

# Using the District Health Information Software 2 as a Think-Tank Strategy for HIV and Syphilis Prevention in Jamaica

Tazhmoye V. Crawford (EdD)<sup>1</sup>, Collin A. Dosunmu (BSc.)<sup>1</sup>,  
Kimalie F. Parchment (BSc.)<sup>1</sup>

<sup>1</sup>National Family Planning Board, Statutory Body under the Ministry of Health, Kingston, Jamaica

---

**Abstract:** The integration of District Health Information Software 2 (DHIS2) is one of the most cost-effective investments used by developing countries to improve data management in health information systems. With this strategy, coupled with the needs required to meet goals stipulated by global indicators, Jamaica's HIV Programme executed the national roll-out of the Unique Identification Code (UIC) for HIV prevention component, using the DHIS2 platform.

The objectives of this study is to bring into perspective, standardisation of data collection and reporting for HIV and Syphilis cases, and at the same time, showcase improvements in the management of HIV/Syphilis health-related data on a national level with the use of an electronic system, to guide the strategies used for HIV prevention in the targeted population.

The design of the comprehensive approach, guided by the Steering Committee of the UIC, encompassed both quantitative and qualitative methodologies. This is to assess the needs for implementing a functional system in the health sphere. The implementation of the UIC, DHIS2 HIV Prevention platform used a purposive sample to achieve the objectives of the National Integrated Strategic Plan.

The design includes an UIC pilot analysis, UIC-DHIS2 platform development and training with feedback, along with the data sites' assessments for evaluation, prior to implementation on a national level. The development of the Data Security Protocol gave ethical directives as part of the implementation process.

The comprehensive process resulted in a successful implementation of the DHIS2 HIV Prevention platform, taking both ethical and technical issues into considerations, especially during the national roll-out of the UIC. The series of trainings with mixed methodologies, highlighted barriers and challenges prior to and during the implementation. This had helped to guide the process. In addition to the delivery of the UIC and the DHIS2 HIV Prevention Platform, all data sites were assessed to ensure that they were viable for the needs with increased attention paid to the security of the data.

**Conclusion:** The results of this study show that standardised data collection instruments along with the use of UIC for HIV and Syphilis reporting are effective ways of monitoring key indicators to drive the programme-policy decision-making. The DHIS2 HIV Prevention Component provides the solution for improvement in tracking HIV prevention indicators.

**Keywords:** District Health Information Software 2, HIV Prevention Platform, Unique Identification Code.

---

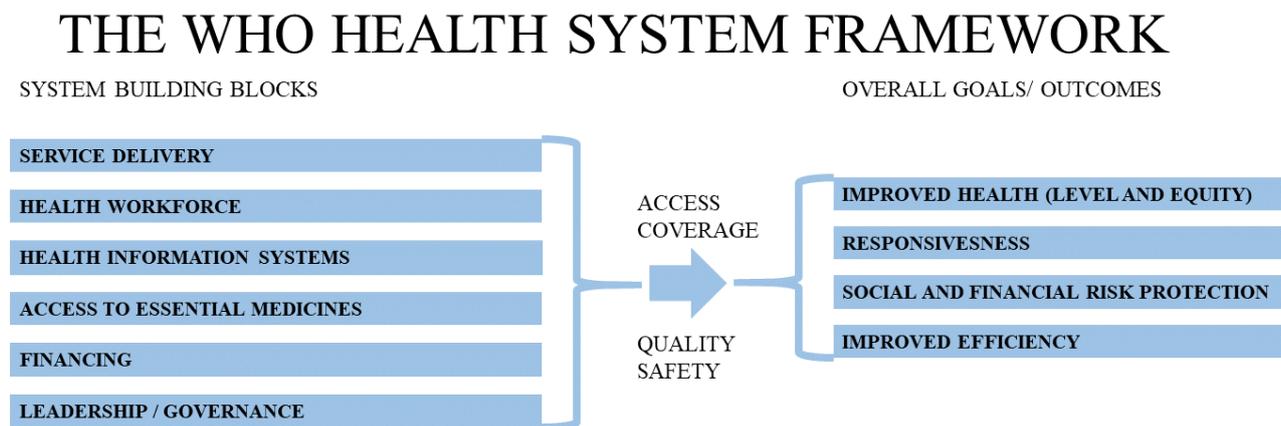
## 1. BACKGROUND

The National Family Planning Board (NFPB) is a Statutory Body under the Ministry of Health and Wellness (MoHW) in Jamaica with legislative mandate (1970 Act of Parliament) for population planning and development, within the context of sexual and reproductive health. This valuable organisation operates within a three-pronged portfolio, namely: Family

Planning, HIV Prevention, and Enabling Environment and Human Rights - all with the sound intent of serving the nation’s interest within the scope of sustainable development. In 2013, the Government of Jamaica, vide Cabinet Number 12/13, approved “the integration of elements of the National HIV/STI Programme (support to Treatment, and Care Services, Prevention, Enabling Environment and Human Rights) into the National Family Planning Board”. This enabled one national Sexual and Reproductive Coordinating Body, being the NFPB. The HIV Programme supported by the Global Fund and United States Agency for International Development aim to reduce AIDS-related morbidity and mortality with effective biomedical and supporting interventions, and to reduce new HIV infections among key populations (Men who have sex with men, Transgender and Female Sex Workers) through behavioural and structural interventions. Owing to occurrences of multiple count of individuals during HIV Reach, a District Health Information Software 2 (DHIS2) platform was customised for the HIV Prevention Programme. Population Services International Caribbean (PSI-C) conducted training of key Behaviour Change Coordinators (BCC) and intervention personnel to enable an effective roll-out of the UIC. In addition, a UIC Steering Committee was formed and Chaired by the NFPB to provide oversight to the roll-out. The DHIS2 is an open source, web-based health management information system platform, developed by the Health Information Systems Programme (HISP). The software capabilities are important for developing countries to integrate into their current health system structure because it is more cost-effective for smaller budgets [1]. It is important for data to be reported with validity, and be of the highest quality, with the use of an electronic data information system being effective in eliminating common errors when conducting surveys. In addition to data quality for reporting, the timeliness of data is very important to make effective and informed policy and programme decisions.

## 2. INTRODUCTION

The Jamaica National Integration Strategic Plan for Sexual and Reproductive Health and HIV (2014-2019) established the need for monitoring coverage indicators in order to guide the national HIV prevention response. This plan highlighted that the electronic health system must be able to collect the unique identification of each individual whilst respecting their rights to privacy and confidentiality. The Unique Identification Code database must be accessible at local and intermediate level to allow prompt identification of individuals already reached, thus allowing monitoring of new versus repeated reach. The national Health Information System (HIS) is critical to generate information to monitor indicators and support the public health systems in developing countries like Jamaica. This is one of the six building blocks of Health Systems Strengthening (HSS) as seen in Fig. 1 [2]. These building blocks represent:



**Fig 1: Health Systems Building Blocks and Outcomes**

These building blocks form part of the overarching framework of the strategic direction of the public health system to enable achievement of the Sustainable Development Goal’s (SDG) targets.

This paper will look at a best practice journey regarding the UIC being generated through the lens of a customised DHIS2 platform, within the context of HIV prevention. In doing so, the paper presented an Abstract, a Background, an Introduction, a Review of Related Literature, the Methodology, the Results, the Discussion, Conclusion and an Acknowledgement.

### **Problem Statement**

The Unique Identification has been used in a number of countries for more than fifty years, in order to identify persons for whom services are provided. Countries use unique identifiers for purposes such as insurance, banking, accessing health services and the recording of other sensitive data, for the sake of anonymity. Also, the DHIS2 platform allows the tracking of products, information, and people without the need for an external software. However, it has its own limitations. The PSI-Caribbean introduced the UIC to enable Jamaica to efficiently track HIV/STI-related clients. However, the absence of biometrics (a cultural barrier) remains one of the key limitations to establishing efficient and effective UIC in Jamaica.

### **Significance of the Study**

In an effort to avoid national and international missteps, it is imperative that evidence-based information drives programme-policy-project decisions in the nation's interest. Therefore, critical to meeting the HIV Fast Track targets (95-95-95) as well as the 17 SDGs, the establishment of a sound UIC system, steered by a proficient DHIS2 platform is warranted. This study also bears significance in highlighting scope for best practices as an avenue that will enable better strategic measures for HIV prevention, especially within the context of collecting and recording HIV and Syphilis information on clients. Of significance too, is the overall direction of the country's development plan/vision 2030, particularly the achievement of a healthy and stable population"; as well as the NFPB's intent to meet such strategic direction by ensuring "optimum quality, equitable sexual and reproductive health services and outcomes for all Jamaicans where rights are respected and protected".

### **Objectives**

The objectives of this study is to bring into perspective, standardisation of data collection and reporting for HIV and Syphilis cases; to showcase improvement in the management of HIV/Syphilis health-related data on a national level with the use of an electronic system; and to guide the strategies used for HIV prevention in the targeted population..

## **3. REVIEW OF RELATED LITERATURE**

Many International organisations such as UNAIDS, USAID-PEPFAR and Global Fund have invested in supporting low economy countries. In order to continue the reduction in HIV, there is focus on supporting key populations. The key populations are a group within the wider population, who are at a greater risk to epidemics due to inequality and access to health care resources. In Jamaica, the key populations who are disproportionately affected by the HIV epidemic are men who have sex with other men (HIV prevalence of 51%), transgender women (HIV prevalence of 51%), female sex workers (HIV prevalence of 2%), and prisoners (HIV prevalence of 6.9%) [3]. There are set targets to reach individuals in these key populations, and at the same time, provide the services and support accessible to everyone, so as to curtail or prevent the spread of the virus.

The DHIS2 platform is used by many countries for national-level aggregate reporting of health related data [4]. The software allows community-based data to enter real time in an electronic-based system, which allows important indicators to be generated for reporting needs, and be shared to all persons responsible for evidence-based decision-making process [5]. The use of new technology to improve the data quality in the healthcare sector is not unfamiliar in developing countries. DHIS2 is used in several countries to improve data management and to provide a platform to support policy-makers and decision-makers in the evidence-based data driven process [6],[7].

Furthermore, the electronic-based system provides the ideal platform to streamline data from various sources such as governmental and non-governmental organisations (NGOs), who may have many objectives but share a common goal in HIV Prevention. The UIC is an effective tool to help report accurate data for national and global indicators to drive the strategies used for HIV prevention. The implementation of UIC in a population should take ethical and technical considerations to ensure the UIC is supported by individuals in the population and to ensure the unique identifier is functional for the purpose [8]. The use of mixed methods is critical in the development of unique identifiers to collect and share confidential health data such as HIV care. The use of quantitative may indicate the level of degree for errors and duplication of the unique identifiers, but qualitative feedback is necessary from both providers and clients for trust in its use [8], [9].

The Government of Jamaica (GOJ), along with its local and international partners in HIV Prevention, recognised the need for a functioning UIC for the HIV Prevention Programme. This was mainly because the number of organisations that provides similar HIV services to the population has the potential to reach the same individual clients multiple times, hence the likelihood of multicentricity in count, and the dire need for an UIC [10].

#### 4. METHODOLOGY

##### Approach

This paper articulates a mixed method approach; qualitative and quantitative with the use of primary and secondary data. The former takes a direct approach to data collection while the latter takes an indirect. Secondary data are not always readily available, as this is dependent on the nature and dynamics of the study. Nevertheless, both primary and secondary data help the researcher to understand the problem. In taking a mixed method approach, the researcher noted that qualitative method has its advantages; and elements of probing for better understanding of the ‘whys’ and the ‘hows’. Contrarily, quantitative gives far less explanation, but neither tends to enable control numerically over contextual factors that might interfere with the data collected, plus provide statistically meaningful information [11].

##### Sampling

A purposive or judgmental sampling approach was used to identify key members who would be integral to the national roll-out of the UIC-HIV/Syphilis data system. The key members identified and their roles were as follows (Table 1):

**TABLE I: KEY MEMBERS AND THEIR ROLES IN THE IMPLEMENTATION OF THE DHIS2 HIV PREVENTION PLATFORM**

Key Members	Roles
<b>Population Services International Caribbean (PSI-C)</b>	Conducted pilot using the UIC and provided useful information from previous experience. They assisted in the development of a standardized outreach register and conducted data entry and analysis training.
<b>UIC Steering Committee</b>	Oversaw the implementation and functioning of the UIC and overall DHIS2 programme implementation.
<b>The Monitoring, Evaluation and Research Unit Lead, and Chair of the Steering Committee</b>	Operationalised the national roll-out of the UIC
<b>Targeted Intervention Officer (TIO)</b>	Provided useful feedback during training sessions for qualitative component.
<b>Monitoring and Evaluation (M&amp;E) personnel of Civil Society Organisations (CSOs)</b>	Provided useful feedback during training sessions for qualitative component.
<b>Behaviour Change Coordinator (BCC) for Regional Health Authority (RHA)</b>	Provided useful feedback during training sessions for qualitative component.
<b>Database Manager</b>	Liaison between NFPB and the Consultant for DHIS2 HIV Prevention Component.
<b>MoHW HIV/ STI/Tb Unit</b>	Provided approval for changes in the design of DHIS2

Purposive sampling method is considered useful due to its effectiveness when it comes to time constraints and cost, if one were to compare this approach to other sampling methodologies.

##### Instrument Design

The design of the electronic system considered the following elements during the development phase:

- The ability to measure the number of key populations tested for HIV and Syphilis, who knew their status.
- The ability to be linked the DHIS2 with the Electronic Patient Administration System developed by the MoHW.
- To provide a platform to guide an increasing proportion of national health providers.
- To improve the overall tracking of HIV services provided along the treatment cascade, thereby contributing to an effective HIV response.

An Outreach Register was revised to complement the DHIS2 platform and comprised key areas for data capture; namely: Client's Name, Date Reached, Address, Telephone Number, Age, Sex and Point of Care Results (HIV Rapid Test 1 and 2 with results and Syphilis Rapid Test with results).

#### *Data Security Protocol*

The data security protocol was designed to establish procedures that were akin to enabling an environment that safeguard data from threats, such as unauthorized access and disclosure. Confidentiality of UIC information is kept within the laws of the land. Information collected on any individual under the UIC is and should be treated as client information. Any breach of the data security protocol is a threat to human security/information, guided by the Release of Client Information Policy (MoHW's Policy). The implementation of the Data Security Protocol was also to ensure that deductive disclosure was not risked [12] owing to a right of the clients and professional integrity of the organisation [13] - the NFPB.

#### *Health Information System Training Design*

The training modules were designed and led by PSI-C. The module included the following:

- The use and importance of UIC for HIV Prevention. This training allowed participants to be guided in the use of UIC and to indicate any issues or challenges encountered.
- The use of DHIS2 HIV Prevention component, data analysis, reporting and validation. This training allowed participants to use the platform designed for warehousing HIV Prevention data for analysis and reporting. These participants were exposed in techniques used for creating the indicators and validation of the data for quality assurance.

The participants were subjectively identified, invited to a series of trainings and were assessed with both quantitative and qualitative methods.

#### **Data Collection Procedure**

##### *Pilot Design - Quantitative and Qualitative*

The PSI-C conducted a qualitative assessment which concluded with an UIC being proposed for validation. The proposed UIC was tested during a validation phase that lasted for one month, between February and March 2016 (two weeks per month). Outreach Officers from all parishes were provided with UIC collection tools, guidance document and a feedback form. The Outreach Officers used the UIC with the target population for the period of the validation and provided important feedback. The feedback was then used to make final revisions and changes where necessary to the proposed UIC to be rolled out nationally. The feedback was also used to develop the training module.

Several parameters were examined during the pilot. They were as follows:

1. Duplication: The number of identical UICs collected from two different individuals
2. Total Contacts: The total number of instances in which UIC data were collected and reported
3. Individuals Reported (UICs): Reflected the number of UICs collected at least once during the pilot
4. Repeat Contacts: The number of UICs captured more than once in validation data or the number of instances the same UICs was collected on more than one date and/or locations.
5. False Data: The number of UICs that could be reasonably excluded from the total number of individuals reached due to the potential of false data.
6. Estimated Individuals Reached: The estimated number of the true number of unique individuals reached with prevention activities with the potential of false data and incomplete/wrong data taken into consideration.

##### *Training Design- Qualitative*

The training curriculum was developed under the guidance of the UIC Steering Committee. This covered the UIC in detail, and DHIS2 was used for data management and analysis. The PSI-C and the DHIS2 consultant delivered the respective modules to ensure that the topics were grasped. The training sessions targeted key personnel from the CSOs, RHAs, MoHW and NFPB. Feedback from the target audience was collected to measure the impact of the deliverables and to identify areas that required further attention. In addition, the Outreach Register was extensively revised to enable effective data capture that was complementary with the DHIS2 platform.

## Data Analysis Procedures

### UIC-DHIS2 HIV Prevention Component

During data entry, DHIS2 continuously validated required fields. At the start of each new month, the Database Officer uses programme indicators in DHIS2 to show the data entry for each entity (site). If there were to be an anomaly or no entry, then that site would be called to ascertain irregularities in data entry. After data entry is done, then checks are completed. The dataset (data from January to the previous period) is downloaded as a comma separated value (csv) file is then saved as a Microsoft Excel Spreadsheet Workbook. De-Duplicate is then done on the dataset to remove duplicated clients that was tested by the same entity or different entity. After de-duplication is complete, the UIC Line Listing (Figure II) is sent to MoHW. The original dataset is then used to generate a duplicate table that is sent to each entity showing the data entered and the data after duplicates have been removed.

Event date	Entity	Facility	Venue	Type of Venue	Service Delivery Modality	Testing Services	Parish of Event	Target Pop	UIC	HIV Result
January 4, 2018	SERHA	Maxfield Park H Center	CHC	Health Center Hospital	Venue	VCT Centers	Kingston	SAF	ABVF1195	Negative
January 4, 2018	Children First	Children First - KSA	BBKHQ	NGO CSO FBO	Venue	VCT Centers	Kingston	MSM	CFFM0703	Negative
January 6, 2018	SERHA	Maxfield Park H Center	EDNA MANLEY H/C	Health Center Hospital	Venue	VCT Centers	Kingston	FSW	BBDF2283	Negative
January 6, 2018	SERHA	Greater Portmore H Center	St. Catherine Adult Correctional Center	Correctional Facility	Venue	Other	St. Catherine	IN	AKKM0681	Negative
January 7, 2018	JASL	JASL - St Ann's Bay	Parry Town	Outdoor Hangout	Site	Mobile	St. Ann	FSW	ICDF1579	Positive
January 8, 2018	SERHA	Greater Portmore H Center	Stewarts Hardware	Workplace	Venue	Other	St. Catherine	SAM	AGAM3194	Negative
January 8, 2018	Children First	Hope Worldwide	SEPTIMUS STREET	Outdoor Hangout	Site	Mobile	Kingston	FSW	OLDF1999	Negative
January 8, 2018	SERHA	Maxfield Park H Center	TEEN HUB	NGO CSO FBO	Venue	VCT Centers	St. Catherine	SAF	FLFF2800	Negative
January 9, 2018	SERHA	Greater Portmore H Center	Bushy Park	Outdoor Hangout	Site	Mobile	St. Catherine	SAM	UNDM1772	Negative
January 22, 2018	WRHA	Westmorland H Dept	Richie bar	Bar	Site	Mobile	Westmorland	SAF	OVRF1391	Negative

Fig 2: Example of the UIC line-listing extracted from DHIS2-HIV Prevention platform

## Strength of the Methodology

This study was able to identify gaps pertaining to the data management of HIV/Syphilis for prevention in sexual and reproductive health. This research was able to target and reach key members of the area for a widescale analysis prior to national roll-out. This design also provided an interface for the development of UIC Data Security Protocol and a precedence in the right direction for future development in sexual and reproductive health.

## Limitations

There were a few limitations identified during the process of integrating the UIC and DHIS2. The main limitation was the design of the DHIS2 previously developed to conduct event capture and not tracker capture, hence the inability to de-duplicate UIC. As a result, Microsoft Excel has been used to enable the de-duplication mechanisms. In addition, there were internet connectivity issues identified at a few sites which may prevent a smooth delivery of the data management timeline. Finally the absence of biometrics in the system does not allow for sound accuracy in the generation of an UIC.

## 5. RESULTS

### Pilot Results

#### Quantitative Component

As seen in Table 2, in aggregate terms, a total of 374 UICs were collected from members of the target populations, reporting 366 unique codes which suggested that 1.09 individuals were contacted on average during the two-week's period, whereby data were collected.

TABLE II: QUANTITATIVE ASSESSMENT OF UIC RETRIEVED DURING PILOT/VALIDATION PHASE

Population	Total Contacts	Individuals Reported (UICs)	Incomplete/ Wrong Data	False Data	Est. Individuals Reached	Individuals Reached more than Once
MSM	141	139	14 (10.1%)	2 (1.4%)	123	2
TG	25	24	2 (8.3%)	2 (8.3%)	20	1
FSW	208	203	9 (4.4%)	4 (1.9%)	190	5
<b>Total</b>	<b>374</b>	<b>366</b>	<b>25 (6.8%)</b>	<b>8 (2.1%)</b>	<b>333</b>	<b>8</b>

The pilot above shows that it was reported that reaching 139 unique individuals from the MSM target group with two (1.4%) UIC could be potential cases of false data due to instances where two or more codes were identical except for slight differences in birth date or birth year. In addition, 14 (10.1%) of the UICs collected were incomplete or indicated collection errors. This is indicative of the total number of individuals (139) being likely somewhat inflated and hence the 1.4% occurrence of false data being used to revise the total of 123 MSM reached. The data also showed only two MSM that were reached had participated in two (2) activities.

Secondly, the report also shows a reach of 208 unique individuals from the FSW target group, with the analysis of potential false data, indicating a similar result to the MSM. This reveals approximately two percent (4 total codes) and 4.4% (9 codes total) - also indicating false and incomplete or wrong data respectively. This indicated that the total number of individuals (208) was likely inflated, and the revised total individuals in this target population reached was 190 FSW.

Thirdly, a total of twenty-five (25) UIC were reported for the TG target population and only one was repeated which was possibly due to duplication. There were concerns with obtaining accurate and consistent UIC data for this population, and as such, two UICs were identified as potentially false because of the likelihood that they reflected a different contact; but the information provided from one individual was very similar to the information retrieved from another individual. This suggested that 8.3% of the twenty-four (24) unique individuals reported was possibly false data. In addition, two datasets appeared to be incomplete or of collection errors, which led to the downward revision of the total number of TGs reached being 20.

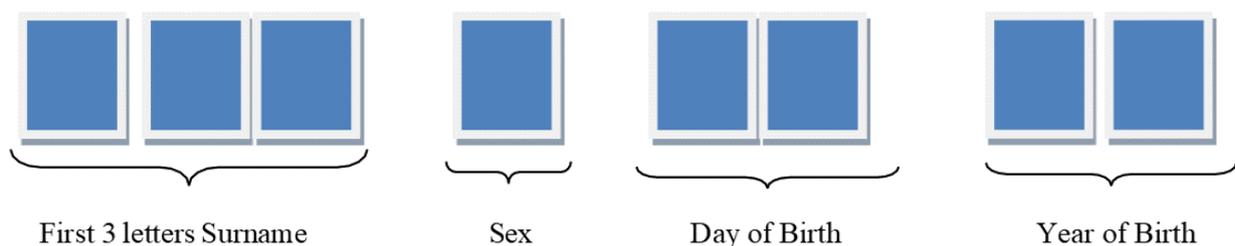
Finally of the 333 UIC collected from the three target population during the pilot, four UICs were collected in different areas. This suggested that they were duplicated at a rate of 1.17%, which is similar to the rate found in other countries using a similar UIC structure- for example, Central America (1.5% - 3.5%).

*Qualitative Component*

The Outreach Officers were asked to answer a brief survey with open-ended questions about the experience, clarity of the instructions, barriers and challenges. Request for solution-related suggestions (if any) were also made. A total of 58 persons from eight (8) different organisations completed the survey, with 37% of the officers indicated that they encountered challenges when requesting information. Of these 22 reports, three of the officers were able to overcome the challenges by explaining the use of the UIC being collected.

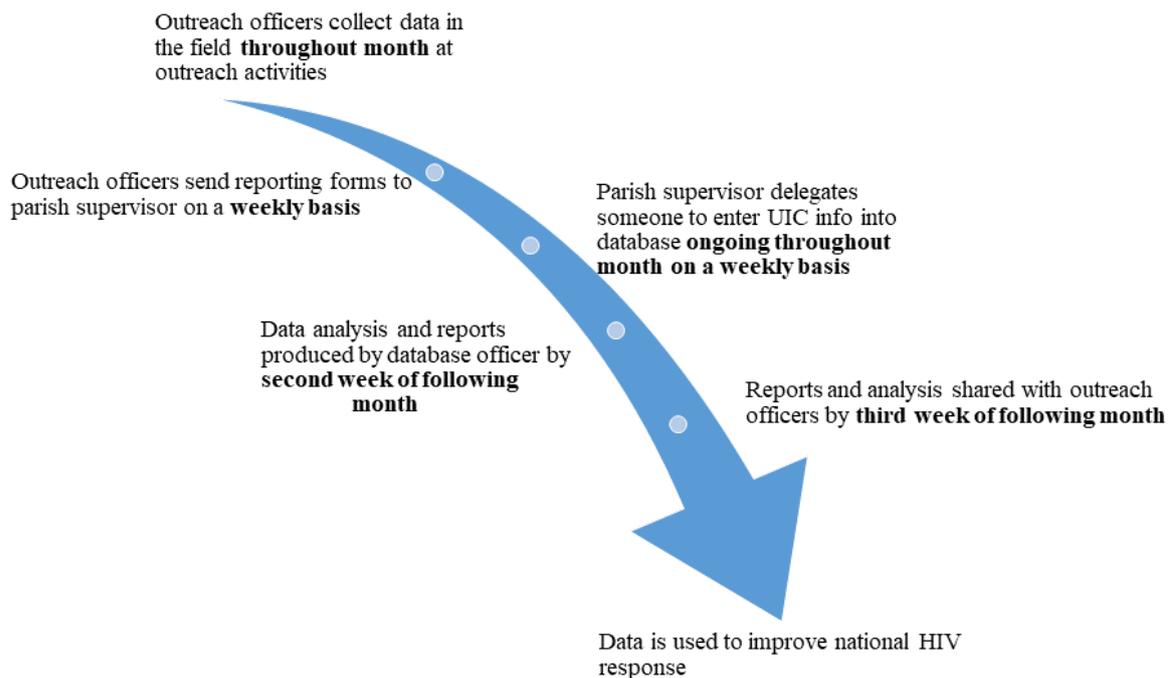
**UIC**

The UIC selected for the electronic-based data system was done under the guidelines of an assessment by PSI-C. The PSI-C used a qualitative approach by discussing various UIC strategies with key stakeholders. The UIC selected consisted of an eight-digit code that were created from information that was gathered by Outreach Officers in the field as shown below (Figure III).



**Fig 3: The structure or formulation of the unique identification code (UIC) used in the DHIS2 HIV Prevention Platform**

As a best practice, Data is entered throughout the month by the outreach officers into the DHIS2 database. By the 5th of the next month, the Database Officer checks the data to ensure that each entity is represented in the database. If there is no data, the Database Officer checks with the entity to ascertain the reason for absence, and endeavor to take corrective measures where needed. By the 8th of the month, the Database Officer downloads the data from the DHIS2 platform into Microsoft Excel, and then cleans same. The deduplication is then done and the data is sent to MoHW (Figure IV).



**Fig 4: The UIC-DHIS2 HIV Prevention Platform Information Flow**

#### Data Sites Assessment

The assessments of the data sites were done in two folds (refer to Tables 3 and 4) during the implementation process to address the infrastructural needs with a focus on security of the data hub. The data sites required significant improvement to enable a national roll-out of the UIC-HIV Prevention component. This was guided by the UIC Steering Committee, under the financial sponsorship of key international partners. Examples of the equipment and materials procured for the facilitation of the roll-out were desktop central processing units and all components; network cabling; privacy screens; servers; external hard drives; and Uninterruptible Power Supply.

**Table III: Initial Assessment of the DHIS2 Data Sites**

Type of Data Sites	Number of Sites	Estimated Cost	Funding Support
NFPB Data Hub	1	USD \$2,190.00	USAID/Global Fund/GOJ
RHA	13	JMD \$905,000.00	USAID/Global Fund/GOJ
CSO	7	JMD \$225,000.00	USAID/Global Fund/GOJ

**Table IV: Second Assessment of the DHIS2 Data Sites**

Type of Data Sites	Number of Sites	Estimated Cost (JMD\$)	Funding Support
NFPB Data Hub	1	54,000.00	USAID/Global Fund/GOJ
RHA	13	1,035,000.00	USAID/Global Fund/GOJ
CSO	7	64,000.00	USAID/Global Fund/GOJ

#### Training

There were a series of training held to cover the comprehensive design of the data management system. The participants targeted were responsible for the management of data and/or the data entry points. This included the Outreach Officers, TIOs, BCC, M&E personnel and Data Hub Officers (Table 5). These persons were trained on the UIC, data analysis, reporting and validation in addition to the use of the DHIS2-HIV Prevention Component. Most of the surveys answered (93%) reported that instructions were clear, concise, helpful, precise and easy to understand, while 6.8% of the participants reported that it was partially clear.

Of the 70 Outreach Officers that collected UIC data, only two (2.8%) evidenced a misunderstanding of the components of the UIC. However the two persons reported the inclusion of the two digits for the month of birth and another added the mentioned error and four digits for the year.

According to the survey conducted at the training, some Outreach Officers misunderstood the time taken to retrieve the UIC data. Forty individuals (68.9%) answered based on the time it took to build the UIC. Of those individuals, 27.5% reported that it took three minutes or less to complete the form. It took a reported 32.5%, between 5 and 10 minutes to obtain the information. The other respondents informed that after clarification on the use of the information, it was obtained in a few minutes.

**Table V: Training Participants for the UIC-DHIS2 HIV Prevention Implementation**

Target Audience	Number of Participants-UIC	Number of Participants-DHIS, Data Analysis, Reporting and Validation
MoHW	1	1
NFPB	3	10
RHA	4	47
CSO	13	17
Other	2	2

## 6. DISCUSSION

This paper described a comprehensive process to identify and address gaps in HIV prevention, so as to implement a data management system, using DHIS2. In addition to the use of the software, a UIC was tested and implemented using both quantitative and qualitative approaches which took both ethical and technical approaches.

The ethical considerations addressed data privacy and confidentiality issues to improve confidence in managing the data to reach and support the target population [8]. The development of a Data Security Protocol ensured that any potential breaches were addressed as suggested in the literature.

The technical considerations addressed the need of an UIC to reduce duplication in the system to accurately represent indicators such as total unique individual in the target population reached and tested which are used to drive the decision-making process. The results of this paper noted the use of an effective UIC that would enable such tracking with UIC to meet set goals.

The purposive approach used in the implementation at each step was critical to understand the possible barriers and challenges for a smooth integration. This approach allowed the UIC Steering Committee to guide the process in an efficient manner and to meet targets in order to improve the data management process for HIV Prevention in the target group. The process utilised both quantitative and qualitative methods to acquire useful information to improve the type of UIC implemented; the use of the platform to improve the HIV Prevention Programme; and to improve the data sites with devices that has a higher degree of security.

The results of the UIC DHIS2-HIV Prevention platform allow unique identifiers to measure targets that are critical to monitoring, and to make sound programme-policy decisions in keeping with the aforementioned evidence, as well as that which the literature had purported.

## 7. CONCLUSION

The results of this study show that standardised data collection instruments along with the use of UIC for HIV and Syphilis reporting are effective ways of monitoring key indicators to drive programme-policy decision-making. The DHIS2 HIV Prevention Component provides the solution for improvement in tracking HIV prevention indicators. In addition, the UIC improves the DHIS2 HIV Prevention Component platform, and helps the decision-maker to inform the type of strategies to be employed for the strengthening of the HIV Prevention target groups. This is deemed critical to achieving the target goals, as guided by the global indicators. In addition, the process led by the Steering Committee strengthens the overall health system with improvement in equipment for data collection, processing and management for quality reporting. However, there are still gaps such as the absence of biometrics (fingerprint) to improve the whole sense of unique identification, and the inability of the customised platform to de-duplicate UIC for reporting.

## 8. RECOMMENDATIONS

Given the foregoing, this paper recommends the following:

1. The implementation of tracker, as this would help in providing coherent information on a client's status and needs, as they change from time to time. This would undoubtedly reduce duplicates in the database.
2. An effective communication campaign to engage national buy-in of the UIC and data security. In doing so, this may likely enable a nation-wide appreciation, if the importance were to be communicated in light of improvement of the population-based barriers surrounding data privacy and confidentiality. This may also improve the quality of data from the target population which is critical for evidence-based decision-making.
3. Implementation of further data quality assurance in the data system, such as auditing the data management forms and the system at each data sites at intervals. This may improve the quality of the data used for reporting indicators and formulation of strategies.

## ACKNOWLEDGEMENT

The following are being acknowledged for their contribution to the process of the development and implementation of the UIC and DHIS2 platforms: USAID-PEPFAR, Global Fund, MoHW, NFPB, PSI-C, RHAs, CSOs, UIC Steering Committee among other key stakeholders.

## REFERENCES

- [1] J. Karuri, P. Waiganjo, D. Orwa, A. Many, "DHIS2: The Tool to Improve Health Data Demand and Use in Kenya," *Journal of Health Informatics in Developing Countries*, vol. 8, no. 1, pp. 12–34, 2014.
- [2] World Health Organization. Monitoring the Building Blocks of Health Systems: A Handbook of Indicators and their Measurement Strategies. 2010. Retrieved from: <https://www.who.int/healthinfo/systems>. December 2020.
- [3] Focus on: Jamaica. (n.d.). Retrieved from the UNAIDS website: [https://www.unaids.org/en/20191107\\_country\\_focus\\_Jamaica](https://www.unaids.org/en/20191107_country_focus_Jamaica). December 2020.
- [4] DHIS2 Documentation Team. DHIS2 Tracker Implementation Guide. District Health Information Software 2. Retrieved from: [https://docs.DHIS2.org/2.35/en/implementer/html/DHIS2\\_tracker\\_implementation\\_guide\\_full.html](https://docs.DHIS2.org/2.35/en/implementer/html/DHIS2_tracker_implementation_guide_full.html). January 2021
- [5] T. Begum, S.M. Khan, J. Ferdous, M.M. Parvez, A. Rahman, F.A. Kumkum, I. Anwar. Using DHIS2 Software to Collect Health Data in Bangladesh. (2019, March) Retrieved from Measure Evaluation website: <https://www.measureevaluation.org/>. December 2020.
- [6] R. Dehnavieh, A. Haghdoost, A. Khosravi, F. Hoseinabadi, H. Rahimi, A. Poursheikhali, N. Khajehpour, Z. Khajeh, N. Mirshekari, M. Hasani, S. Radmerikhi, H. Haghghi, M.H. Mehroolhassani, E. Kazemi, S. Aghamohamadi, "The District Health Information System (DHIS2): A literature review and meta-synthesis of its strengths and operational challenges based on the experiences of 11 countries," *Health Information Management : Journal of the Health Information Management Association of Australia*, 12 Jun 2018, 48(2):62-75.
- [7] J.M. Kariuki, E. Manders, J. Richards, T. Oluoch, D. Kimanga, S. Wanyee, J.O. Kwach, X. Santas, "Automating indicator data reporting from health facility EMR to a national aggregate data system in Kenya: An Interoperability field-test using OpenMRS and DHIS2," *Online Journal of Public Health Informatics*, 15 Sep 2016, 8(2): e188.
- [8] Technical brief on HIV and key populations Programming at scale with sex workers, men who have sex with men, transgender people, people who inject drugs, and people in prison and other closed settings (Tech.). (2019, October). Retrieved from The Global Fund website: [https://www.theglobalfund.org/media/4794/core\\_keypopulations\\_technicalbrief\\_en.pdf](https://www.theglobalfund.org/media/4794/core_keypopulations_technicalbrief_en.pdf). December 2020.
- [9] A. Maiorana, W.T. Steward, K.A. Koester, C. Pearson, S.B. Shade, D. Chakravarty, J.J. Myers, "Trust, confidentiality, and the acceptability of sharing HIV-related patient data: lessons learned from a mixed methods study about Health Information Exchanges," *Implementation Science*, 2012, 7:34.

- [10] UNAIDS. Developing and Using Individual Identifiers for the Provision of Health Services including HIV: Proceedings from a Workshop, 24-26 February 2009. Retrieved from the UNAIDS website: <https://www.unaids.org>. December 2020.
- [11] L.R. Gay and P.W. Airasian (2000). Educational Research Competencies for Analysis and Application 6<sup>th</sup> ED. NJ: Prentice- Hall Inc.
- [12] Tolich M. (2004). Internal confidentiality: When confidentiality assurances fail relational informants. *Qualitative Sociology* 27(1): 101–106.
- [13] Corti, L., Day, A., & Backhouse, G. (2000). Confidentiality and Informed Consent: Issues for Consideration in the Preservation of the Provision of Access to Qualitative Data Archives. *Forum: Qualitative Social Research*, 1(3).