

# Using data from routine health information systems as a public good in Trinidad and Tobago

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## ABSTRACT

**Objectives.** This study aimed to explore the use of data from routine health information systems (RHIS) as a public good in Trinidad and Tobago, the challenges faced in doing this and opportunities for strengthening the health information system.

**Methods.** For this descriptive qualitative study, purposive sampling was utilized to recruit 19 people who used or produced RHIS data. Online interviews were conducted via Zoom, and all interviews were recorded and transcribed. Pseudonyms were used to protect participants' identity. Transcripts were cleaned and analyzed using Dedoose (v. 9.0.17; Dedoose, Los Angeles, CA, USA).

**Results.** There was significant underutilization of RHIS data as a public good, primarily due to challenges related to data access and quality. Access to the data was stymied by burdensome bureaucratic processes, paper-based recording and storage systems, and ownership and security concerns. Data quality was adversely affected by a lack of standardized data collection forms and processes, staff training, data completeness, and also by technological and infrastructural constraints. Key opportunities for increasing the use of Trinidad and Tobago's RHIS data would include addressing the need for a national electronic health information system, ensuring adequate training for staff involved in data management, and developing a comprehensive monitoring and evaluation plan.

**Conclusions.** Data quality and access must be improved to enable greater use of RHIS data as a public good in Trinidad and Tobago. The planned change from a paper-based to a national electronic data recording and storage system must be expedited, and it should be accompanied by the standardization of processes, and investments in adequate staffing and timely training. Appropriate technological and infrastructural support, as well as an improved data governance system, are also required.

## Keywords

Health information systems; access to information; data sharing; developing countries; Caribbean.

Routine health information systems (RHIS) collect data at regular intervals from health facilities, institutions and programs (1). These data are used by health officials for allocating resources, policy-making, planning and patient management. However, there have been challenges related to the quality, timeliness, relevance and consequently the use of the RHIS data, especially in low- and middle-income countries (LMICs) (2). The Performance of Routine Information System

Management (PRISM) framework was developed to evaluate RHIS operations with the goal of strengthening them, and it has been used in several countries (3). The Framework defines organizational, technical and behavioral determinants of performance.

The use of RHIS data in LMICs and strategies to address systems' shortcomings have been extensively studied (4–6). One recent systematic review reported that organizational

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determinants were the most prevalent barriers to RHIS performance (5). These included shortages of human resources and equipment, a lack of training programs, and the absence of proper management and standardization of processes. The behavioral determinants were also common, including a lack of understanding of the importance of the data, lack of supervision and feedback, and poor staff motivation. In addition, technical determinants were highlighted, such as limitations of data collection forms, discrepancies in data collected from different sources and poor internet connectivity (5).

As a clear demonstration of its importance, data and evidence for decision-making and accountability was declared as one of five health priorities by the Caribbean Community (CARICOM) countries for 2016–2025 (7). This announcement was followed by a High-Level Meeting on Information Systems for Health (8) during which health ministers committed to implementing strategies to strengthen HIS at the national level. Despite support from the Pan American Health Organization (PAHO), an assessment conducted in 2020 revealed that in terms of RHIS maturity, CARICOM countries were at the developing stage (9).

Data as public goods can be defined as being “freely and openly available, with minimal restrictions on how they can be distributed, adapted and reused” (10). Consequently, RHIS data are recognized as a public good, highlighting their value in improving public health. This was emphasized during the COVID-19 pandemic and led to two health data governance summits, hosted by the World Health Organization (WHO) in 2021 (11). At these summits, best practices were shared to highlight the value of using RHIS data, and solutions were identified to help countries facing challenges related to data governance and quality. Trinidad and Tobago was one country in which RHIS data were used with great success at the start of the pandemic to guide the roll out and monitor the effectiveness of various interventions (12). However, it is unclear whether RHIS data continued to be used as a public good subsequently. Notably, the paucity of publications about the use of RHIS in CARICOM countries is highlighted by the realization that none of the previously cited systematic reviews included research from the Caribbean. This is critical because the HIS challenges in the small island developing states of the Caribbean are not the same as in other LMICs.

The present study explored the extent to which RHIS data were used as a public good in Trinidad and Tobago, identifying challenges to using the data and the opportunities for strengthening systems.

## METHODS

### Setting

Trinidad and Tobago is a twin island republic located in the southern Caribbean. Its population of 1.3 million has access to both public and private health care. There is free access to public health care, which is funded by the Government. It is managed by the Ministry of Health (MOH), and five autonomous Regional Health Authorities (RHAs) are responsible for providing health services.

Trinidad and Tobago’s RHIS collects data about disease surveillance, health service utilization and administrative

functions, primarily from RHAs and other health institutions. It also includes population-based data from the Central Statistical Office (13).

### Study design

A qualitative, descriptive study of those who use and produce RHIS data was conducted in February and March 2024. Purposive and snowball sampling were used to identify 23 key informants whose responsibilities included the generation, management and use of RHIS data. Potential participants were contacted via email and telephone to determine whether they were willing to be interviewed.

The study was approved by the Campus Research Ethics Committee of The University of the West Indies, St. Augustine Campus (reference: CREC-SA.2556/02/2024), in accordance with the revised Declaration of Helsinki 2000. All participants provided informed consent.

### Data collection instruments

An interview schedule with 26 guiding questions was developed, based on the PRISM framework and relevant research studies (1, 5, 14). (The schedule is available to the interested reader through the corresponding author.) The key areas covered for data were quality, use, collection and reporting, access and demand; monitoring and evaluation (M&E) was also covered.

### Data collection

Each participant used a pseudonym during their online interview conducted via Zoom (v. 5.16.10; Zoom, San José, CA, USA), and all audio recordings were saved. All researchers conducted interviews, which lasted 60 minutes, on average. Zoom-generated transcripts of each interview were edited and cross-referenced with the audio recordings to ensure their accuracy and completeness prior to data analysis.

Inductive thematic saturation was used to aid in sample size determination. Themes recurred throughout the transcripts. When no new relevant information emerged, data collection was stopped after the 19th participant had been interviewed, and replacements were not pursued for the four persons who had been unavailable.

### Data analysis

Thematic analysis, guided by the research objectives, was conducted. The deidentified and cleaned transcripts were analyzed using Dedoose (v. 9.0.17; Dedoose, Los Angeles, CA, USA) (15). Two researchers conducted a priori coding of the scripts, generating codes and themes that were grouped into five areas: RHIS data access and use as a public good, opportunities for increased use of RHIS data, and organizational, technical and behavioral determinants (Table 1). The last three areas are the PRISM determinants of RHIS performance (3). The code descriptors for these PRISM determinants were organized according to collection tools and processes; data transmission; processing and analysis; and the dissemination of processed information. All researchers discussed and agreed on the category system used for data analysis.

**TABLE 1. Thematic areas and code definition descriptors for interviews about Trinidad and Tobago's routine health information system, 2024**

Thematic areas	Code definition descriptors			
Data access and use as a public good	Issues or challenges around data access and use for research and policymaking; the use of data as a public good			
Opportunities for increased data use	Changes to increase data use; changes to system, staff, training and methods			
<b>PRISM determinants of RHIS performance<sup>a</sup></b>				
	<b>Data collection tools and processes</b>	<b>Data transmission</b>	<b>Data processing and analysis</b>	<b>Dissemination of processed information</b>
Organizational	Collection, management and storage constraints; human resources constraints; limited standardized monitoring and supervision	Lack of resources; lack or limited standardization of monitoring and supervision processes	Lack of training and equipment; lack or limited standardization of monitoring and supervision	Limited feedback on data from the central level (e.g. Ministry of Health) to the district level; limited data dissemination; lack of inter- and intradepartmental data coordination
Technical	Inadequate collection tools; patient and illness definition issues; different tools and reporting systems; lack of integration with community-level data	Issues with connectivity and use of web-based tools; data stored in an inaccessible format	Inaccurate population estimates presented or used to calculate percentages and rates	Conflicting numbers for the same service or variable across different reporting platforms or surveys
Behavioral	Incomplete data collection; misclassification of diseases; lack of recognition of need for and purpose of data; time constraints; poor recollection of information; lack of supervisory feedback	Delays in data submission; resistance to the use of electronic communication	No or infrequent data analysis; errors in simple mathematical computations	Difficulty understanding feedback from central level; limited sharing of reports from analyzed data

PRISM: Performance of Routine Information System Management; RHIS: routine health information system.  
<sup>a</sup> Determinants of the performance of routine health information systems as identified by the PRISM framework (1).  
**Source:** Table developed by the authors based on their research.

## RESULTS

Of the 23 invited key informants, 19 were interviewed, comprising health planners and policy-makers ( $n = 4$ ), health care professionals ( $n = 9$ ), statisticians and epidemiologists ( $n = 6$ ) and academics ( $n = 3$ ). Informants had overlapping roles and responsibilities, and eight of them were also representatives of regional agencies. Four other persons – two academics, one health care worker and one statistical officer – had expressed interest in participating but were not available during the short data collection period. The 19 interviewees comprised 10 males and 9 females. They worked in government (1 male, 2 females), RHAs (2 males, 5 females), international institutions (4 males, 2 females) and universities (3 males). Most were clinicians, directors or heads of units, nurses or epidemiologists. Their years of experience in their respective professions ranged from 2 to 30. Three participants were involved in RHIS data production, nine in its use, and seven had experiences in both data production and use.

### Data access and use as a public good

Participants described access to RHIS data as fundamental to its use as a public good. Illustrative quotes about some of the challenges related to data access are shown in Table 2. Persons working within the health care sector indicated that they sometimes “had to go through a lot of approvals to get access” (Participant 18, epidemiologist). This, coupled with the format in which data were recorded and stored (i.e. the paper-based system), made accessing the RHIS data a tedious process. The paper-based system presented other challenges to accessing

medical records, as Participant 2 (statistician) explained, “The nurses are using the book, which is the same book that I have to collect information from”. Furthermore, not all paper records were kept on-site, with Participant 5 (clinician) noting that, “Because of space constraints, they have to be purged”. This required off-site storage of data, making the process of accessing data longer, because health workers had to “go through the archives or go to different records” (Participant 18) to extract the required information.

External users such as academics faced even more barriers to accessing the RHIS data, with Participant 8 (academic and statistician) describing it as “virtually impossible...to access” due to proprietary treatment by organizations. This view stemmed from the belief that “even though there is information...they consider that they [the organization] collected it. It belongs to them” (Participant 11, laboratorian). Additionally, the cumbersome bureaucratic process required to obtain access involved the need “to write to the [Permanent Secretary], attention of the [Chief Medical Officer], and then copy[ing] the person who is in charge of that program” (Participant 9, epidemiologist). Even so, access was not guaranteed. Concerns regarding confidentiality and data security further complicated access. Here, the role of ethics committees as independent evaluative bodies alongside and within agencies was highlighted, as they could potentially facilitate implementation of streamlined and secure data access processes for external users to utilize the RHIS data while maintaining all ethical requirements.

There were mixed views about the use of the RHIS data as a public good (Table 2). For some, the RHIS already served

**TABLE 2. Illustrative quotes from interviewees about data from the routine health information system, Trinidad and Tobago, 2024**

Thematic area	Illustrative quotes
Access to RHIS data	<p>“If I made a data request, it would take a couple of days to get the data because, again, the system was paper-based.” Participant 18, epidemiologist<sup>a</sup></p> <p>“It’s more of an email communication.... Then it goes to the source [who]...will have to get that verification from their supervisor, and...they may or may not be open to giving you all the information, given their level of confidentiality and security.” Participant 10, epidemiologist<sup>a</sup></p> <p>“Authorities [are] not willing to share [and]...this whole issue of...ownership – to have extreme control over the data; the data have currency.” Participant 8, academic/statistician</p>
Uses of data from the RHIS as a public good	<p>“We can have quality improvement....I think there’s some room for that. And I think that’s probably one of the reasons that people don’t use data as much.” Participant 3, clinician/policy-maker</p> <p>“But there’s a great space for improvement, for more usage...It’s a great gap that needs to be addressed...And when it’s a public good...how do we engage and empower community?” Participant 9, epidemiologist<sup>a</sup></p> <p>“We’ve seen how spectacularly maternal health has improved over the last few years because the data [are] driving the policy... It has to be equitable...If the only interest that’s being highlighted is [for example] maternal health...that is the policy change that you will see.” Participant 5, clinician</p>
Opportunities for increased use of RHIS data	<p>“I think it would be unanimous that electronic records are the way forward. I think it will give a significant advantage and... significant savings, not just in terms of finance but also in terms of time for the function of the health care system.” Participant 5, clinician</p> <p>“Do a situation analysis...as it relates to what are the intricacies? What are the complexities? What are the gaps? What are the deficiencies? Then...make recommendations and then develop a work plan to be able to support the Ministry.” Participant 9, epidemiologist<sup>a</sup></p> <p>“Probably provide more training for the various categories of staff collecting the data... So you update the training, or you send [staff] for refresher courses.” Participant 1, nurse</p>

RHIS: routine health information system.

<sup>a</sup> These participants worked with a regional institution.

Source: Table developed by the authors based on their research.

as a public good, aiding in “yearly budgeting, infrastructural [and health] programs [and] new initiatives” (Participant 15, academic and former policy-maker). However, most disagreed with this assessment, but saw potential for improving the RHIS as a public good, with broad applications and great impact. Meanwhile, some critics highlighted the need to first “implement a proper RHIS data collection system” (Participant 4, clinician) that could greatly benefit public health and produce a shift towards utilizing data for preventive health care rather than solely for managing illnesses. Concerns were also raised about potential drawbacks to the use of RHIS data. For example, there was a fear of victimization if the data generated reports reflecting suboptimal population health outcomes.

Some participants observed that the use of RHIS data as a public good focused only on certain disease areas, leading to calls for more equitable data use. These participants believed that while resources for positive change were directed toward some areas, such as maternal health, other areas with important issues were overlooked, such as trauma, violence and occupational injuries.

Moreover, it was felt that for the RHIS to serve as a public good, it needed to be widely accessible, which emphasizes the importance of community engagement and regular communication of RHIS data reports to the public. Participant 17 (laboratorian), highlighted that, “Numbers always make a bigger impact than just words”. This was seen as key to influencing public perception and health behaviors.

### PRISM-based determinants

Key barriers to utilizing the data, identified both by data users and producers, were also categorized under the three PRISM determinants of RHIS performance, and illustrative quotations are presented in Table 3.

**Organizational determinants.** Shortages of staff and inadequate training were major challenges identified by the interviewees. They gave examples of the disproportionate ratio of health care workers (HCWs) to clients, staff being overwhelmed and overburdened, and the perception or belief that data collection went beyond what was needed for direct patient care. Participants also highlighted that the lack of support staff for data collection placed a burden on physicians to collect or record data, affecting the quality of data collected. Overburdened HCWs would often prioritize data relevant to patient services, rather than completing all required fields.

Inadequate training emerged as another important challenge for data collection and recording. Most participants reported that they received instruction outside the health care system, through their personal pursuits of either academic development or skills training. Some mentioned learning on the job, stating, “You learn as you go along” (Participant 1, nurse) or through trial and error. Participants who received formal training from their workplace, expressed that this was of limited value as the sessions were usually inadequate, leaving “many aspects...following the training...unanswered” (Participant 4).

Infrastructure and technology resources were reported as challenges severely impacting the availability and utilization of RHIS data. Participants identified a shortage or absence of computerized systems and inconsistent internet access as significant obstacles to data recording, storage and management. Participant 4 also reported instances in which they were “trained on the software, and then they gave us paper....We actually are using the paper version”. This heavy reliance on physical records complicated data access and management (e.g. difficulties faced when trying to access data from shared physical logbooks). The storage and retrieval of volumes of paper-based records presented further challenges. These were described as

**TABLE 3. Illustrative quotes from interviewees about the determinants of performance of the routine health information system, Trinidad and Tobago, 2024**

Determinant	Illustrative quotes
Organizational	<p>“[The doctors] are already overwhelmed with clinical work, so they don’t see it [as] their priority to record in a template or report how many patients they saw per condition.” Participant 16, clinician</p> <p>“They would have had training sessions... on how to use the software...I would argue that it was woefully inadequate because it was done in such a rapid... and...mass- teaching manner.” Participant 4, clinician</p> <p>“Technology is something that is lacking because a lot of the data that [are] collected [are] paper-based. That takes time [and] causes higher risk of errors.” Participant 10, epidemiologist<sup>a</sup></p>
Behavioral	<p>“I didn’t receive training at all. But [it] came from my own academic development. I was able to use that.” Participant 19, academic/nurse</p> <p>“[The doctors] would just probably fill out the information that was required [for patient care]. They believed it was a lot of information that they had to input on the form.” Participant 18, epidemiologist<sup>a</sup></p> <p>“You have to do a lot of data cleaning because so much information has not been completed or not completed properly.” Participant 6, statistician<sup>a</sup></p> <p>“If a nurse or a clerk or even a doctor feels like it’s not of great importance, they will just write anything, and that becomes a problem...People don’t understand the importance of data.” Participant 2, statistician</p>
Technical	<p>“[The forms] are a bit outdated [in] our new environment.” Participant 14, policy-maker</p> <p>“What we have is very simple...How many persons are admitted to each ward?...How many surgeries? How many discharges? How many deaths? That’s count data.” Participant 16, clinician</p> <p>“There isn’t a written guideline...[No one] comes down to us to say, ‘This is the format of documentation.’” Participant 1, nurse</p>

RHIS: routine health information system.

<sup>a</sup> These participants worked with a regional institution.

Source: Table developed by the authors based on their research.

cumbersome and inefficient and needing “outsource[d] storage” solutions (Participant 5, clinician).

Notably, the absence of a comprehensive M&E framework within the RHIS was emphasized as being a significant gap. While a few participants were aware of M&E systems, these were often limited to special external programs, driven by international funders. Overall, most participants were unaware of any established M&E plans for the RHIS.

**Technical determinants.** Interviewees highlighted several issues with the data collection tools and processes. First, it was noted that many tools provided by the MOH for data collection were outdated and did not align with current needs. As Participant 16 (clinician) described, “Templates that we use from the Ministry in terms of reporting are old...[and] very vague”. Some participants also elaborated on critical fields not being present in the data collection tools, affecting the quality of data being collected. Participant 4 highlighted another challenge, noting that staff “are still using manual files and hard copies to count and gather the data”.

Inconsistency in data collection was identified as a serious issue affecting data quality, both by those who use and those who produce the data. In addition to the system being primarily paper-based, the forms were neither fit-for-purpose nor widely used. Subjectivity also guided the recording of data at facilities as there were no standard operating procedures. This led to inconsistencies in how data were recorded. For example, Participant 1 stated that they were given a “blank continuation sheet with lines” and were expected to develop their own documentation methods. Additionally, various users required data in different formats, resulting in different request forms for the same data. In other instances, definitions were not included that would “assist persons with completing...forms” (Participant

18). This lack of standardization of the data often led to conflicting reports regarding the situation at health facilities.

The lack of standardization of methods and processes was a key issue impacting the use of data from the RHIS. Data collection methods varied across departments and facilities, and were made more complex by the heavy reliance on paper-based systems. While there were instances in which there was a shift to the use of electronic health records, these electronic records were not standardized, interconnected or interoperable, and often operated in silos. This resulted in variability in and a lack of timeliness and completeness of data. For example, Participant 16 shared that while some departments had adopted electronic medical records for primary care, and emergency and laboratory services, each “department has its own information system, and [they are] not interoperable”, highlighting the fragmentation and lack of connectivity.

**Behavioral determinants.** A lack of commitment to the process by HCWs was one of the reasons proffered for incomplete data collection. Some interviewees indicated that the volume of data they were required to collect often resulted in resistance among HCWs, leading to missing data or incorrect data entry. For example, Participant 18 stated that, “We [the users] pull the data, and people [are] not entering the data correctly. They put in wrong values”. This often resulted in significant data cleaning efforts to address quality concerns, such as the incompleteness and inaccuracy of the data collected at the facilities. Additionally, interviewees highlighted that handwriting compromised data accuracy and quality (i.e. due to illegibility).

Participants shared that there was an observed lack of knowledge and understanding among some HCWs of the value of the data being collected. They linked this to how health care professionals viewed their duties, with Participant 16 stating,

for example, that “[HCWs] don’t see data collection and data reporting as part and parcel of their job description”.

### Opportunities to increase data use

Table 2 includes some of the key opportunities identified by interviewees to increase the use of RHIS data. Implementation of an electronic HIS (e-HIS) was suggested as a measure to increase the use of RHIS data. It would increase efficiency (i.e. by reducing wastage), allow smooth sharing of data across and within RHAs, and produce more comprehensive data for analysis, research and informed decision-making. It was also suggested that it would foster increased collaboration with international agencies.

M&E was identified as important to enhancing and increasing the utilization of data from the RHIS. Participant 10 (epidemiologist) suggested that there was a need for a national M&E policy for the RHIS, featuring “clear guidelines on... [implementation]... what should be measured, and a standardized [list] of possible indicators to help guide that process”. The MOH was identified as the central body that could develop and enforce these policies and guidelines.

Finally, investment in training for RHIS staff across a facility was flagged as a critical step. Participant 10 suggested “having a specific certification course that could be conducted by any one of our tertiary level institutions and also hav[ing] some retraining... provided by the RHAs on an ongoing [basis]”. It was suggested that such training would elevate the overall skill set and capabilities across various categories of staff and align with overall improvement of the RHIS.

## DISCUSSION

This study examined how key staff using or producing RHIS data perceived the use of such data as a public good. Our findings indicate there was minimal use of the data due to significant issues with access and data quality. The HIS in Trinidad and Tobago was driven by autonomous, decentralized RHAs which funneled data to the parent body (i.e. the MOH). According to Hotchkiss et al., within decentralized health care systems, RHIS can drive improvements in management and accountability capacities (6). However, from the views expressed by the participants, there was little evidence of this in Trinidad and Tobago. There was an absence of a consistent and standardized system for collecting and processing data from health care facilities. These barriers hindered the potential to use data as a public good.

RHIS data can play an important role in guiding public health policy development and decision-making processes, and improving health outcomes. However, despite the country’s use of RHIS data in a few disease-specific areas, the data remained largely underused. This underutilization has been identified across LMICs (4), but there has also been an increase in the trend of using RHIS data (4). Data from RHIS have been used to formulate health policy, make financing decisions, in health care decision-making processes, in evaluating programs, to analyze patterns of health care utilization and in assessing interventions (4, 16). The wide array of uses highlights the vast potential for the use of RHIS data in Trinidad and Tobago.

Underutilization of RHIS data in the country was also driven by issues related to the quality of the data and its readiness for

use. Our findings indicated that data quality was adversely affected by organizational challenges, such as staff shortages, and inadequate training programs and infrastructure, as well as a lack of standardized methods and processes. There were also technical issues, such as outdated and inappropriate data collection tools.

Staff shortages and inadequate training had serious implications for the accuracy of the data that were collected and recorded, problems that were further compounded by issues such as a lack of motivation, not understanding the value of the data and being afraid to report unfavorable data. These organizational and behavioral issues observed in the present study were similar to those identified in other reports (5, 14). Notably, WHO has promoted the need for training to improve the quality and accuracy of RHIS data produced by health facilities (17). HCWs enter the health care system with varying educational backgrounds, highlighting how essential it is for all personnel to receive comprehensive training. Such training should cover the purpose of data collection, its role in the larger health system, and the value and importance of high-quality data. In Trinidad and Tobago, training about the RHIS appeared primarily to occur on the job or as needed. It tended not to focus on the importance of data, and data collection, processing and analysis. Further, access to training was inconsistent across the health care system. Thus, when training was provided it failed to effectively improve data collection and recording practices. Other studies in LMICs have also highlighted that a lack of training is a major barrier to the production and use of data from an RHIS (5, 14, 18).

A major barrier to effective access to and use of RHIS data in the country was inadequate access to technology, both hardware and software. This is important as there are reports of improvements in RHIS data quality with the adoption of web-based systems (4). The absence of standardized practices and evaluation mechanisms in the public health system likely undermined the efficiency, reliability and comparability of data collected in the HIS. This limitation can affect the internal and external validity of data and poses a challenge to those who want to conduct research using RHIS data.

The ongoing use of paper-based methods was reported to have a negative impact on the efficiency and timeliness of data, and it delayed and restricted the staff’s retrieval of information. Notably, the present study found that despite computers being available at facilities, they were not interconnected within or across facilities. This could result in double reporting. Similar issues have been reported in other studies (14, 19).

For RHIS data to be a public good they must be accessible. Our findings indicated that in Trinidad and Tobago issues related to RHIS data ownership impacted the utilization of the data for research, policy and health promotion. The need for data in appropriate formats was also flagged as a challenge by users both within and, especially, outside of health care setting, such as academics. The inability of the latter to obtain permission to access the data despite repeated and protracted efforts had left them discouraged. This is unfortunate as academics play a pivotal role in utilizing RHIS data as a public good because they are at the intersection of research, policy, advocacy and education. They are expected to employ robust analytical methods using RHIS data to uncover insights into

public health trends, effective interventions and system performance (4).

## Limitations

The study utilized qualitative methods and produced insightful data. However, it would have been valuable to have used a mixed methods approach in which quantitative and qualitative data are triangulated to provide a more holistic picture of the situation regarding data use in Trinidad and Tobago and the associated barriers. A similar mixed methods approach was successfully used in Ethiopia (18). Data collection in the present study focused on the experiences of participants regarding RHIS data use. However, we also could have explored their subjective feelings about the challenges they faced.

Accessing current and accurate information about the structure and processes of the RHIS in the country was challenging. The only available information was a conference presentation (13), which was outdated and did not include extensive details about the system. While this was useful in shaping the context of the research, it was not possible to compare participants' perspectives against the existing capacities of the RHIS.

## Recommendations

There are several recommendations for increasing the use of RHIS data as a public good in Trinidad and Tobago, some of which were highlighted by the participants. There is an urgent need to improve the quality of the data collected and shared, and the interoperability of different systems, which will increase the confidence of users and result in greater utilization. The replacement of the paper-based data recording system with a national e-HIS must be prioritized and expedited. Its implementation was discussed by the MOH more than a decade ago (13). Since then, there have been many pilot projects (20), but these have been disjointed and resulted in siloed systems that were not interoperable. Critically, the implementation of an e-HIS must be accompanied by adequate staffing, standardization of processes, and comprehensive and continual training of all relevant personnel. The absence of these was identified in the present study as an important contributor to the data quality challenges of the RHIS. There must also be proper oversight at all levels of the system, supported by the implementation of a functional M&E plan.

The challenges faced by researchers or others who had limited or no access to the data were significant, suggesting the need to review the data governance system of the MOH. The

burdensome bureaucratic processes and data ownership challenges can be resolved with support from networks such as the Observational Health Data Sciences and Informatics collaborative (21). Some countries have also used other secure data platforms, such as trusted research environments, which include critical safeguards to ensure privacy and confidentiality and therefore satisfy the concerns of conservative data curators (22).

The absence of published reports from the Caribbean that interrogate the functioning of RHIS is noted. Therefore, it is recommended that more research is undertaken in other Caribbean countries to determine whether the challenges faced by other RHIS are similar to those in Trinidad and Tobago. Studies should also be linked so they can provide evidence to inform implementation of the CARICOM- and PAHO-led program to strengthen HIS in the Caribbean (8).

## Conclusions

Although there was a consensus among stakeholders in Trinidad and Tobago about the potential of the RHIS, there was limited use of its data as a public good. The main reasons for this were challenges related to data quality and access. The planned change from a paper-based to a national electronic data recording and storage system must be expedited to increase use of the data. This must be accompanied by a standardization of processes and investments in adequate staffing and training, as well as the requisite infrastructure and technological support. The data governance system must also be improved.

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## REFERENCES

1. MEASURE Evaluation. Using PRISM to strengthen and evaluate health information systems: fact sheet [Internet]. Chapel Hill (NC): MEASURE Evaluation; 2024 [cited 2024 Jul 22]. Available from: <https://www.measureevaluation.org/resources/publications/fs-07-18.html>
2. Lippeveld T, Sauerborn R, Bodart C, editors. Design and implementation of health information systems. Geneva: World Health Organization; 2000. <https://iris.who.int/handle/10665/42289>
3. Aqil A, Lippeveld T, Hozumi D. PRISM framework: a paradigm shift for designing, strengthening and evaluating routine health information systems. *Health Policy Plan.* 2009;24(3):217–28.
4. Hung YW, Hoxha K, Irwin BR, Law MR, Grépin KA. Using routine health information data for research in low- and middle-income countries: a systematic review. *BMC Health Serv Res.* 2020;20:790.
5. Hoxha K, Hung YW, Irwin BR, Grépin KA. Understanding the challenges associated with the use of data from routine health

- information systems in low- and middle-income countries: a systematic review. *Health Inf Manag.* 2022;51(3):135–48.
6. Hotchkiss DR, Diana ML, Fleischman Foreit KG. How can routine health information systems improve health systems functioning in low- and middle-income countries? Assessing the evidence base. In: Menachemi N, Singh S, editors. *Health information technology in the international context. Advances in health care management, volume 12.* Leeds (UK): Emerald Group; 2012. p. 25–58.
  7. Caribbean Community (CARICOM). *Caribbean cooperation in health phase IV (CCH IV): summary of the Regional Health Framework 2016–2025. Regional public goods for sustainable health development.* Georgetown (Guyana): CARICOM; 2016.
  8. Pan American Health Organization. *High-Level Meeting on Information Systems for Health: advancing public health in the Caribbean Region.* Washington (DC): Pan American Health Organization; 2017.
  9. Pan American Health Organization. *Information systems for health: lessons learned and after-action review of the implementation process in the Caribbean, 2016–2019.* Washington (DC): PAHO; 2021. <https://iris.paho.org/handle/10665.2/54033>
  10. Digital Public Goods Alliance. *Frequently asked questions* [Internet]. New York: Digital Public Goods Alliance; 2024 [cited 2024 Jun 25]. Available from: <https://digitalpublicgoods.net/frequently-asked-questions/>
  11. World Health Organization. *Health data governance summit: governing data for better health* [Internet]. Geneva: WHO; 2021 [cited 2024 Jun 16]. Available from: <https://www.who.int/data/events/health-data-governance-summit/introduction>
  12. Hunte SA, Pierre K, St. Rose R, Simeon DT. Health systems' resilience: COVID-19 response in Trinidad and Tobago. *Am J Trop Med Hyg.* 2020;103(2):590–2.
  13. Hinds A, Rampaul H. Trinidad and Tobago health information systems (HIS) [Internet]. Washington (DC): Pan American Health Organization; 2013 [cited 2024 Mar 10]. Available from: [https://cdn.who.int/media/docs/default-source/digital-health-documents/global-observatory-on-digital-health/tnt\\_his\\_2013.pdf?sfvrsn=61d552f8\\_3](https://cdn.who.int/media/docs/default-source/digital-health-documents/global-observatory-on-digital-health/tnt_his_2013.pdf?sfvrsn=61d552f8_3)
  14. Ledikwe JH, Grignon J, Lebelonyane R, Ludick S, Matshediso E, Sento BW, et al. Improving the quality of health information: a qualitative assessment of data management and reporting systems in Botswana. *Health Res Policy Syst.* 2014;12(1):7.
  15. SocioCultural Research Consultants. *Features: full qualitative and mixed methods support.* Dedoose [Internet]. Los Angeles (CA): SocioCultural Research Consultants; 2024 [cited 2024 Jul 22]. Available from: <https://www.dedoose.com/home/features>
  16. Ruton H, Musabyimana A, Gaju E, Berhe A, Grépin KA, Ngenzi J, et al. The impact of an mHealth monitoring system on health care utilization by mothers and children: an evaluation using routine health information in Rwanda. *Health Policy Plan.* 2018;33(8):920–7.
  17. MEASURE Evaluation. *Routine health information systems: a curriculum on basic concepts and practice.* Syllabus. Chapel Hill (NC): MEASURE Evaluation; 2017.
  18. Operational Research and Coaching for Analysts (ORCA) – participants and team; Adane A, Adege TM, Ahmed MM, Anteneh HA, Ayalew ES, et al. Exploring data quality and use of the routine health information system in Ethiopia: a mixed-methods study. *BMJ Open.* 2021;11:e050356.
  19. Cunningham-Myrie C, Reid M, Forrester TE. A comparative study of the quality and availability of health information used to facilitate cost burden analysis of diabetes and hypertension in the Caribbean. *West Indian Med J.* 2008;57(4):383–92.
  20. Ramroop S, Turner MC, Bynoe R, Garner MJ, Clarke R, Krewski D, et al. Injury surveillance in Trinidad: an accident and emergency based injury surveillance system at the San Fernando General Hospital. *West Indian Med J.* 2009;58(2):118–23.
  21. Observational Health Data Sciences and Informatics (OHDSI) collaborative. *Who we are* [Internet]. New York: OHDSI; 2024 [cited 2024 Jun 16]. Available from: <https://www.ohdsi.org/who-we-are/>
  22. Varma S, Hubbard T, Seymour D, Brassington N, Madden S. *Building trusted research environments – principles and best practices. Towards TRE ecosystems.* London: UK Health Data Research Alliance; 2021.

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## Uso de los datos de los sistemas de información de salud habituales como bien público en Trinidad y Tobago

### RESUMEN

**Objetivos.** Este estudio tuvo como objetivo explorar el uso de los datos de los sistemas de información de salud habituales como un bien público en Trinidad y Tabago, los desafíos que ello supone y las oportunidades que brinda para el fortalecimiento del sistema de información de salud.

**Métodos.** En este estudio cualitativo descriptivo se utilizó un muestreo dirigido para reclutar a 19 personas que usaban o generaban datos de sistemas de información de salud habituales. Se realizaron entrevistas en línea mediante Zoom y todas ellas se grabaron y transcribieron. Se utilizaron seudónimos para proteger la identidad de los participantes. Las transcripciones se depuraron y analizaron con Dedoose (v. 9.0.17; Dedoose, Los Ángeles, CA, EE. UU.)

**Resultados.** Había una importante infrautilización de los datos de los sistemas de información de salud habituales como bien público debido, ante todo, a problemas relacionados con el acceso a los datos y con su calidad. El acceso a los datos se veía obstaculizado por los procesos burocráticos engorrosos, los sistemas de registro y almacenamiento en papel y los problemas respecto a su propiedad y seguridad. La calidad de los datos se veía dificultada por la falta de formularios y procesos estandarizados para la recopilación de datos, capacitación del personal y exhaustividad de los datos, así como por limitaciones tecnológicas y de infraestructura. Entre las principales oportunidades existentes para aumentar el uso de los datos de sistemas de información de salud habituales en Trinidad y Tabago se encontrarían las de abordar la necesidad de un sistema nacional de información de salud electrónico, garantizar una capacitación adecuada para el personal implicado en la gestión de datos y elaborar un plan integral de seguimiento y evaluación.

**Conclusiones.** Es preciso mejorar la calidad de los datos y de la forma de acceder a ellos para permitir un mayor aprovechamiento de los datos de los sistemas de información de salud habituales como bien público en Trinidad y Tabago. Se debe acelerar la transición prevista de un sistema de registro y almacenamiento de datos en papel a un sistema electrónico nacional; esto debe ir acompañado de una estandarización de los procesos y de inversiones para una dotación de personal adecuada, así como de capacitación en el momento oportuno. También es necesario contar con el apoyo tecnológico y de infraestructuras adecuado, junto con un mejor sistema de gobernanza de datos.

### Palabras clave

Sistemas de información en salud; acceso a la información; difusión de la información; países en desarrollo; Región del Caribe.

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## Uso de dados de sistemas de informações em saúde de rotina como bem público em Trinidad e Tobago

### RESUMO

**Objetivos.** Este estudo teve como objetivo explorar o uso de dados dos sistemas de informações em saúde de rotina (RHIS, na sigla em inglês) como um bem público em Trinidad e Tobago, os desafios existentes e as oportunidades para fortalecer o sistema de informações em saúde.

**Métodos.** Neste estudo qualitativo descritivo, foi utilizada amostragem intencional para recrutar 19 pessoas que usassem ou produzissem dados de RHIS. As entrevistas on-line foram realizadas via Zoom, e todas as entrevistas foram gravadas e transcritas. Foram usados pseudônimos para proteger a identidade dos participantes. As transcrições foram limpas e analisadas com o Dedoose (v. 9.0.17; Dedoose, Los Angeles, CA, EUA).

**Resultados.** Havia grande subutilização dos dados de RHIS como um bem público, principalmente devido aos desafios relacionados ao acesso aos dados e à sua qualidade. O acesso aos dados era dificultado por processos burocráticos onerosos, sistemas de registro e armazenamento em papel e preocupações com a propriedade e a segurança. A qualidade dos dados foi afetada negativamente pela falta de formulários e processos padronizados de coleta de dados, capacitação da equipe e completude dos dados, além de restrições tecnológicas e de infraestrutura. Algumas das oportunidades cruciais para aumentar o uso de dados de RHIS de Trinidad e Tobago incluem resolver a necessidade de um sistema nacional de informações eletrônicas em saúde, garantir uma capacitação adequada para a equipe envolvida no gerenciamento dos dados e elaborar um plano abrangente de monitoramento e avaliação.

**Conclusões.** É preciso melhorar a qualidade dos dados e o acesso a eles de forma a permitir a ampliação do uso de dados de RHIS como um bem público em Trinidad e Tobago. Os planos de transição de um sistema de registro e armazenamento de dados em papel para um sistema nacional de registro e armazenamento eletrônico de dados devem ser acelerados, e isso deve estar aliado à padronização dos processos e a investimentos em uma força de trabalho adequada e em capacitação oportuna. Também é necessário dispor de suporte tecnológico e de infraestrutura adequado, bem como um sistema aprimorado de governança de dados.

### Palavras-chave

Sistemas de informação em saúde; acesso à informação; disseminação de informação; países em desenvolvimento; Região do Caribe.