

# Digital Transformation and Healthcare Innovation in the Caribbean

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## Abstract

Healthcare systems across the globe vary in their strengths and also areas for improvement. There is a paradigm shift in the efficiency of data processing and healthcare decision-making. This is due to the digital transformation including the increasing use of electronic medical record (EMR) systems. One of the obstacles in implementing digital transformation in the Caribbean is cost. According to the Inter-American Developmental Bank (IDB), healthcare will be positively impacted and the cost to productivity will decrease long term. This has benefits for the Caribbean, by improving operations, boosting clinical efficiency and decreasing the requisite government expenditure. The ultimate aim is to provide Caribbean patients a robust service that is commensurate with 21<sup>st</sup> century global practice.

## Keywords:

healthcare, innovation, optimisation, electronic medical records, artificial intelligence, machine learning

## Introduction

Medical records allow healthcare professionals to document and track cases with demographic detail, outcomes and complications of care. To standardise this, the American College of Surgeons (ACOS) established the Association of Record Librarians of North America (ARLNA) in 1928, known commonly as the American Health Information Management Association (AHIMA). Currently, software development companies have revolutionised and established platforms for electronic medical records (EMR).<sup>1</sup>

It has been noted that the healthcare system in the Caribbean falls behind sectors such as economics, politics and social care.<sup>2</sup> Interestingly, in the Caribbean and Latin America there is no homogeneity in the introduction of digital transformation in Spanish, French and English speaking territories. The Cayman Islands have integrated medical technology such as telemedicine through the Cayman Islands Health Services Authority (HAS), even before the COVID-19 pandemic while other countries are in the developmental stages.<sup>3</sup>

Paper record systems deliver quality care to the region, however a paradigm shift to EMR has occurred. Raw data from EMR can be extracted, organised and pattern recognition performed to deliver consistent quality in a cost-effective manner. The objective of this article is to explore the benefits and employability of wide scale digital transformation in the Caribbean. Additionally, we will outline what has been implemented in Trinidad and Tobago.

The postgraduate institution in the Caribbean, the University of the West Indies (UWI), sits in the top 5% of the Times Higher Education University ranking worldwide. UWI graduates are recognised both in and out of the regional basin, for their contribution to research and development.<sup>4</sup> The Caribbean healthcare system, with their UWI trained physicians, must continue to engage in innovation, to help create a competitive and cost effective data system.

### ***Importance to the Caribbean Healthcare System***

The experience in healthcare for developing nations is tied to the country's economy of scale. The public health

system receives its funding from the local Government, and so it is reflective of the financial budget. Growing deficiencies in global health provision have been laid bare by COVID-19, with increasing demands on technology to help address an ageing and/or complex patient population. According to a report by the Association of American Medical Colleges, an analysis underscored the systematic differences based on individual's insurance coverage, urban/rural settings and of ethnicity.<sup>5</sup> Currently, novel platforms for data capture, diagnostics and treatments are being introduced, but the processing should match the innovation. The development and required results need to be up to date with innovation, as the latter is accelerating.<sup>6</sup>

The Caribbean has been recommended by the World bank to plan developing strategies to mitigate the short supply of a skilled workforce. Additionally, the costs associated with non-communicable disease, particularly diabetes continue to make impacts on the population.<sup>7</sup> Every task does not require high level training nor experience, and medical regulatory bodies should recognise the burden of time this places on the current doctors and nurses. For example, during the pandemic, numerous physicians administered vaccines that diverted their skills from high level elective and emergency services. The credentialing of auxiliary staff to perform tasks requires competency sign off in order to obviate the need for physicians or nurse-led tasks only. This can also include medical data entry and analysis, to build a case for redistribution of funding by demonstrating analysed and published results. Therefore, reconfiguration of roles in hospital data administration would be the first step to digital health innovation.

The physician to patient consultation transferred to a telephone/virtual platform during the peak of the COVID-19 pandemic. Reported satisfaction with this process may represent a willingness to continue after the pandemic.<sup>8</sup> This would allow clinic space and personnel to be available for training in and developing virtual health platforms. Sectors of the population with limited access to technology present an understandable exception to tele-consultation, but should not be digitally excluded. The EMR systems should allow transfer of medically confidential information between physicians and patients, in different facilities or even countries. The collaboration

to planned care in multiple specialty domains for a singular patient, can harmonise investigations and rationalise resources when auxiliary clinical information is needed. Physicians within the same health network should be able to access data from any hospital. The input of data should be effortless and consistent during user interface changes to create easy adaptability to upgrades. Hospital management's focus beyond the present challenges in health care, can identify contributing factors that impact future introductions of digital care.

Regionally, the Inter-American Development Bank (IDB) analysed innovation amongst services in Latin America and the Caribbean. Similar to health sectors, when service firms look to innovation, it was found that one of the limiting factors was financial. However, once designed and fully implemented, digitalisation can have significant economic advantages. An IDB report in 2022 stated World Health Organization estimated that \$1.4 to \$1.6 billion in annual productivity losses by low and middle income countries. This is a result of healthcare standards which stand to be improved by digital transformation. For the Caribbean and Latin America healthcare expenditure is on an "upward trajectory" without robust information systems live. Developing nations of the Caribbean, in comparison to developed nations, may find the upfront investment costs a challenge to adoption. Although this analysis by IDB focused on services, it is applicable to process innovation in the healthcare system as well. The IDB emphasised the importance of digital transformation, as it estimated that 5.7 to 8.4 million or 15% of deaths each year in low and middle income countries could be circumvented by digital transformation of healthcare.<sup>9, 10</sup> For nations to successfully implement and encourage digital transformation, sufficient investment opportunities should be available. According to a United Nation's report on "e-Health" it outlined that Trinidad and Tobago in the year 2005 spent 3.75% of GDP to healthcare in comparison to the regional average of 5% as stated by PAHO. The healthcare system in Trinidad and Tobago acts on a decentralisation operating system. The country is divided in five Regional Health Authorities (RHAs). A National Health Insurance System was developed with intentions to form contracts with insurance companies. However, the public health centres under the state, increased the budget to 6% of GDP.

Trinidad and Tobago acknowledged that healthcare was a priority in 2009; with projects undertaken including the AIDS Programme. This was financed by the World Bank and the Office of the Prime Minister (OPM). This project allowed implementation of Cellma clinical administration system operated by the company, RioMed. This system has been implemented in South-West Regional Health Authority.<sup>11,12</sup> The COVID-19 pandemic postponed the integration in other RHA's. The AIDS Programme included the National Epidemiology Surveillance Unit and National AIDS Coordinating Committee. On assessment in 2011, a report published by United Nations, "E-Health in Latin America and the Caribbean Progress and Challenges" showed that the country was found to have one of the most modern AIDS information system but several obstacles were highlighted. These included the need for continuous support from the Ministry of Health overall. The Epidemiology Unit of the Ministry of Health at that time operated on paper based information, which was found to be incomplete and backlogged.<sup>13</sup>

The National AIDS Programme has made significant advancements. It has been renamed HIV and AIDS Coordinating Unit (HACU) and has made several policies impacting all five RHAs. These include:

- I. National HIV Testing and Counselling Policy
- II. Health Sector Workplace HIV and AIDS Policy
- III. The Prevention of Mother to Child Transmission Policy
- IV. Post Exposure Prophylaxis Policy

This has led to several services available to the public such as free HIV testing, counselling and free antiretroviral treatment and care for all ages affected by HIV. This unit monitors and evaluated the implementation of these programmes and services. This can now utilize the networks to assist in providing reports such as the annual surveillance report and were aided and catalysed by digital transformation. In this case, the digital transformation method being used are in the form of Information and Communication Technologies (ICTs) e.g. E and M- Health (Mobile).<sup>14</sup>

The country has made progress that should be highlighted. This includes the Chronic Disease Assistance Program (CDAP) which has been ongoing and continues to provide free medication for this patient group. An

online system tracks the number of prescriptions dispensed and the total amount of authorised medication for a selected period. The information is sent to a central database: the National Insurance Property Development Company (NIPDEC) Infotech.<sup>13</sup> In addition to CDAP there is the public e-Service available through the Ministry of Health where forms and digital services are readily available to promote blood donation, information on health, National Alcohol and Drug Abuse Prevention Programme, HACU and other services.<sup>15,16</sup>

## Conclusion

Digital transformation of the healthcare system in the Caribbean is essential for growth. In order to progress, stakeholders in public and private sector must appreciate the importance. Several benefits include increased productivity, cost savings, clinical connectivity and their impact on population health. The Trinidad and Tobago examples outlined, are possibilities of digital transformation in our healthcare system. The transformation should be adopted across the region, to the betterment of patient care and clinical efficiency.

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**Conflict of Interest** - all authors have no conflicts of interest to declare.

**Author Contributions** – all authors have given their approval for publication of final manuscript. Dr Noël was involved in the conception of the idea for this viewpoint. Dr Noël and Dr. Basdeo were involved in drafting and putting together the manuscript. Both Dr Noël, Dr. Basdeo were involved in critically revising manuscript for publication.

**Ethics Approval** - Not Applicable

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## References

1. Baytech IT. The history of healthcare technology and the evolution of EHR. Baytech IT. 2018. Available from: <https://www.baytechit.com/history-healthcare-technology/> [Accessed 2023, Jan7].
2. Rodrigues R, Risk A. e-Health in Latin America and the Caribbean: Development and Policy Issues. *Journal Of Medical Internet Research*, 2003; 5(1), e4. doi: 10.2196/jmir.5.1. e4
3. Ezema C. Clark University Clark Digital Commons. 2021 Available from: [https://commons.clarku.edu/cgi/viewcontent.cgi?article=1085&context=sps\\_masters\\_papers](https://commons.clarku.edu/cgi/viewcontent.cgi?article=1085&context=sps_masters_papers) [Accessed 2023, Jan 8].
4. Centre for Excellence in Teaching and Learning. The University of the West Indies, St. Augustine. Available from: <https://sta.uwi.edu/cetl/new-rankings-put-uwi-among-top-5-percent-best-universities-world> [Accessed 2021, Sep 15]
5. The Complexities of Physician Supply and Demand: Projections From 2018 to 2033. Association of American Medical Colleges, June 2020 <https://www.aamc.org/media/45976/download>. [Accessed 2021, Sep 15]
6. Govindarajan V, Sebell M. Match your innovation process to the results you want. *Harvard Business Review* 2014. Available from: <https://hbr.org/2012/09/match-your-innovation-process-to-the> [Accessed 2022, May 31].
7. Institute for Health Metrics and Evaluation, Human Development Network, The World Bank. The Global Burden of Disease: Generating Evidence, Guiding Policy – Latin America and Caribbean Regional Edition. Seattle, WA: IHME, 2013. [https://www.healthdata.org/sites/default/files/files/policy\\_report/2013/WB\\_LatinAmericaCaribbean/IHME\\_GBD\\_WorldBank\\_LatinAmericaCaribbean\\_FullReport.pdf](https://www.healthdata.org/sites/default/files/files/policy_report/2013/WB_LatinAmericaCaribbean/IHME_GBD_WorldBank_LatinAmericaCaribbean_FullReport.pdf) [Accessed 2022, May 31]
8. Andrews E, Berghofer K, Long J, Prescott A, Caboral-Stevens M. Satisfaction with the use of telehealth during COVID-19: An integrative review. *Int J Nurs Stud Adv*.

2020 Nov;2:100008. doi: 10.1016/j.ijnsa.2020.100008.  
Epub 2020 Oct 16.

9. Tacsir E. Innovation in Services: The Hard Case for Latin America and the Caribbean, October 2011. Available from: [https://www.competecaribbean.org/wp-content/uploads/2013/06/Ezequiel\\_Tacsir\\_final\\_Innovation-in-Services-english.pdf](https://www.competecaribbean.org/wp-content/uploads/2013/06/Ezequiel_Tacsir_final_Innovation-in-Services-english.pdf) [Accessed 2022, May 31]

10. Inter-American Development Bank. IDB report: Digital Transformation of healthcare systems saves lives, lowers costs. IADB. 2022 Available from: <https://www.iadb.org/en/news/idb-report-digital-transformation-healthcare-systems-saves-lives-lowers-costs> [Accessed 2023, Jan7].

11. Maharaj R, Jumrattie C, Ramcharan C, Rampersad P, Singh A, Varachhia S. Pre-triage times at San Fernando General Hospital Emergency Department for patients based on CELLMA data for 2018. uwispace.sta.uwi.edu. The University of the West Indies; 2020 Available from: <https://uwispace.sta.uwi.edu/dspace/handle/2139/49557?show=full> [Accessed 2023, Jan7].

12. Riomed. Point Fortin Hospital: GO Live of Patient Administration and scheduling. RioMed. 2021 Available from: <https://www.riomed.com/point-fortin-hospital-go-live-of-patient-administration-and-scheduling/> [Accessed 2023, Jan7].

13. Fernández A, Oviedo E. E-health in Latin America and the Caribbean: Progress and Challenges. United Nations; 2011 Available from: [https://repositorio.cepal.org/bitstream/handle/11362/3001/1/S2011027\\_en.pdf](https://repositorio.cepal.org/bitstream/handle/11362/3001/1/S2011027_en.pdf) [Accessed 2023, Jan 19].

14. HIV / AIDS coordinating unit. Ministry of Health. Available from: <https://health.gov.tt/services/hiv-aids-coordinating-unit> [Accessed 2023, Jan7].

15. NACC. PANCAP – Pan Caribbean Partnership against HIV/AIDS. 2018 Available from: [https://pancap.org/pc/pcc/media/pancap\\_announcement/HIV\\_AIDS\\_Policy-TRT.pdf](https://pancap.org/pc/pcc/media/pancap_announcement/HIV_AIDS_Policy-TRT.pdf) [Accessed 2023, Jan 8].

16. Public e-services. Ministry of Health. Available from: <https://health.gov.tt/e-services-public> [Accessed 2023, Jan7].