have exposure to patients and other customers/users of the DPHSS facility. A remodel would be further compounded due to: lab services and/or patient care would need to be relocated during construction; functions currently housed in the DPHSS facility would need to be relocated permanently to another facility or an additional space would need to be added, which is questionable given the existing site; and the age of the existing facility. Overall, it is unlikely that the existing facility could accommodate regional testing needs.

Option 3: Design and construct a new dedicated laboratory facility.

Pro: Less complicated design. A new standalone facility could accommodate current and future infrastructure needs, including contemporary analytical, safety, information technology, and security systems. There would be greater operational efficiencies gained by a redesigned workspace that optimizes the delivery of laboratory testing services. This option provides a facility that could conceivably serve the region’s public health laboratory needs for the next 50 years. The facility if appropriately staffed would have the ability to decrease foodborne illness outbreaks; saving costs to the healthcare system and protecting food service and tourism revenue. It would also have the potential to decrease vector borne disease outbreaks and provide a greater ability to track influenza outbreaks\(^1\). The same impact could be expected with measles and sexually transmitted diseases (STDs)\(^2\). In addition, the new building would foster better employee morale and improve employee retention.

Con: Requires land acquisition and site preparation. To do correctly, the cost could approach $20 million. Requires a serious long-term commitment by the Government of Guam to maintain the facility and sustainment of the laboratory services.

Neutral: Timeframe for this option is about 4 years.

Section 4: Recommendation

The Association of Public Health Laboratories (APHL) team recommends Option 3. Although from the discussion above, Option 1 is the least expensive, it does not address the needs of the public health laboratory system. In each of the three options, it is difficult to illustrate the economic impact to the healthcare system of not having adequate public health laboratory services. For this reason, we have attempted to describe the human cost in terms of disease and its impact on the population of Guam, the region, and ultimately the tourism industry. The most

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\(^1\) Ortega-Sanchez, I. R., Molinari, N. -A. M., Fairbrother, G., et al. Indirect, out-of-pocket and medical costs from influenza-related illness in young children. Vaccine (2012). For kids, medical expenses ranged from under $300 to about $4,000 and parents missed between 11 and 73 hours of work. Flu costs the US Economy about $87 billion annually and kills 36,000 citizens.

\(^2\) Numerous CDC MMWR reports and studies in the region support the importance of laboratory screening as important in controlling STDs.
apparent example is the case of food borne illness. Guam currently has no capacity to detect and prevent the transmission of food borne diseases. The lack of food borne analytical testing creates a risk to the existing residents on Guam (both civilian and military) and will be compounded with the projected increase in population. Another example is the prevalence of Chlamydia and Gonorrhea infections. The incidence of these diseases is higher in the region than on the mainland US. The overall prevalence of chlamydia is 21.1% and for gonorrhea is 2.7%. Public health laboratory testing capability would directly impact and improve the current situation in the region. Testing for vector borne illnesses such as dengue, chikungunya, and leptospirosis is also lacking in the region. A new and expanded public health laboratory is the best option for providing the specialized laboratory space required to implement this testing. Influenza sub-typing capability is presently only available through the State of Hawaii public health laboratory. Sampling has been limited due to funding and transport issues. The result has been a lack of current data on influenza strains circulating in the region. With a new public health laboratory, GDPHSS would be better equipped to safely handle the increased volume of samples from each of the examples presented above.

The APHL team believes that the new facility described as option 3, is the best solution to the region’s public health laboratory needs. This option requires the facility funding, a construction site, a Government of Guam commitment for ongoing financial support of the facility and its programs, and continued progress with the restoration of services at the existing Guam DPHSS laboratory.

Section 5: Facility Project Description

The new Public Health Laboratory proposed for Guam will be a key facility for the Department of Public Health and Social Services (DPHSS) by providing testing and research to improve the health for all the people on the island. The new lab will also support diagnostic services for regionally important diseases and conditions that may impact the health of the community and the region, and serve as a regional center of excellence for reference testing.

The cost of a fully functioning laboratory for public health testing should take into account a number of factors that will impact not only the design and construction of the facility, but the operations and maintenance of the facility over time to assure high quality public health for the island and the region. The goal is to create a sustainable public health program for Guam and the building is just one important

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4 "Recommendations for the laboratory-Based Detection of Chlamydia trachomatis and Neisseria gonorrhoeae-2014" CDC, MMWR vol. 63, no. 2 March 14th, 2014
component toward achieving that goal. In order to realize a building project of this complexity there a number of elements that should be considered in addition to the overall construction cost of the building.

**Planning and Design** – The design of a public health testing laboratory will require an architect and engineer familiar with zoning, building codes, and construction practices for Guam and specialty consultants who possess the expertise and experience in the design and operations of public health laboratories. The estimated \textit{A/E Fees} are for developing the construction bid documents and basic construction administration services. The \textit{Design Reimbursables} are for document printing, travel, and other costs incurred during the production of the documents. \textit{Specialty consultants} are needed to finalize the design. They should be experienced and familiar with public health testing laboratories.

**Site** – Since the site for the new facility has not yet been selected, the Site Budget consists of: \textit{Site Improvements}, which includes allowances for clearing, rough grading, roads and parking; and \textit{Site Utilities} (water, sewer, power, gas, and communications) that may need to be brought to the site.

**Construction** – The \textit{Construction Cost} of the building includes the structure, enclosure, interior build out, and fixed lab equipment and casework (autoclaves, glass washers, dryers, biological safety cabinets, and fume hoods). \textit{Interior Furniture} includes chairs, desks, tables, office cubicles, and lab stools. The Communication system includes the telephone system hardware and devices. \textit{Signage} includes laboratory safety signage, way-finding, and building identification. \textit{Public Art Allowance} is a set aside to promote the local arts community through public projects.

**Services During Construction** – \textit{Record Documents} incorporate all changes during construction and will be the basis for operating the facility. \textit{Fulltime Construction Inspection} in addition to basic A/E construction administration will assure that the intent of the construction documents is maintained during construction. \textit{Building Commissioning} will assure laboratory certification and validate that the entire building operates as intended and is ready for testing.

**Move In** – Once the new lab is complete, the move in to the new laboratory will include \textit{Relocation Costs} to bring any existing analytical equipment and files to the new facility. This is usually done by a professional mover and is scheduled to minimize disruption to the testing and the laborators. A new \textit{Lab Information System} will include computer hardware, software, and training. \textit{New Analytical Equipment} will be needed to replace outdated and equipment in disrepair and for increased capacity and capabilities.

**Annual Facility Operations** – To ensure a sustainable future for the public health laboratory, the building and the analytical equipment must be maintained continually. \textit{Facility Management} consists of an FTE or FTE’s assigned to manage
the day-to-day performance of the building. Facility managers will use the Building Management System (BMS) to monitor ongoing performance and make changes as necessary to enhance the testing environment and control operating costs. Facility Maintenance will be achieved by the use of preventive maintenance software to assist in scheduling routine maintenance. An annual budget should be established to repair the building and its systems to assure continued certification of the laboratory. Equipment and LIMS Maintenance contracts for the analytical equipment are necessary to provide support to lab personnel for continued testing. In addition, as new tests are required, the LIMS software and programming must be updated to assure accurate reporting.
Guam Public Health Laboratory Overall Project Budget

Guam Public Health Lab Site Selection Criteria

1. **Zoning District** – Preferred sites should be located in the following zoning districts.
   a. C (Commercial)
   b. M-1 (Light Industrial)

Both allow for institutional/medical uses. In addition, the R2 Multiple Dwelling Zone allows a conditional use for health clinics. Given that the public health laboratory does not actively treat patients, additional definition should be given by the regulatory agency to ensure that the correct use category is used.

2. **Topography** - Preferred sites should be located on land with the following topography characteristics.
   a. Average site slope 2% or less is preferred.
   b. Average site slope equal or less than 5% is usable but will require additional space to transition slopes or provide retaining walls as needed.
   c. Any average site slopes greater than 10% is not recommended. Retaining walls and other techniques will be required to mitigate safety concerns and visibility.

3. **Environmental Restrictions** – The site should avoid environmentally sensitive areas such as-
   a. Costal lands
   b. 100-year floodplain areas.
   c. Within 100’ or closer to an existing wetland boundary.
   d. Natural Areas such as the forest areas and the mangrove mudflats.

4. **Vegetation** – Preferred sites should have limited or low vegetation to limit clearing and provide for visibility and security. If other factors under consideration are more favorable but vegetation is an issue, clearing the site, as needed, can be coordinated with the development plan.
Assessing local government’s commitment to sustainability during design

In order to mitigate risk, the following milestones were established in order to make a "go/no-go" decision to progress from design to construction. If milestones are not met, the project manager has the option of terminating the project after design phase. Under these circumstances, the Government of Guam still receives valuable design documents so that they can proceed with construction at some point in the future.

1. Conduct training to resume in-house confirmatory testing for sexually transmitted infections and bacterial agents of food poisoning.
2. Hire a Laboratory Administrator, a Territorial Epidemiologist, and at least 1 microbiologist initially. Staffing levels would need to be brought up to a level of 12 FTE over time as workload increased. (See staffing appendix)
3. Demonstrate sufficient cross-training to ensure minimal interruption of services.
4. Move into production environment the electronic laboratory reporting from supporting laboratories.
5. Establish influenza subtyping using CDC methods and instrumentation.
6. Provide /ensure capacity for regional influenza surveillance in conjunction with PIHOA.
7. Establish dengue testing using CDC methods and platform.
8. Rapid serological testing for acute leptospirosis.
9. Establish a fee structure for CMS reimbursable primary care testing services (e.g., WIC services).

This project consists of four phases as follows:

**Phase I** – Assess current Guam public health laboratories conditions (Guam Public Health Laboratories Baseline Assessment)

**Phase II** – Develop the Business Case to present at least 3 options. Provide a recommendation for the preferred option with business details for implementation.

**Phase III** – Develop a design program of requirements or Design Criteria

**Phase IV** – Develop a Conceptual Programmatic Budget Estimate
Appendix- Staffing

Status of GPHSS Laboratory Positions

Current Staffing

1. MD Laboratory Director (forensic pathologist consultant - 8 hrs. week)
2. Public Health Laboratory Administrator (vacant; currently recruiting)
3. Medical Technologist Supervisor (vacant; consultant 2 hrs. /day)
4. Microbiologist II
5. Medical Technologist II (vacant; currently recruiting)
6. Medical Technologist I
7. Medical Laboratory Technician II
8. Medical Laboratory Technician I
9. Territorial Epidemiologist (retired consultant; currently recruiting)

Recommended Personnel Actions

1. Conduct a classification and salary audit. Analysis included in this Appendix suggest these specific actions:
   1a. Convert a filled MLT I-III to Lab Assistant I-III. Future MLTs require Associates & certification (e.g., MLT IV).
   1b. Retain the MLT IV as the Associate Degree level, certified MLT (non-supervisory).
   1c. Guam MT I should be Bachelors Degree level, certified MT (AKA CLS – clinical laboratory scientist).
   1d. Guam Microbiologist I has a Bachelors Degree, but little or no clinical microbiology training/experience.
   1e. Adjust salaries so they are approximately 20% lower than Hawaii civil service, which is consistent with the difference between commercial lab salaries in the two locations. Open the high end of Lab Administrator (not adjusted at a 20% discount) to external applicants as well as internal promotion.
2. Medical Technologist Supervisor; Hire as a full time position with the new facility
4. Microbiologist III; Hire as work volume increases
5. MLT II; Convert to Associates level (MLT IV) and hire as work volume increases.
6. Chemist III; Convert this position to Microbiologist III (molecular/methods development) and hire as work volume increases.
7. Laboratory Assistant (III?); Use HI class standards and hire this position as work volume increases.
8. Word Processing Secretary II; Convert to Lab Assistant III or MLT IV as work volume increases.
9. Microbiologist I; Hire as work volume increases
10. Laboratory Technician II; Convert to MLT IV and hire as work volume increases
11. Microbiologist II; Hire as work volume increases.
12. Consider a clinical pathologist or doctoral level clinical microbiologist; Hire with the new facility.

<table>
<thead>
<tr>
<th>Class</th>
<th>Hawaii Level</th>
<th>Salary Range</th>
<th>US Median</th>
<th>Guam Class</th>
<th>Salary Range</th>
<th>TARGET</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>Lab Asst I</td>
<td>I</td>
<td>24,636-39,492</td>
<td>GU MLT I</td>
<td>18,723-28,085</td>
<td>19,709-31,594</td>
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<tr>
<td></td>
<td>II</td>
<td>26,700-42,684</td>
<td>GU MLT II</td>
<td>21,389-32,083</td>
<td>OK-34,147</td>
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<td>Most HI positions</td>
<td>III</td>
<td>28,872-46,188</td>
<td>GU MLT III</td>
<td>22,942-34,414</td>
<td>OK-36,950</td>
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<td>HI supervisory</td>
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<td>MLT</td>
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<td>GU MLT IV (except Supervisory)</td>
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<td>V</td>
<td>53,364-78,996</td>
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<tr>
<td>HI Entry level</td>
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<td>43,812-64,920</td>
<td>GU Micro I</td>
<td>26,520-36,984</td>
<td>27,753-OK</td>
<td>The top level is higher than the 20% formula, but that's currently limited to a promotion (a mistake)</td>
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DPHSS salaries are very low compared to Hawaii (http://dhrd.hawaii.gov/state-hr-professionals/class-and-comp/) and the mainland US ([Pub Health Mgmt Practice, 2013; US median adjusted up 18% to 2015 estimates assuming 2010 levels reflect widespread furloughs (+10%) and wage freezes (two +4% increases). Local salaries at private labs are also higher. The cost of living on Guam is estimated to be higher than most of the US mainland, but about 20% lower than Hawaii (although US median salaries exceed the Hawaii range midpoint). These differentials and a lack of clinical and public health laboratory degree programs at University of Guam and Guam Community College contribute to problems with recruitment and retention.)
Appendix- Budget

Payroll and Benefits:
Current salaries and benefits = $471,711. At full staffing of 14 FTE estimated adjusted salaries and benefits = $1,500,000

Non-payroll Operating:
Consumable reagents and supplies = $1,000,000

Service Contracts:
Analytical equipment = $150,000
Laboratory Information System = $100,000

Facility Management:
Management and maintenance $200,000
Utilities= $500,000

Total Annual Operating Budget = $3,450,000

Note: estimated based on current and anticipated spending