

**HEALTH SERVICES SUPPORT PROGRAM (HSSP) LOAN NO.: TT-L1039**

**WBS 1.8 GESTATIONAL DIABETES MANAGEMENT PROGRAM**

**TERMS OF REFERENCE**

**TECHNICAL ARCHITECT AND SYSTEMS INTEGRATOR**

1. **BACKGROUND**

The Government of the Republic of Trinidad and Tobago and the Inter-American Development Bank (IDB) entered into a loan agreement for the TT-L1039 – Health Services Support Program (HSSP) for a period of five years August 12, 2017, to August 11, 2021, which has been extended to August 11, 2023.

The Health Services Support Program (HSSP TT-L1039) aims to prevent and control non-communicable diseases (NCDs) among adults and prevent and control risk factors among primary and secondary school students by strengthening the delivery of integrated primary care services; implementing behavior change programs and policies; ensuring Human Resources for Health (HRH); and enhancing Health Facilities Investment Management.

The HSSP Program is comprised of the following four components:

* **Component 1 – Implementation of NCD Prevention and Control Plan**
* Component 2 – Execution of the Human Resources for Health Plan
* Component 3 – Implementation of an e-Health Information Management System (e-HIMS)
* Component 4 – Strengthening of Health Facilities Investment Management

The objective of Component 1 of the HSSP is to reduce the morbidity and mortality from NCDs by increasing screening, early identification and treatment of NCD risk factors, as set out in The National Strategic Plan for the Prevention and Control of Non-Communicable Diseases (NSP NCD), 2017-2021.

The Ministry of Health (MOH) has contracted The Helen Bhagwansingh Diabetes Education Research and Prevention Institute (DERPi) to facilitate the program for the screening and management of diabetes in pregnancy.

DERPi’s Consultancy is concerned with Component 1 of the HSSP loan program; activity/ WBS 1.8 Gestational Diabetes Management Program - Consulting Services to Undertake a National Screening and Management Program for Diabetes in Pregnancy (DIP) in Trinidad and Tobago hereinafter referred to as the *DIP National Screening and Management Program*.

The DIP National Screening and Management Programaims to improve early detection and reduce undetected cases of diabetes in pregnancy at public health facilities in Trinidad and Tobago, by standardizing screening and management. Clinical guidelines have been published by the Directorate of Women’s Health (DOWH), *Diabetes Mellitus and Pregnancy: Clinical Guidelines, 2018* and The Ministry of Health, *Maternal and Child Health Manual, 2015*. These national guidelines inform the DIP National Screening and Management Program and outlines the recommended standards for screening and management of diabetes in pregnancy in Trinidad and Tobago.

DERPi’s Consultancy to undertake the DIP National Screening and Management Program has some specific objectives, one of which is to develop a sustainable, integrative and compatible Information Technology (IT) based surveillance system to capture national ante-natal (ANC) data including a component to capture the prevalence and outcomes of gestational diabetes.

In order to achieve this specific objective, DERPi has architected an IT Surveillance System (ITSS) design that allows for the linking together already existing information systems via a standardized health information system (HIS). An overview of this architecture is depicted in Figure 1 below and explained in detail thereafter. A full ITSS design with all considerations and requirements is included in Appendix A for further consideration. The ITSS is essentially all components working together in order to track a patient digitally as they enter the national health system, and in real time, be able to identify the hyperglycemic patients clearly to the clinicians via SIP Plus (also called the Clinical Information System).



Figure 1: The Overall IT Surveillance System

The HIS software that has been selected to be utilized in this project is a HL7 FHIR Server that can collect information from the Clinical Information System (hereinafter known as SIP Plus) and the Laboratory Information System (LIS) independently. This data flow is facilitated by a Health Integration Engine (HIE) software that acts as the translator of information from these disparate systems to the HIS and manages the syncing of both clinical and demographic data to SIP Plus and the LIS accordingly.

During this project, DERPi is responsible for the coordination of this ICT strengthening exercise as contracted by the Ministry of Health, with necessary technical support provided by MoH ICTD through the oversight by the Directorate of Women’s Health. The pilot project would be done at the ERHA and once successful implementation of the ITSS has been achieved, it would be rolled out to the TRHA, SWRHA, NCRHA and NWRHA. The Ministry of Health reserves the right to change the order of the RHA rollout. The MoH consultants would be hired for a period of eight months.

During the period of engagement to September 30th 2022, the consultant would report to DERPi followed by the Directorate of Women’s Health which in turn would rely heavily on the services of the MOH ICTD to provide relevant technical support. After September 30th 2022, during the remaining time, the first line of reporting would be through the Directorate of Women’s Health which will continue its reliance on the technical expertise provided by the MoH ICT Division.

The Ministry of Health seeks an individual consultant filling a dual role, a Technical Architect and Systems Integrator, as a member of a small team (4 members in total) of consultants, all working together for the development of this IT Surveillance System.

1. **OBJECTIVES**
   1. **General Objective**
      1. The overall objective of The National Screening and Management Program for Diabetes in Pregnancy in Trinidad and Tobago is to improve early detection and reduce undetected cases of diabetes in pregnancy by implementing an IT Surveillance System that is able to digitally track patients throughout their pregnancy by linking together already existing health information systems and making the necessary recommendations for alerting mechanisms for clinicians to take action and manage the patient accordingly.
      2. In order to achieve the overall objective stated above, a team of IT consultants comprising of the following roles is needed to build and link the necessary software systems.

* Technical Team Leader and Software Project Manager
* Technical Architect and Systems Integrator
* Health Integration Engineer #1
* Health Integration Engineer #2

**Title: Organogram during project**

MOH ICT Division

Directorate of Women’s Health

DERPi IT Consultant

Technical Team Leader and Software Project Manager

Technical Architect and Systems Integrator

Health Integration Engineer #2

Health Integration Engineer #1

**Title: Organogram post project (September 30th 2022 onwards)**

MOH ICT Division

Directorate of Women’s Health

Technical Architect and Systems Integrator

Health Integration Engineer #1

Health Integration Engineer #2

Technical Team Leader and Software Project Manager

* 1. **Specific Objectives of this assignment**
     1. The specific objective of the Technical Architect and Systems Integrator is to provide all necessary expertise and support to ensure that the datacenter hardware and software that is provided by the Ministry of Health IT Staff is properly configured to ensure the successful completion of all data mapping activities, configuration of the HIE and the software development necessary to meet the objectives of the ITSS within its allocated time. This can be done remotely and physical presence in Trinidad & Tobago is not required.
     2. Understanding the needs for each ITSS component for effective communication through TCP IP and HTTP(s) protocols and configure the locally provided datacenter environment to meet the communication needs of the project and its software systems.
     3. Determining and overseeing consistent testing, evaluation, and troubleshooting of all hardware and networking components of the ITSS to ensure a robust architecture that can withstand the primary server failing and components being re-routed to the secondary server automatically.

1. **SCOPE OF SERVICES, TASKS AND EXPECTED DELIVERABLES**

The DERPi IT Consultant is responsible for the architecture and overall delivery of the IT Surveillance System but requires a team of software developers, an architect and a project manager in order to realize the design. The objective of the ITSS is to capture and synchronize all demographic and clinical data from two separate IT systems, one of which, does not have a standardized form of health communication.

With the direction and supervision of the DERPi IT Consultant, the Technical Architect and Systems Integrator will liaise with the IT staff at the Ministry of Health (MOH) to ensure that adequate remote access is provided and all hardware infrastructure is appropriately setup for the software developers to build and configure the software to meet the needs of the ITSS.

Most of the work required to develop the ITSS involves the data mapping and transformation of all data points from SIP Plus and the LIS to the relevant HL7 FHIR equivalents. This process involves all members of the development and architecture team to understand the technical documentation of SIP Plus, the LIS, the HIE and the HIS and to build the architecture and logic needed to properly move data without error and duplication.

Once the software has been developed and all data points mapped, the surveillance system should be piloted at the Eastern Regional Health Authority (ERHA) over a period of 1 month. During this time, provisions should be made in parallel to have a second LIS connected to the ITSS by the IT Systems and Technical Architect. This LIS is at the Tobago Regional Health Authority (TRHA) and it is to be linked to the ITSS and piloted having learnt from the previous pilot at the ERHA.

The scope of services, tasks and expected deliverables of the Technical Architect and Systems Integrator are outlined below. In order to achieve this the Technical Architect and Systems Integrator will be expected to:

* 1. **Manage** all aspects of the to-be-provided datacenter hardware and software to support the needs of the software developers and the ITSS on the whole, including, but not limited to, managing and configuring Windows Server operating systems, managing and configuring firewall appliances, setting up load balancers and web application firewalls with the assistance of MOH IT staff.
  2. **Communicate** with the software vendors, namely the HIS, LIS, HIE and SIP Plus vendors to understand the IT communication requirements of each component and how they fit into the overall ITSS design. The Technical Architect and Systems Integrator is to also ensure that any issues that may arise with working with the vendors or their respective software is escalated to the Software Project Manager which will then be further escalated to the DERPi IT Consultant.
  3. **Assist** with building the documentation of the developed ITSS along with the rest of the technical team such that, post project, the staff at the Ministry of Health and RHA can understand the software systems in place and be able to troubleshoot if the need arises without external intervention.
  4. **Provide online support** through email, WhatsApp, and online meetings to the team members and ensure all hardware and system configurations meet the needs in the development of the ITSS.
  5. **Provide the Software Project Manager and DERPi IT Consultant with weekly reports** on progress on configuring the datacenter environment for the ITSS and any encountered challenges. Following each report, it is expected that the Technical Architect and Systems Integrator collaborate with the DERPi IT Consultant to determine strategies for addressing barriers and challenges and implement interventions to address barriers and challenges as agreed in collaboration with the DERPi IT Consultant.
  6. **Identify key challenges and suggest solutions** with respect to barriers to implementation identified at the initial pilot site at the Eastern Regional Health Authority (ERHA) and subsequently to other RHA sites that the project team is implementing the ITSS.
  7. **Highlight best practices** that may be useful for implementation throughout the selected RHA locations.
  8. **Assist in developing a training program and plan** which would identify the key configurations to the datacenter that were done to allow for all components to successfully communicate to the ITSS as well as how the high availability was done for each component.
  9. **Assisting with** testing, evaluation, and troubleshooting of all developed products in all stages of completion.
  10. **Deliver the necessary training** to the relevant MOH IT staff, virtually, for understanding the network architecture developed and the explain documentation that adequately describes the functions and steps needed to troubleshoot the ITSS should the need arise.
  11. **Develop** a sustainability and Disaster Recovery plan to be delivered before the end of the consultancy. This plan should contain all the considerations and precautions needed for all architectural and networking components that were designed and configured by the Technical Architect and Systems Integrator.
  12. **Maintenance and Support (Optional)** Annual support and maintenance ofthe ITSS System to be decided at the end of the eight month contract period by MOH on the recommendations of MOH ICTD. (Cost to be only negotiated with contracted consultant)
  13. Possible onsite visits may be required (Cost to be only negotiated with contracted consultant)

**4. CHARACTERISTICS OF THE CONSULTANCY**

*4.1* ***Type of Consultancy:*** *Individual Consultant*

*4.2* ***Duration:*** *8 months*

*4.3* ***Place of Work:*** *Off-site (virtually)*

*4.4* ***Language:*** *English (FLUENT)*

*4.5* ***Qualifications, Experience, Skills and Areas of Expertise***

* + 1. **Academic Qualification:**

1. *Bachelor's or Master's Degree in Computer Science, Engineering, Computer Engineering or Software Engineering*

4.5.2 **General Experience:**

1. *Five (5) years’ experience following post-graduate qualification architecting and implementing IT systems and familiar with configuring hardware and software systems to support internal and external software applications.*

4.5.3 **Specific Expertise**

1. *Three (3) years of experience in IT consulting, IT Architecture development, Business System’s Analysis, or similar fields.*
2. *Two (2) years’ experience in writing technical documentation and developing implementation supporting systems and documents.*
3. *Five (5) years’ experience in managing, configuring and deploying Microsoft SQL databases.*
4. *Two (2) years’ experience in managing datacenters physically or remotely.*
   * 1. **IT Knowledge and Skills**

*Working proficiency and familiarity with remote administration tools such as Remote Desktop, managing databases such as CouchDB and Microsoft SQL and using productivity tools like Microsoft Word, Excel and Power Point.*

* + 1. *Provide three (3) references relevant to this scope of works*

**5. REPORTING REQUIREMENTS AND TIME SCHEDULE FOR DELIVERABLES**

The reporting requirements, expected deliverables and time schedule are outlined below.

| **Report/ Deliverables** | **Scope of Reports/ Deliverables** | **Timeline for submission** |
| --- | --- | --- |
| Implementation Plan | Proposed implementation plan for configuring the Windows Servers provided by MOH for the various software components of the ITSS. | Three (3) weeks after signed contract  (Month 1) |
| Report due on successful configuration of HIE for communication and load balanced | Ensure the HIE is properly configured for HTTPS and TCP/IP communication via internal and external IP addresses to the HIS and other connected entities identified in the project. Also ensure that the HIE is load balanced across two virtual machines via firewall configuration and assist the vendor with this process as necessary. | Milestone in implementation plan |
| Report on successful configuration of HIS for communication and load balanced | Ensure the HIS is properly configured for TCP/IP communication via internal IP address to the HIS. Also ensure that the HISE is load balanced across two virtual machines via firewall configuration and assist the vendor with this process as necessary. | Milestone in implementation plan |
| Report on successful configuration VPN link between LIS and HIE | Assist the RHAs and LIS vendor with connecting the LIS at ERHA initially and subsequently at TRHA to the HIE via VPN connection. This needs to be a stable connection and load balanced across two physical servers at the datacenter. | Milestone in implementation plan |
| Documentation of all server configurations | Fully document all steps taken to configure each server and virtual machine to realize the ITSS. Also document all challenges encountered and actions taken to address these challenges. | Two weeks before end of DERPi’s contract. |
| Handover Training | Delivered a training session to the IT staff at MOH to go over the documentation developed by the Technical Architect and Systems Integrator and understand the overall ITSS built. | Two weeks before end of DERPi’s contract. |
| Disaster and Recovery Report | A report should be submitted that clearly identifies all points in the architecture that can fail and what steps should be taken by Ministry of Health IT staff to resolve any failures or issues. | Two weeks before end of DERPi’s contract. |
| Lessons Learnt / Best Practices Report #1 | All best practices and lessons learnt should be clearly documented such that any architect taking over the project post consultancy should be able to understand what could have been done differently and what the best practices are when it comes to architecting the ITSS. | One week before end of DERPi’s contract. |
| Report on successful configuration VPN link between LIS and HIE | Assist the RHAs and the Roche LIS vendor with connecting the LIS at the RHAs to the HIE via VPN connection. This needs to be a stable connection and load balanced across two physical servers at the datacenter.  Assist the RHA to integrate any LIS outside of the Roche LIS with the ITSS. | Milestone in implementation plan. |
| Lessons Learnt / Best Practices Report #2 | All best practices and lessons learnt should be clearly documented such that any architect taking over the project post consultancy should be able to understand what could have been done differently and what the best practices are when it comes to architecting the ITSS. | One week before end of Consultant’s contract. |

Reports are to be submitted as follows:

* 1. The Technical Architect and Systems Integrator submits reports to the DERPi IT Consultant via the Technical Team Leader and Software Project Manager and as per the schedule above. The DERPi IT Consultant will approve reports.
  2. DERPi will review and on acceptance, submit to the Project Management Team assigned to the DOWH.
  3. The DOWH Project Management Team coordinates the review by and feedback from the MOH ICT Director and facilitates the provision of feedback to DERPi.
  4. DERPi submits the final version of report with attachment(s), delivery acceptance signoff form and invoice from the consultant to Director DOWH.
  5. Director DOWH countersigns the delivery acceptance signoff form and submits accepted reports along with invoice from the consultant, to PIU HSSP for payments.

Reports should be submitted electronically by email to the DERPi IT Consultant with a copy to the DERPi Project Manager. After September 30th 2022, reports would be submitted electronically to the Project Management Team assigned to the Directorate of Women’s Health.

All payments will be made upon submission and acceptance of Reports/Deliverables by the Project Management Team assigned to the Directorate of Women’s Health.

**6.0 CLIENT INPUT AND COUNTERPART PERSONNEL**

The client input and counterpart personnel relevant to the consultancy of the Technical Architect and Systems Integrator are outlined below.

6.1 DERPi together with the Regional Health Authority is responsible for making the initial introductions of the individual software vendors to the Technical Architect and Systems Integrator. Following this, all interactions should be directly between vendor and hired Technical Architect whilst copying DERPi IT Consultant and the Project Management Team at the Directorate of Women’s Health in all electronic communications.

6.2 DERPi will work with the IT Manager at each respective RHA to facilitate the identification of the respective focal points from ERHA and TRHA such that, the Technical Architect and Systems Integrator through DERPi will liaise with these focal points.

6.3 The Technical Architect and Systems Integrator needs to maintain constant communications, through DoWH, with the IT staff at the Ministry of Health, as all hardware interferences are the responsibility of MOH IT staff.

**7.0 COORDINATION**

The Technical Architect and Systems Integrator will be hired as an MOH Consultant to give assistance to the Diabetes in Pregnancy project. During this project, DERPi is responsible for the coordination of this ICT strengthening exercise as contracted by Ministry of Health, with oversight by the Directorate of Women’s Health and necessary technical support to DoWH provided by MOH ICT. After September 30th 2022, for the remaining time, the coordination and first line of reporting will be through the Directorate of Women’s Health, which will be supported technically by the MOH ICTD.

**ANNEX A:**

The Evaluation Criteria and Committee are as outlined in the respective tables below.

**EVALUATION CRITERIA**

|  |  |  |  |
| --- | --- | --- | --- |
| **#** | **Evaluation Component** | **Evaluation Criteria** | **Maximum Points** |
| **1** | **Academic Qualification** | Bachelor's or Master's Degree in Computer Science, Engineering, Computer Engineering or Software Engineering. | **10** |
| **2** | **General Experience** | Five (5) years’ experience following post-graduate qualification architecting and implementing IT systems and familiar with configuring hardware and software systems to support internal and external software applications. | **15** |
| **3** | **Specific Experience** | Three (3) years of experience in IT consulting, IT Architecture development, Business System’s Analysis, or similar fields. | **65** |
| Two (2) years’ experience in writing technical documentation and developing implementation supporting systems and documents. |
| Five (5) years’ experience in managing, configuring and deploying Microsoft SQL databases. |
| Two (2) years’ experience in managing datacenters physically or remotely. |
| **4** | **IT Knowledge & Skills** | Working proficiency and familiarity with remote administration tools such as Remote Desktop, managing databases such as CouchDB and Microsoft SQL and using productivity tools like Microsoft Word, Excel and Power Point. | **10** |
| **TOTAL POINTS** | | | **100** |

**ANNEX B**

## CURRICULUM VITAE FORMAT

|  |  |
| --- | --- |
| **Name of Consultant Services** | Procurement and Contract Management Consultant |
| **Name of Individual Consultant:** | *[Insert full name]* |
| **Date of Birth:** | *[day/month/year]* |
| **Nationality** |  |

**Education:** *[List college/university or other specialized education, giving names of educational institutions, dates attended, degree(s)/diploma(s) obtained]*

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**Experience relevant to the Assignment**: *[Experience related to the services and tasks performed; professional skills according to the assignment requirements, and knowledge of administrative systems and government organisation within the country of the Client and Region. List previous positions relevant to the Assignment starting with present position, list in reverse order, provide dates, name of contracting organization, titles of positions held, types of activities performed that best illustrate capability to handle the services/tasks and location of the assignment, and contact information of previous clients who can be contacted for references. Past position that is not relevant to the assignment does not need to be included.]*

|  |  |  |  |
| --- | --- | --- | --- |
| **Period** | **Contracting organization and Title/Position; Contact Information for References** | **Country** | **Summary of Key Activities performed relevant to the Assignment** |
| *[e.g., May 2005-present]* | *[e.g., Ministry of ……, advisor/consultant to…*  *For references: Tel…………/e-mail……; Mr. Bbbbbb, Deputy Minister]* |  |  |
| Etc. |  |  |  |
|  |  |  |  |

**Membership in Professional Associations and Publications:**

**Language Skills (indicate only languages in which you can work):**

**Consultant contact information :** [*e-mail………………, phone……………]*

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, experience, skills and knowledge and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to termination by the Client, and/or sanctions by the Bank.

Name of Consultant Signature Date*[day/month/year]*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Yes |  | No |
| (i) This CV correctly describes my qualifications, experience, skills and knowledge |  |  |  |
| (ii) I am employed by the Executing or the Implementing Agency |  |  |  |
| (iii) I was part of the team who wrote the Terms of Reference for this consulting services assignment |  |  |  |
| (iv) I am currently debarred by a multilateral development bank (If yes, identify who) |  |  |  |

I confirm that I will be available to carry out the assignment for which my CV has been submitted in accordance with the Scope of Services and Consultant’s Reporting Obligations set out in the Terms of Reference.

**ANNEX C**

**ELIGIBLE COUNTRIES**

A Consultant, and all parties constituting the Consultant, shall be nationals of member countries of the Bank. Consultants from other countries shall be disqualified from participating in contracts intended to be financed in whole or in part from Bank loans. This section lists the Bank’s member countries, as well as the criteria to determine the nationality of Consultants.

“Eligible countries are: Argentina, Austria, Bahamas, Barbados, Belgium, Belize, Bolivia, Brazil, Canada, Colombia, Costa Rica, Chile, Croatia, Denmark, Dominican Republic, Ecuador, El Salvador, Finland, France, Germany, Guatemala, Guyana, Haiti, Honduras, Israel, Italy, Jamaica, Japan, Mexico, Netherlands, Nicaragua, Norway, Panama, Paraguay, People’s Republic of China, Peru, Portugal, Republic of Korea, Slovenia, Spain, Suriname, Sweden, Switzerland, Trinidad & Tobago, United Kingdom, and United States, Uruguay and Venezuela.

Eligible Territories are:

* + - 1. Guadeloupe, French Guiana, Martinique, Reunion – as Departments of France
      2. U.S. Virgin Islands, Puerto Rico, Guam – as Territories of the USA
      3. Aruba – as a constituent country of the Kingdom of the Netherlands; and Bonaire, Curacao, Saint Marten, Saba, St Eustatius – as Departments of the Kingdom of the Netherlands
      4. Hong Kong – as a Special Administrative Region of the People’s Republic of China”

Nationality and origin of Goods and Services Criteria

The policy provisions make it necessary to establish criteria to determine: a) the nationality of the firms and individuals eligible to bid or participate in a bank-financed contract and b) the country of origin of goods and services. For these determinations, the following criteria shall be used:

(A) Nationality.

a) **An individual** is considered to be a national of a member country of the Bank if he or she meets either of the following requirements:

1. is a citizen of a member country; or

ii has established his/her domicile in a member country as a “bona fide” resident and is legally entitled to work in the country of domicile.

-End-