

Technical Cooperation Document

I. Basic Information for TC

▪ Country/Region:	BARBADOS
▪ TC Name:	Technical Support for Monitoring and Evaluation of the Digital Transformation of the Queen Elizabeth Hospital.
▪ TC Number:	BA-T1092
▪ Team Leader/Members:	Bauhoff, Sebastian (SCL/SPH) Team Leader; Nelson, Jennifer A (SCL/SPH) Alternate Team Leader; Tejerina, Luis R. (SCL/SPH) Alternate Team Leader; Donghyun Kang (SCL/SPH); Ofir Marer (SCL/SPH); Sara Vila Saintetienne (LEG/SGO); Silveira, Sheyla (SCL/SPH); Vanessa Curran (SCL/SPH)
▪ Taxonomy:	Research and Dissemination
▪ Operation Supported by the TC:	BA-G1006 (GRT/ER-19884-BA)
▪ Date of TC Abstract authorization:	30 Jan 2023.
▪ Beneficiary:	Barbados through its Ministry of Health and Wellness (MOHW) and the Queen Elizabeth Hospital (QEH)
▪ Executing Agency and contact name:	Inter-American Development Bank
▪ Donors providing funding:	OC SDP Window 2 - Social Development(W2E)
▪ IDB Funding Requested:	US\$125,000.00
▪ Local counterpart funding, if any:	US\$0
▪ Disbursement period (which includes Execution period):	24 months
▪ Required start date:	15 June 2023
▪ Types of consultants:	Consulting firms
▪ Prepared by Unit:	SCL/SPH-Social Protection & Health
▪ Unit of Disbursement Responsibility:	CCB/CBA-Country Office Barbados
▪ TC included in Country Strategy (y/n):	No
▪ TC included in CPD (y/n):	Yes
▪ Alignment to the Update to the Institutional Strategy 2010-2020:	Social inclusion and equality; Productivity and innovation; Institutional capacity and rule of law

II. Description of the Associated Grant

- 2.1 The Inter-American Development Bank (IDB) is currently providing support to Barbados in the digital transformation of the Queen Elizabeth Hospital (QEH) with resources from the Modification of the Public Sector Modernization Programme (4920/OC-BA) and Supplementary Nonreimbursable Investment Financing "Digital Transformation of The Queen Elizabeth Hospital" (GRT/ER-19884-BA). The latter are grant resources that complement the objectives of the Bank loan Public Sector Modernization Programme (4920/OC-BA) to improve the effectiveness of the Government of Barbados to enhance the competitiveness of its economy.

III. Objectives and Justification of the TC

- 3.1 This Technical Cooperation (TC) has two objectives. The first objective is to provide support and gather necessary data for the monitoring and evaluation of the digital transformation of the Queen Elizabeth Hospital (QEH) using innovative tools for measuring adoption, use and improvements in quality and efficiency. The second objective is to explore linkages between primary and hospital care.

- 3.2 Hospitals are a critical part of health systems in Latin America and the Caribbean (LAC), they provide a wide range of key health services, from outpatient to specialty care and serve as training hubs for public health systems. Hospital care accounted for about 1/3 of total health spending in LAC (WHO, 2022) and spending is likely to become more important in absolute and relative terms as populations age and medical technology improves (Rao et al., 2022). In Barbados, the QEH is the principal acute care medical facility. It is an accredited teaching hospital allied with The University of the West Indies at Cave Hill, Barbados. It opened in 1964 to meet the medical, surgical, clinical and treatment needs of the Caribbean and to act as a teaching hospital for those entering the medical profession. Its mission is to be the premier regional institution providing excellent, patient-centered, secondary and tertiary health care services and health professional teaching in Barbados, the Eastern Caribbean and beyond.
- 3.3 While the hospital is the Barbados' main acute care medical facility there are many areas in which both quality and efficiency need to be improved. For example, in improving the time it takes to provide care in the case of emergencies or to perform scheduled surgeries. Also, in terms of patient safety regarding the adherence to protocols such as patient safety checklists, and the reduction in adverse events due to medication interactions. On average, the time it takes in the hospital to deliver a patient from the door to doctor in the case of emergencies is 6.15 hours, but the target for the hospital is 4 hours. The 15 specialty departments have a large backlog in scheduled surgeries, the exact magnitude of the backlog is unknown for most departments, however an exercise of measurement was done for three departments which allowed the monitoring and development of plans for improvement. An information system is expected to allow the continuous monitoring of all departments. And monthly there are approximately 50 adverse events because of clinical procedures.
- 3.4 In addition to the QEH, Barbados operates a network of eight polyclinics and four satellite clinics that provide primary care coverage, including preventive, curative and rehabilitative services. These clinics are staffed by public health nurses and environmental health officers and serve defined local catchment areas. Since 2019, the Winston Scott Polyclinic provides round-the-clock service for routine and urgent care with the objective to reduce wait times for patients who may otherwise seek care from the QEH Accident and Emergency Department.
- 3.5 Existing evidence – mostly from high-income countries – points to several ways in which digital transformation can improve technical and allocative efficiency, including through fewer redundant or unnecessary tests; improved management of materials, supplies and records; improved staff efficiency (including through reduced workload due to improved or eliminated tasks and documentation); improved operational efficiency that can lower the need for capital investments or replacements (e.g., more efficient and reduced use of imaging systems, and automated restocking and forecasting); and identification of lower-cost therapeutic options (e.g., watchful waiting instead of immediate surgery) and lower-cost pharmaceuticals (e.g., equivalent generics) (IADB 2022; OECD 2019; Adler-Milstein et al., 2014). By improving patient care and management, digital transformation can also help reduce length-of-stays and avoid unnecessary readmissions. More broadly, as a key part of digital transformation, integrated information systems can facilitate more effective centralized management of information technology (IT) systems and the overall hospital. This can support optimization within and across departments (e.g., more effective deployment of staff,

monitoring and addressing backlogs, and more informed prioritization of investments) and reduce administrative costs (e.g., fewer and more centralized administrative staff).

- 3.6 Digital transformation can also improve the quality of clinical services by providing safe, effective, timely and integrated care that is patient-centered (IOM 2001; WHO 2018; OECD 2019). These improvements can be achieved in several ways, including: reduced adverse events and complications (e.g., automated checks for potential drug interactions); improved adherence to evidence-based standards (e.g., via decision support, clinical protocols and surgical safety checklists); reduced wait times (e.g., shorter turnaround for lab results and improved scheduling); fewer cancellations (e.g., due to complete records); and enhanced patient experience (e.g., through faster care and discharge, and better-informed caregivers).
- 3.7 In addition, integrated information systems can also enable internal research (e.g., clinical research and operational studies), help identify and address additional constraints to efficiency and quality, and improve monitoring and evaluation. They can also facilitate integration with Barbados' polyclinics and in this way improve preventive and primary care, e.g., by sharing medical records with clinics and patients and by notifying primary care providers (and patients) about post-operative checkups and chronic care management.
- 3.8 Improving efficiency and quality of hospital care also requires changes in other parts of the health system. In particular, some care provided at hospitals like QEH could have been prevented if patients had been more effectively managed at the primary care level. This is particularly relevant for non-communicable diseases (NCDs) for which patients can develop acute complications that require hospital-level care. An example is hospitalization for long-term complications for diabetes, e.g., renal, eye, neurological, and circulatory complications. Addressing these "ambulatory care sensitive conditions" (ACSC, also called primary care sensitive conditions or prevention quality indicators) could improve health outcomes while reducing health expenditures and freeing up capacity at the hospital level. Estimates from Brazil suggest that 28.2 percent of all hospitalizations in the National Unified Health System in 2006 are due to ACSCs (Alfradique et al., 2009). There is likely substantial scope to reduce hospitalizations for ACSCs in Barbados.
- 3.9 There is only limited evidence on digital transformation of hospitals and primary care settings in LAC and, specifically, how such transformation impacts the experience of patients and staff. For example, digital transformation could impact how patients transit through the hospital (from making appointments and admission to discharge); the interaction of patients with staff; the patient experience and satisfaction; and the knowledge that patients have at discharge (e.g., for follow-up care or instructions on how to manage their condition). In some contexts, the use of electronic health records can improve quality of primary care, e.g., by improving thoroughness and communication (Rotenstein et al., 2022), but also contribute to dissatisfaction especially in the initial stages (Meyerhofer et al., 2018). Similarly, staff (from surgeons to nurses and technicians to administrative staff) need to effectively use digital tools and this may change how they spend their time on patient care or administrative tasks. Overall, digital transformation may also reduce idle time, delays in obtaining relevant information, and delayed discharges. In this way, digital transformation may improve efficiency and patient outcomes.
- 3.10 It is also unclear what specific changes to the primary care system may be needed to reduce avoidable hospitalizations. Improved management of NCDs may require

improved processes and protocols at primary care clinics, and possibly additional staff or training. There may also be scope for patients and staff to make use of new digital tools to facilitate management and self-management of NCDs, including integrated electronic health records (also linked to hospital records), patient-facing apps for behavior change and self-monitoring, and improved systems for renewing prescriptions and scheduling routine visits. Improved management of NCDs in primary care could improve patient agency and health, reduce unnecessary and costly hospitalizations, and free up capacity at QEH.

- 3.11 This TC will help in the design and implementation of studies such as a time and motion analysis to study the use of time of medical personnel in the QEH before and after the implementation of an electronic health record (EHR) system. It will also quantify the prevalence of ambulatory care sensitive conditions and examine ways to improve primary care of these conditions to reduce avoidable hospitalizations.
- 3.12 **Strategic Alignment.** This TC is consistent with the IDB's Second Update to the Institutional Strategy (AB-3190-2) and is strategically aligned with the development challenges of: (i) social inclusion and equality by contributing to improving the quality and access of health services to the vulnerable population; and (ii) productivity and innovation by contributing to showcase transformative healthcare technologies with sustainable and inclusive settings. Additionally, this TC is consistent with the objective of The Ordinary Capital Strategic Development Program (OC SDP) (GN-2819-14) which refers to strengthening the efforts made by public institutions to be more effective and efficient in their social programs. This TC is also aligned with two of the three areas of engagement in the IDB Group Country Strategy with Barbados (2019-2023) (BA-P1118), (i) fostering fiscal sustainability and a more efficient public sector; and (ii) safeguarding social outcomes. The TC informs work related to the IDB Group Corporate Results Framework 2020-2023 (GN-2727-12) indicators 2.2 (beneficiaries receiving health services) and 2.10 (technical assistance to enterprises, in this case the hospital and primary care clinics). This TC is also aligned with two priority areas of the OC SDP Window 2 - Social Development (W2E) fund (GN-2819-14), in particular priority area 3 (effective, efficient and transparent institutions) and 5 (inclusive social development) through the focus on efficient delivery of high-quality health care services.
- 3.13 **Beneficiaries.** The beneficiaries of this TC will be stakeholders from Barbados through its Ministry of Health and Wellness (MOHW) and the Queen Elizabeth Hospital (QEH) who participate in virtual technical meetings, webinars, workshops, policy discussions, and trainings, as well as those who read the knowledge products and technical documents that will be produced by this operation.

IV. Description of activities/components and budget

- 4.1 This TC will develop four main components: Component 1. Patient Journey; Component 2. Time use of hospital and clinic staff; Component 3. Care provided at QEH that could have been avoided by more effective primary care; and Component 4. Health professional perspectives of the NCD model.
- 4.2 **Component 1. Patient Journey.** This component has the objective to understand the experience of patients admitted to QEH and identify potential improvements in the flow of patients, as well as how the digital transformation project changes the patient journey and patient flow.

- 4.3 To achieve this objective, this TC will finance patient journey studies (also called “patient shadowing”) in which trained enumerators accompany patients from admission to discharge at QEH, and several days after discharge (Trebbles et al., 2010). After obtaining consent, the enumerator tracks all of the patient's contacts with different staff (the time, purpose, and communication) and experiences (anxiety, frustration, satisfaction, understanding and participation in the care process) with the care they receive during their time at QEH. This information can be used to describe how the digital transformation changes patient flows (reduction in wait times, availability of clinical records or lab results) and affects patient-centeredness (e.g., satisfaction, understanding) and possibly improves discharge (e.g., appropriate instructions for follow-up with primary care). In addition, we will contact patients several days after they have been discharged (e.g., by phone) to understand how they manage their condition post-discharge and whether they received appropriate follow-up in primary care.
- 4.4 We will conduct one round of such patient journeys, before the implementation of the digital transformation project, to establish a base line. We will randomly select 10 days and 4 patients per day (with a total of 80 patients shadowed across the two rounds -a second round of follow-up data is expected to be collected after the "Digital Transformation of The Queen Elizabeth Hospital" -GRT/ER-19884-BA implementation). We will stratify patients by admission in the morning, afternoon, or night. We will also stratify the sample across two common causes of admission for which care is relatively homogenous in order to facilitate comparisons; we will determine these conditions together with the QEH partners.
- 4.5 **Component 2. Time use of hospital and clinic staff.** This component has objective to understand how much time health care providers at QEH and at primary care clinics spend on different tasks (such as patient care, record keeping and administration) and to identify specific opportunities for redesigning processes, leveraging digital tools and improving staff use. The product of this component will be databases and analyses regarding time use.
- 4.6 To achieve this objective, this TC will finance time-and-motion studies. Enumerators will arrive at a randomly selected day and, after obtaining consent, follow a randomly selected sample of staff (from the duty roster) for their full shift and capture the types and durations of their activities. Time-and-motion studies are widely used in health care (Lopetegui et al., 2014) and have been previously used to study the introduction of electronic health records (e.g., Pizziferri et al., 2005). The one time-and-motion study for primary care in LAC (Peru, 2019) has been supported by the IDB and involved 275 providers that were tracked with the tablet-based Work Observation Method by Activity Timing tool (Leslie et al., 2021). This TC will build on this experience and peruse the existing protocols and tools. In addition, this component will conduct a brief survey with the observed staff at the end of their shifts to understand their perspective, constraints and suggestions, especially as they relate to the digital transformation (QEH) and NCD management (clinics).
- 4.7 For QEH we will conduct one round of time-and-motion study before the "Digital Transformation of The Queen Elizabeth Hospital" (GRT/ER-19884-BA) to facilitate its evaluation. The sample will be of 30 staff members across 10 shifts, including medical staff and technicians (tentatively 10 doctors, 10 nurses, 5 midwives, and 5 technicians). We will stratify the sample to cover clinical departments that are early versus late adopters of the digital transformation project, leveraging the staggered implementation for a difference-in-difference type of analysis. This analysis is not

intended as rigorous estimates of causal effects because the project will likely impact all departments and because there are only a few departments at QEH. The baseline ("pre") measurement will occur prior to the project implementation. A future follow-up measurement ("post") will occur 3 months after the implementation is completed and will be conducted separately. The relatively short follow-up will help inform the project implementation and the rollout to all QEH departments.

- 4.8 For the primary care setting, we will randomly select 10 clinics and conduct a single round of data collection in which we observe 5 shifts at each clinic. The sample will be 5 staff members at each clinic (total of 50, one per shift) with 1 doctor, 2 nurses, 1 midwife and 1 pharmacist. This study will be completed after the measurements at QEH have started.
- 4.9 **Component 3. Care provided at QEH that could have been avoided by more effective primary care.** This component has the objective to quantify the prevalence of ambulatory care sensitive conditions (ACSC) at QEH to motivate improvements of NCD management at the primary care level. The product will be a descriptive analysis of ACSCs at QEH.
- 4.10 This TC will finance a study of ACSC at QEH using secondary data. We will work with the Ministry of Health and Wellness (MOHW) to select a set of internationally used ACSC indicators that are appropriate and of key interest to Barbados. For example, the United States Agency for Healthcare Research and Quality (AHRQ) currently considers 14 ACSC indicators, while Brazil considers around 20. The Organization for Economic Cooperation and Development (OECD) reports on seven conditions that are also reported for Colombia. Examples for avoidable admissions to the emergency department include acute events related to uncontrolled hypertension, diabetes, and asthma. ACSC indicators are based on diagnoses codes (International Classification of Diseases -ICD) and for specific patient populations (via the use of inclusion and exclusion criteria). Because this information is not currently available electronically at QEH, we will work with a sample of clinical paper records and extract the relevant information.
- 4.11 Specifically, we will randomly sample records for 1,200 admissions that occurred in 2022, stratified by month (N=100 per month). For each record, we will abstract the relevant information to construct the ACSC indicator, as well as basic information about the patient (demographics) and other relevant information (e.g., time and weekday of the admission in case primary care was not available to the patient at the admission). We will also collect information about the discharge, such as whether recommended screenings and tests were done (including for comorbidities), the instructions given to patients (e.g., related to follow-up and prescriptions), as well as length of stay and (if available) resource use while admitted. This can inform cost analyses and how to improve the hand-off of hospitalized patients to primary care and self-management.
- 4.12 **Component 4. Health professional perspectives of the NCD model.** The objective of this component is to understand why patients with ACSCs experience acute events that lead to hospitalization at QEH. The product will be a short report describing the context and drivers of such hospitalizations, along with suggestions for reducing them.
- 4.13 Hospitalizations for ACSCs point to ineffective management of patients at the primary care level. This component will finance qualitative interviews with staff at primary care clinics to explore reasons for these hospitalizations and identify potential ways to improve patient management. Specifically, we will conduct semi-structured qualitative

interviews at the same 10 randomly selected clinics in Component 2. At each clinic, we will interview 2 doctors, 2 nurses and 2 auxiliary staff (pharmacist or technician). The interviews will focus on perceived reasons why patients' conditions are not well managed, e.g., because of limited patient adherence regarding medication or routine checkups, limited capacity (wait lists, lack of dedicated or trained staff), local context (accessibility or utilization), and health information systems (delay or lack in obtaining relevant clinical data). We will also elicit suggestions for improvements regarding the clinic environment and patient self-management. Finally, we will assess clinic staff's skills, comfort and experience with electronic systems for patient management and digital technology in general.

4.14 **Expected results.** The expected products of this TC include studies and datasets that contribute to the policy dialogue on health in Barbados and inform operation BA-G1006.

4.15 **Total costs.** The total cost of this TC is US\$125,000, financed by the OC SDP Window 2 - Social Development (W2E) fund. These resources will finance two consulting firms for 24 months.

Indicative Budget (US\$)

Component	Description	IDB/Fund W2E Total Funding
1. Patient Journey	Observe patients at QEH	40,000
2. Time use of hospital and clinic staff	Observe staff throughout their shifts	55,000
3. Care provided at QEH that could have been avoided by more effective primary care.	Use historical patient records to analyze ACSC admissions at QEH	20,000
4. Health professional perspectives of the NCD model.	Qualitative interviews with clinic staff	10,000
Total		125,000

4.16 **Supervision, monitoring and evaluation.** Arrangements for TC supervision, monitoring and evaluation will be the responsibility of the TC team leader of the Social Protection and Health Division (SCL/SPH). Additional supervision costs, if any, of local supervision or supervision meetings will be covered by the division with transactional budget resources allocated annually. The monitoring mechanisms include the continuous supervision of the contracted consulting firms, review of their products and payments, monthly supervision meetings with the beneficiary, as well as the preparation of annual reports on the progress and performance of the TC execution.

V. Executing agency and execution structure

5.1 The Bank will be executing this TC given the high level of complexity and technical expertise required to prepare the terms of reference of the studies and assessments involved, as well as to supervise their implementation. SCL/SPH has the capacity and technical expertise required to carry out these processes. This is a research and dissemination TC and does not require justification to be executed by the Bank.

5.2 The activities to be executed under this TC have been included in the Procurement Plan and will be executed in accordance with the procurement methods established by the Bank, namely: (i) hiring of individual consultants, as established in AM-650 standards; (ii) contracting of consulting firms for services of an intellectual nature in accordance with the Policy for the Selection and Contracting of Consulting

Firms for Bank-executed Operational Work (GN-2765-4) and its associated operating guidelines (OP-1155-4); and (iii) contracting of logistics services and other services other than consulting, in accordance with policy GN-2303-28.

- 5.3 All knowledge products derived from this TC will be the Bank's intellectual property and will be published through the Bank's web page and other means accounted for in the indicative budget such as the webpage for digital material of the Social Sector ([Social Digital](#)).
- 5.4 The project team will not start activities in Barbados provided they receive the non-objection letter from the Government of Barbados¹.

VI. Major issues

- 6.1 The team is working with the QEH and the Ministry of Health and Wellness (MOHW) to ensure there is an adequate understanding of the products to be developed and of the level of effort required from both institutions to ensure an adequate data collection for the exercise. The team will mitigate this risk ex-ante through the involvement of the QEH and MOHW stakeholders in the conception and execution of the project, and ex-post in collaborating on the analyses and interpretation.

VII. Exceptions to Bank policy

- 7.1 There are no exceptions to Bank policy.

VIII. Environmental and Social Strategy

- 8.1 This TC will not finance feasibility or pre-feasibility studies of investment projects with associated environmental and social studies; therefore, it is excluded from the scope of the Bank's Environmental and Social Policy Framework (ESPF).

Required Annexes:

[Results Matrix - BA-T1092](#)

[Terms of Reference - BA-T1092](#)

[Procurement Plan - BA-T1092](#)

¹ Once the letter is received, it will be saved in the Convergence site under "documents" folder.