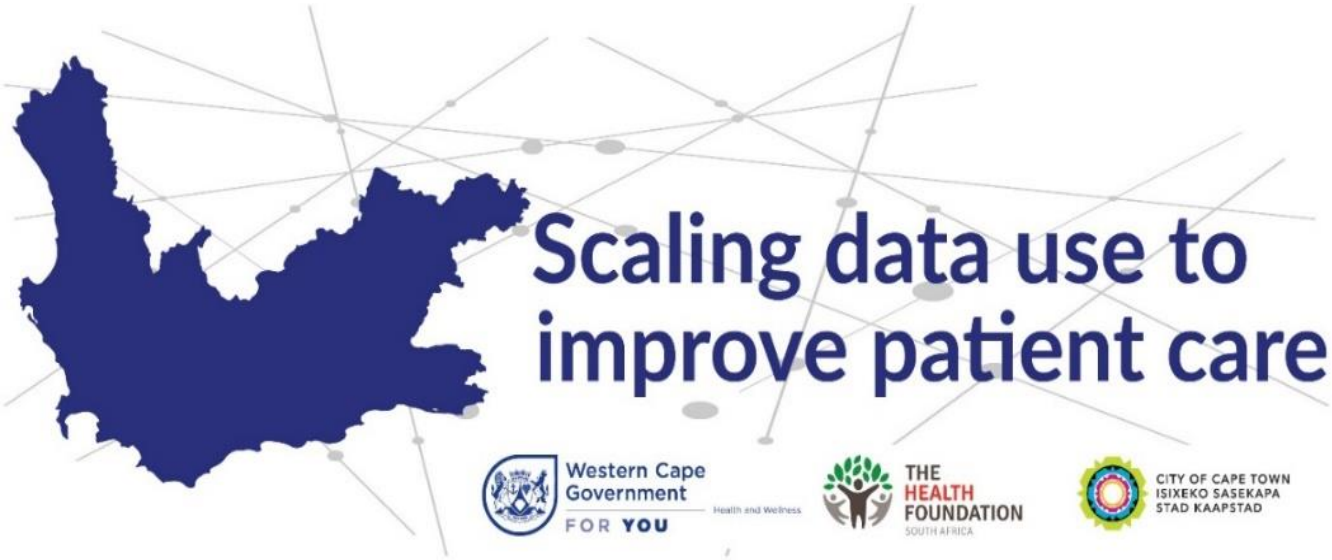

KNOWLEDGE, ATTITUDE AND PRACTICES SURVEY
MIDPOINT FINAL REPORT
2023

Western Cape Government
Health and Wellness
FOR YOU
THE HEALTH FOUNDATION
SOUTH AFRICA
CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD
Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT
forward together
sonke siya phambili
saam vorentoe
DESMOND TUTU
CENTRE • SENTRUM • IZIKO
Every breath counts

Midpoint report prepared and presented to The Health Foundation on behalf of Stellenbosch University, Desmond Tutu TB Centre by:

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BMGF	-	Bill and Melinda Gates Foundation
CCT Health	-	City of Cape Town, Health
CDC	-	Community Day Centre
CHC	-	Community Health Centre
DTTC	-	Desmond Tutu TB Centre
eCCR	-	Continuity of Care Record
EDR	-	Electronic DR-TB Register
EHIS	-	Electronic Health Information Systems
EN	-	Enrolled Nurse
ENA	-	Enrolled Nursing Assistant
ETR	-	Electronic TB Register
Hectis	-	Hospital Emergency Centre Triage and Information System
HCW's	-	Healthcare Workers
HSRC	-	Human Science Research Council
MHS	-	Metro Health Services
NGO	-	Non-Governmental Organisation
NHLS	-	National Health Laboratory Service
NPO	-	Non-Profit Organisation
PEoU	-	Perceived Ease of Use
PHC	-	Primary Health Care
PHCIS	-	Primary Health Care Information System
PHDC	-	Provincial Health Data Centre
PREHMIS	-	Patient Record and Health Management Information System
PU	-	Perceived Usefulness
RIS	-	Radiology Information System
SPV	-	Single Patient Viewer
TAM	-	Technology Acceptance Model
WCGHW	-	Western Cape Government: Health and Wellness

Executive summary

Electronic data systems are key to strengthening healthcare services, however implementation can be challenging. These challenges include health worker knowledge, training, and notably, acceptance of electronic systems. These factors serve as the primary determinants of users' inclination to embrace and employ any novel system.

Baseline survey: The Western Cape Government: Health and Wellness (WCGHW) (including Metro Health Services (MHS) and the Provincial Health Data Centre (PHDC)), and City Health, City of Cape Town (CCT Health), have implemented the 'Scaling Data use to Improve Patient Care' initiative to facilitate effective data use to improve various health outcomes in the province. From August 2021 to January 2022 the Human Science Research Council (HSRC), in partnership with The Health Foundation, undertook a baseline survey with 1974 health workers to measure knowledge, attitudes and practices of electronic health information systems (EHIS) amongst health workers in the Cape Metro.

ScIP KAPS: This follow-up tracking study (ScIP KAPS) was designed to show changes in the acceptance and use of electronic health information systems and to inform training needs, improve the design and use of the available tools and dashboards for improved uptake and use, to enable better patient care. We report on the midpoint survey results.

Methods: This study was implemented by the Desmond Tutu TB Centre (DTTC) in partnership with The Health Foundation (THF), at the request of the WCGHW and CCT Health. A multi-round open cohort panel survey of 'knowledge', 'attitudes', and 'practices' was implemented across 65 health facilities in the Cape Town district in the Western Cape Province, South Africa. A total of 1437 health workers accessed the SciP KAPS survey, and 1435 health workers completed the survey, providing information on EHIS usage, perceived usefulness of EHIS, perceived ease of use of EHIS, and questions specifically related to use, knowledge, and attitudes of the Single Patient Viewer (SPV) system. Data was analysed using the Software, Analytic and Descriptive Statistics Programme (SAS). Descriptive statistics were calculated.

Findings: Most participants were employed by WCGHW or CCT Health (1226/1435; 85%). Of these participants, 839/1226 (68.4%) were clinical staff, 275/1226 (22.4%) were support staff, 81/1226 (6.6%) were management staff, and 31/1226 (2.5%) were "other" staff. Participants were mostly female (>80%) and 25-44-years-old.

Of all the participants approached for the midpoint Survey, 1036/1435 (72.1%) made use of EHIS. EHIS were mostly used for clinical management, tracking of patients and administration. Among

clinical workers, 349/986 (35.4%) who accessed the survey did *not* use EHIS at all. In further analysis among clinical, management, and support staff from WCGHW and CCT Health using EHIS (n=921), more than 90% of participants reported that EHIS are easy to use, while 354/921 (38.4%) of these EHIS users rated their skills as 'average'. One in four reported concerns about accuracy, completeness, and confidentiality when comparing EHIS to paper-based systems. More than a third reported that they did not access EHIS due to time constraints (37%), lack of access to a computer (36%), or limited internet (44%).

Overall, SPV awareness and use (i.e., participants reporting using SPV) is low across CCT Health and WCGHW facilities, with 368 EHIS users reporting that they were aware of or had heard of SPV. Of clinical, management, and support staff using EHIS from CCT Health or WCGHW, 184/921 (19.98%) were using SPV. Of those *aware* of SPV, 184/368 (50.0%) were using SPV. Those using SPV found it beneficial; 95.1% reported that it helped manage patients better and 96.2% stated that it was useful getting patient information from other facilities.

Among people who were using SPV, participants reported that they would use SPV *more* if they received support (59%) and that they are not using SPV to its full capacity (72%). Health workers using SPV would use it more if (a) if there was someone available to provide support and (b) they received feedback on their use of SPV. Only 133/368 (36%) of health workers aware of SPV had received training and 17% of health workers who had received SPV training reported not currently using SPV. Of the health workers using SPV, 83/184 (45%) did not received training. More than half of health workers using SPV reported that they do not have the training they need to use SPV. SPV is not reported as the norm amongst managers and 38% of health workers reported that managers did not support the use of SPV.

Key recommendations: 1) Communicating the usefulness and benefits of using EHIS and SPV as part of patient management together with addressing confidentiality and accuracy of EHIS systems is vital; 2) providing targeted education and training across health services; escalating training and providing on-site user support and mentoring, especially with regards to SPV use, is key for improving SPV uptake; 3) facilitating user feedback to the PHDC to ensure tool improvement is also important; 4) it is also recommended that training is provided using a top-down approach, where managers are prioritised to establish EHIS use as the norm. 5) Long term planning should address connectivity issues (including access to computers and internet, especially with regards to power outages and 'loadshedding'), which is often described as hampering the use of EHIS.

1. Background

Electronic health information systems (EHIS) are utilized to provide healthcare professionals with point of care services for their clients, as well as to facilitate the exchange of data between healthcare providers.[1] EHIS has been found to improve service quality, staff efficiency and effectiveness, and in reducing organizational expenses.[1,2] While the use of electronic systems is generally presented as means to improve health service delivery overall, there are often challenges with the implementation of electronic systems.[3,4] This involves difficulties relating to knowledge, training, and notably, acceptance. The cost of low acceptance of technological systems has been shown to result in delays in, or even failure of, successful implementation of electronic health information systems.[5] However, health worker knowledge and attitudes also contribute to the efficiency of electronic health system implementation and the clinical work being carried out.[1,4,6]

The Technological Acceptance Model (TAM) was originally designed to assess why individuals were not be utilising available electronic health information systems but has since been applied to understand the acceptance of technological/computer systems and is now used and cited in the field of healthcare.[1,3,5,7] Accordingly, the model proposes that information system use can be explained or predicted through perceived usefulness (PU) and perceived ease-of-use (PEoU). These elements are the principal determinants of users' intention to use ("acceptance") of any new technology or innovation.[4] Other key attributes determining acceptance include individual user attributes and system attributes.[4,7]

The establishment of the PHDC in Western Cape has led to an increase in health-related information that is now accessible to aid clinical care, program management, and operational decision-making. However, there is little evidence that this increase in data availability results in more efficient usage

[1] Kalayou, M. H., Endehabtu, B. F., & Tilahun, B. (2020). The applicability of the modified technology acceptance model (TAM) on the sustainable adoption of eHealth systems in resource-limited settings. Journal of Multidisciplinary Healthcare, 13, 1827.
[2] Cline, G. B., & Luiz, J. M. (2013). Information technology systems in public sector health facilities in developing countries: the case of South Africa. BMC medical informatics and decision making, 13(1), 1-12.
[3] Rahimi, B., Nadri, H., Afshar, H. L., & Timpka, T. (2018). A systematic review of the technology acceptance model in health informatics. *Applied clinical informatics*, *9*(03), 604-634.
[4] Ketikidis, P., Dimitrovski, T., Lazuras, L., & Bath, P. A. (2012). Acceptance of health information technology in health professionals: an application of the revised technology acceptance model. Health informatics journal, 18(2), 124-134
[5] Ahmad Tubaishat (2017): Perceived usefulness and perceived ease of use of electronic health records among nurses: Application of Technology Acceptance Model, Informatics for Health and Social Care.
[6] Wright, G., O'Mahony, D., & Cilliers, L. (2017). Electronic health information systems for public health care in South Africa: a review of current operational systems. *Journal of Health Informatics in Africa*, 4(1).
[7] AlQudah, A.A.; Al-Emran, M.; Shaalan, K. (2021) Technology Acceptance in Healthcare: A Systematic Review. *Appl. Sci.* 11, 10537.

of data and improvement in health outcomes. It is suggested that to develop a culture of effective data use, barriers to data use will need to be identified and removed and the demand to increase the demand for data.

The Western Cape Government Health and Wellness (WCGHW), and City of Cape Town Health (CCT Health), have implemented an initiative that aims to implement more effective data use to improve TB, HIV, and diabetes outcomes in the province. One of the specific objectives is to address the technical, behavioural, and organisational impediments to effective data utilization. The 'Scaling Data use to Improve Patient Care' initiative, funded by The Bill and Melinda Gates Foundation (BMGF), has sought to understand health workers acceptance of electronic health information systems, including the data use knowledge, attitude, and practices of health workers. During August 2021 to January 2022 the Human Science Research Council (HSRC), in partnership with The Health Foundation (THF), undertook a baseline survey with 1974 health workers. The project is set to run from 2021 – 2024.

This follow-up tracking study (ScIP KAPS) is designed to show changes in the acceptance and use of electronic health information systems (EHIS) and to inform the training needs, improve the design and use of the available tools and dashboards, to improve their uptake and use to enable better patient care. For this project, tracking involves a midpoint survey (detailed in this report) and a follow up survey in Q1 of 2024.

2. Study Aim

The survey aims to understand participant's knowledge, attitude, and practice towards the use of electronic health information systems to increase effective data use to improve patient outcomes in Cape Town.

2.1 Objectives

The objectives of the survey are to:

a) Measure the current state of electronic data system use by health workers in Cape Town;
b) Describe health worker knowledge, attitude, and practices relative to electronic data systems;
c) Develop an understanding of the variables that influence data system usage, and their interplay; and
d) Track changes in knowledge, attitude, and practices over the duration of implementation of the initiative 'Scaling Data use to Improve Patient Care.'

3. Method

3.1 Setting

The Western Cape is the fourth largest and third most populous of the 9 provinces in the country. Of the estimated 7 million residents in the province, 4.7 million are reported to be living in Cape Town.[8] The province consists of one metropolitan municipality and five district municipalities, in turn divided into 24 local municipalities.[9] Two health authorities manage care programmes; WCGHW (provincial authority), which provides tertiary, secondary, primary, and specialised health care, and emergency services, with MHS responsible for primary health and districts hospitals in Cape Town; and City of Cape Town (CCT Health - local authority), providing a range of primary healthcare services, including environmental health.

In the Cape Metro there are an estimated 203 facilities providing healthcare, including 59 clinics, 15 satellite clinics, 47 community day centres (CDC), and 11 community health centres (CHC).[8] Of these facilities, more than 80 facilities are under the authority of CCT Health while the remainder fall under WCGHW.[9]

In the Western Cape, Afrikaans, Xhosa, or English are spoken by most residents and health workers are likely to be fluent in English.

3.2 Design

A multi-round open cohort panel survey of knowledge, attitudes, and practices.

3.3 Context

The midpoint survey was implemented by the Desmond Tutu TB Centre (DTTC), Stellenbosch University, in partnership with The Health Foundation, at the request of WCGHW and CCT Health. This work builds on a baseline study conducted by the HSRC in 2021 to provide a snapshot of the state of data use in Cape Town to guide electronic health data system development and capacity development. This follow-up tracking study (midpoint) was implemented to identify variables that influence health worker data system usage and to track the changes in knowledge, attitude, and practices of health workers in Cape Town, South Africa. The project includes three rounds of surveys: a baseline survey and midpoint (completed January 2022 and January 2023 respectively) and the

[8] Stats SA (2020). Mid-year population estimates; Statistical Release P0302; Pretoria
[9] Western Cape Government (2019); Municipalities in the Western Cape, https://www.westerncape.gov.za/general-publication/municipalities-western-cape
[10] Western Cape Government: Health and Wellness. *Sinjanii*. Available: westernhttps://sinjani.westerncape.gov.za/live/SinjaniMain

endpoint survey expected to be completed in 2024 to span the duration of the 'Scaling Data use to Improve Patient Care' initiative.

3.3 Sampling logic and sample size

We aimed at sampling 20% of health staff across cadres at health facilities at primary health care level and in district hospitals. At the end of an extended data collection period, 1437 health workers (of the targeted ~2000 health workers) accessed the midpoint survey and 1435 participants completed the survey.

All eligible staff within the district, including those working at management level (provincial, district and sub-district offices), and those working in facilities were invited to participate.

CCT Health and WCGHW facilities (excluding hospitals) in sub-health districts were stratified into small or large facilities by number of staff employed at each facility. As WCGHW facilities employ more staff, the cut off for small facilities was 45 staff, whereas large CCT Health facilities were those employing 15 staff members or more. All health workers (clinical, management, and support staff) were approached and invited to participate.

The initial sampling strategy was designed to include 40% in-person or 'assisted' survey participation with the remaining 60% of surveys anticipated to be completed online, via an emailed link or on mobile phones. After low uptake of online participation, the sampling strategy was adapted, and in-person participation recruitment was extended to 65 facilities; 89% of participants completed the survey in-person or were assisted by field staff (see below).

3.4 Data collection processes

Data were collected in two ways: (1) online (computer or cell phone), via a link distributed via email or a QR code shared on posters/pamphlets at facilities, or (2) in person on electronic devices (tablets) with the option of assistance from DTTC field staff. A team of 2 – 4 trained researchers from the DTTC arranged for in-person data collection with facility managers, and health staff were approached to complete the short survey. DTTC staff spent between one and four hours at each of the facilities, depending on the size of the facility. The survey took take place at a time and place convenient to the participant, aiming for minimal disruption of clinic services. For in person data collection, 'assistance' meant that DTTC staff either read the survey to participants or were available for technical guidance (i.e., show participants how to use the device, how to save the survey after completion, etc.).

The questionnaire took 10- 12 minutes to complete and consisted of the following sections:

Section 1: Questions related to place of work, job category and other relevant demographic information.

Sections 2: Electronic health information system usage.

Section 3: Perceived usefulness of electronic health information system usage (for participants indicating that they use electronic systems)

Section 4 Perceived ease of use of electronic health information systems.

Section 5 Multiple attributes related to the Single Patient Viewer usage (for participants who indicated that they use SPV).

A copy of the questionnaire is available in Appendix A.

3.5 Data analysis processes

We conducted descriptive and analytic statistics to characterize the variables relevant to knowledge, acceptance, and behaviour of different cadres of health workers and the variables that influence data use. The quantitative data analysis was conducted by a senior biometrician, using SAS software.

While basic comparisons between baseline and midpoint results are provided in this report, it should be noted that both the sample and the data collection method differed, and caution should be taken when making direct comparisons.

Assumptions

The findings are structured to represent key staff categories (clinical, management, or support staff), based on groupings used in the baseline survey. In addition, reporting is done primarily for staff employed by Province (WCGHW) and City (CCT Health). Where relevant, staff employed by district support organisations or 'other' authorities are noted separately.

Staff categories used throughout in the midpoint Survey include:

Management: Operational Manager/Facility manager/assistant facility manager; Clinical Manager; Health Information Manager; District Programme / Management Support; Sub-district Programme / Management Support (e.g., trainers, HAST coordinators)

Clinical: Allied Health Professionals, Clinical Nurse Practitioner, Clinician, CHWs, counsellor Enrolled Nurse/ Assistant Nurse /Other Nurse, Professional Nurse, Pharmacist

Support: Administrative Staff (clerks, reception), HR, Finance, Health Information Officer

Other: Carer, vaccinator, volunteer, student, senior worker etc.

Some of the analysis from Likert scale questions are also presented as positive/negative. For the purpose of this report:

Positive: Strongly agree / Agree responses

Negative: Strongly disagree /disagree / not sure

4. Findings of midpoint Survey

4.1 Consort diagram

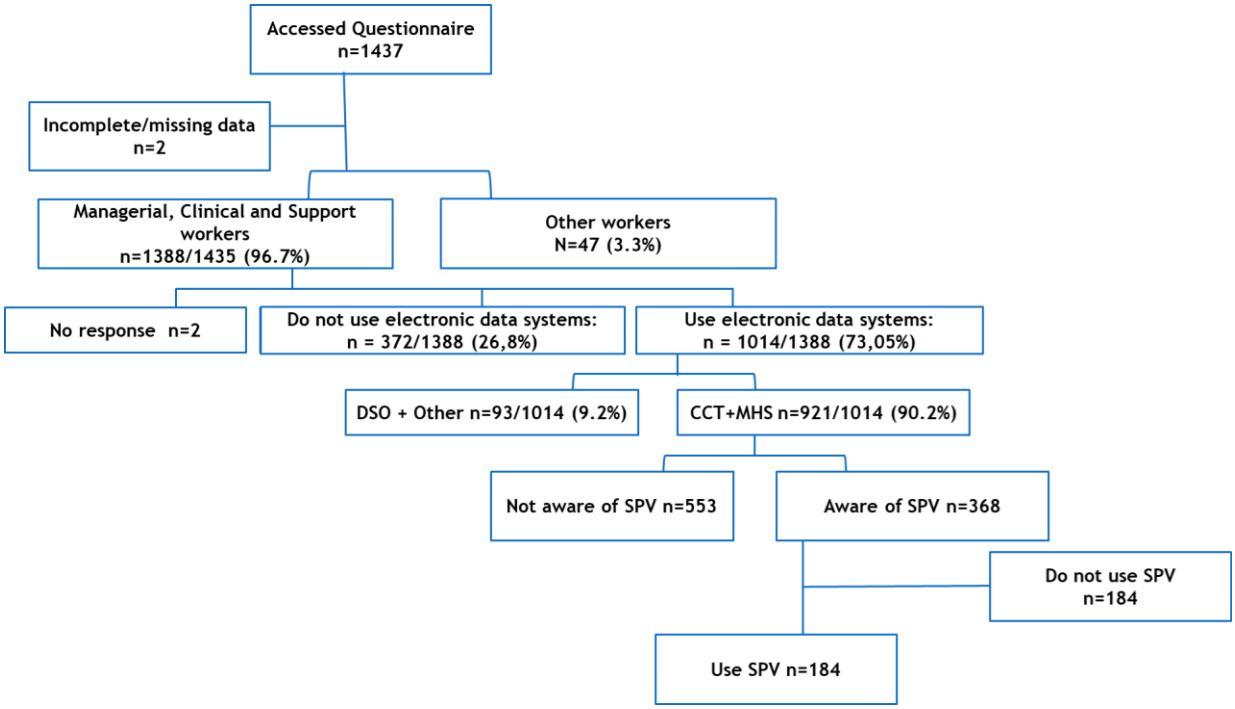

Diagram 1 Midpoint Survey Consort Diagram

A total of 1437 participants accessed the questionnaire. Two questionnaires had missing data and were excluded (see *Diagram 1*). WCGHW was the employer of 892/1435 (62.2%) participants while 334/1435 (23.3%) of participants were employed by the CCT Health and 209/1435 (14.6.%) were employed by district support organizations (NGOs/NPOs) or 'other' employers (see *Figure 1*).

Clinical, management, and support staff made up 1388/1435 (96.7%) of eligible participants and 47/1435 (3.3%) were 'other' workers[10] and were excluded from further analysis. 1014 participants

[13] Carer, vaccinator, volunteer, student, senior worker etc.

indicated that they used EHIS. Of clinical, management, and support staff using electronic health information systems, 921/1014 were employed by WCGHW or CCT Health. Of these, 368/921 (40.0%) were aware of SPV, and 185/368 (50.0%) were using SPV.

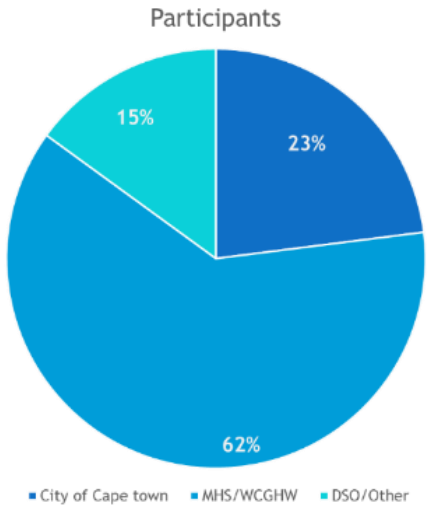

Figure 1. Representation of participant type per employer.

4.2. Participant composition and representation

Staff were well represented across the three categories (clinical, management, support) employed by the different health authorities. The aim was to reach 20% of staff across categories, from cadres with employment figures available. *Table 1* includes an overview of the targeted sample as well as the sample reached for select cadres of staff[11].

Table 1. Staff participation sampled

Role	Staff employed in Metro	Target for selected staff cadres	CCT Health +WCGH Achieved
Managers	304	61	87
Clinical Medical officers	722	144	136
Professional Nurse/Clinical Nurse practitioners	1645	329	349
Enrolled Nurse/Enrolled Nursing Assistant/Staff nurse	1845	369	229
Support: Health Information officer/admin clerk: info man & Administrators	1224	244	313
Pharmacy/ pharm asst/ post basic	500	100	112

[11] Combined categories reported, as was made available.

For participants in the survey, clinical staff comprised the largest category across employers, including 207/334 (61.9%) of CCT Health staff, 632/892 (70.9%) of at WCGHW, and 149/209 (71.3%) DSO/other staff. Support staff comprised 86/334 (25.7%), 189/892 (21.1%), and 38/207 (18.4%) at CCT Health, WCGHW and DSO/other facilities respectively (*Figure 2*).

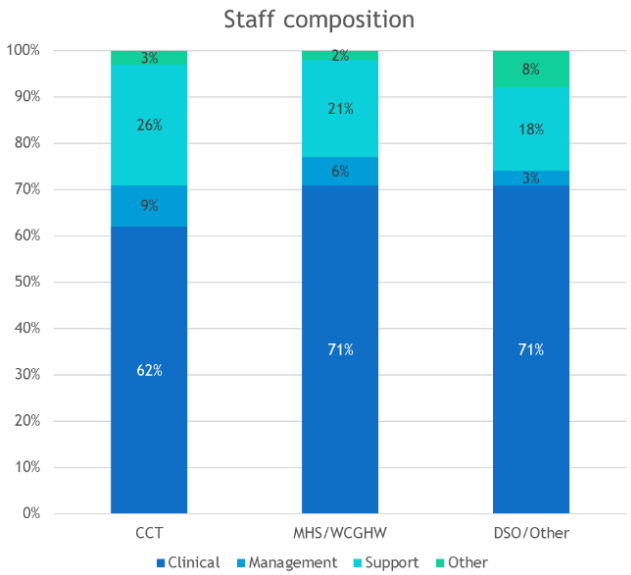

Figure 2. Staff Composition

A breakdown of all health worker cadres per role and employer is provided in *Table 2* below. Professional nurses (n = 262), enrolled nurses/enrolled nurse assistants (n = 229) and admin staff (n = 289) were the largest cadres of participants.

Table 2. Job role and employer

Role	Total (n = 1435)	CCT Health (n = 334)	WCGHW (n = 892)	Other (n = 209)
Management				
Clinical manager	**16**	10	5	1
District Programme/Management Support	**6**	3	2	1
Health Information Manager	**11**	1	8	2
Operational manager/Facility manager	**48**	12	36	0
Sub-district Prog. / Management Support	**6**	4	0	2
Clinical				

Allied health professional	**77**	6	60	11
Clinical Nurse Practitioners	**87**	24	55	8
Clinicians (Doctors/specialists)	**136**	23	108	5
Community Health Worker	**32**	3	2	27
Counsellor	**53**	2	2	49
Enrolled Nurse / Enrolled Nurse Assistant	**229**	41	173	15
Pharmacy	**112**	34	71	7
Professional Nurse	**262**	74	161	27
Support				
Administrative Staff	**289**	81	172	36
Health Information Officer	**24**	5	17	2
Other	**47**	11	20	16

Gender

The majority of participant who accessed the survey are female (1160/1435; 80.8%) with a slightly higher percentage of male participants at WCGHW than the other two employers (20.4%). Of all participants, 264/1435 (18.4%) are male, and 11/1435 (0.8%) participants indicated 'other' or preferred not to say (*Figure* 3).

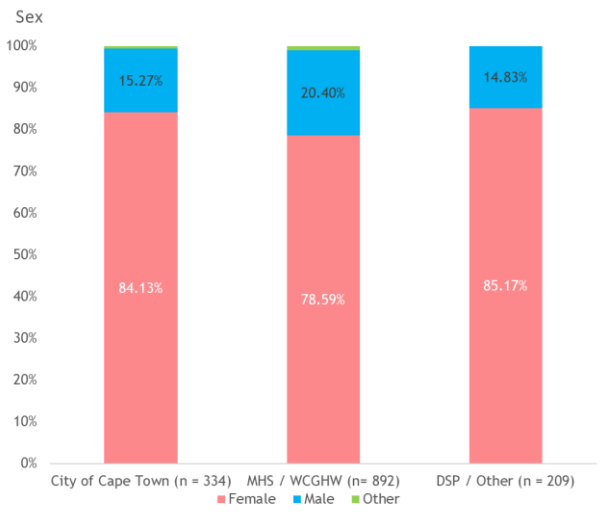

Figure 3. Gender and employer

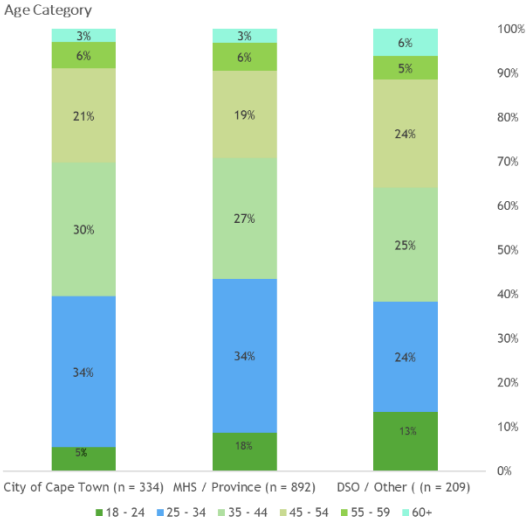

Figure 4. Age and employer

Age

Most participants (875/1435; 60.9%) in the midpoint survey were between the ages of 25 and 44 (*Figure* 4). Of CCT Health employed staff, 64% were in this age bracket, while 61% of WCGHW staff, and 59% DSO/Other staff were in this category.

Employment

Most participants in the midpoint survey have been employed in their current role for more than 10 years (376/1435; 26.2%) with 326/1435 (22.7%) employed in their current role for 6-10 years (*Figure 5*).

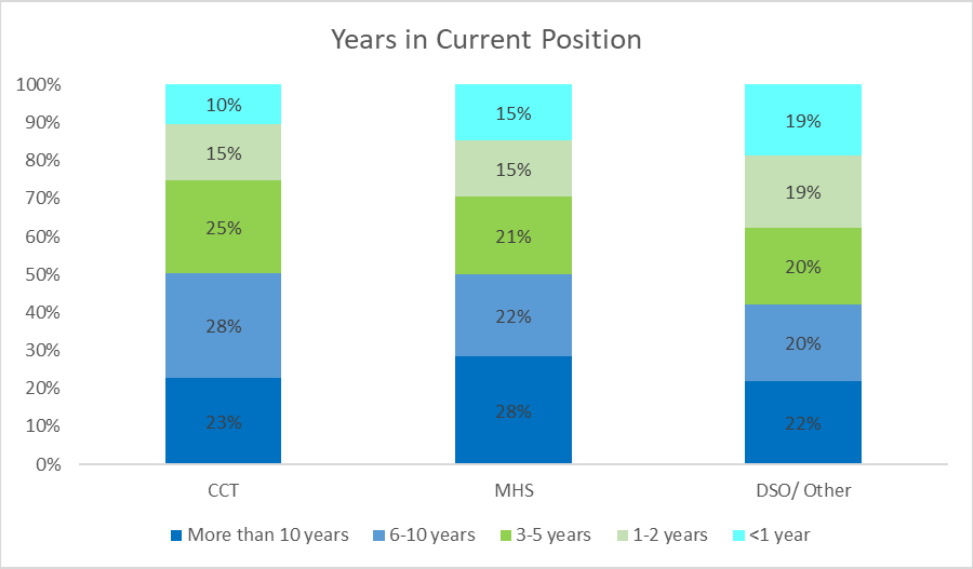

Figure 5. Number of years in current position

4.3. Electronic Health System Usage

Staff categories and their usage of EHIS

How long have health workers been using EHIS

Participants were asked to report on EHIS use. In the midpoint survey, 1036/1435 (72.1%) had made use of EHIS and 397/1435 (27.9%) reported not having used EHIS at all (including 2 non-responses). Of those who reported having used EHIS; 194/1435 (13.5%) had done so for less than a year, 431/1435 (30.0%) for 1 - 5 years, 206/1435 (14.4%) for 6 – 10 years, and 205/1435 (14.3%) for more than 10 years.

When limited to clinical, management, and support participants, 1014/1388 (73.1%) reported making use of EHIS at least some of the time. Of these, 921/1014 (90.2%) were employed by CCT Health and WCGHW facilities and are included for further analysis.

Non-usage of EHIS

Among all clinical worker participants (from all employers) 349/988 (35.4%) reported that they did *not* use EHIS at all. Within this category, the following cadres of health staff had the highest percentage for non-usage: Counsellors (40/53; 75.4%); Community Health Workers (21/32; 66%); and Enrolled Nurse/Enrolled Nursing Assistants (EN/ENA) (135/228; 59.2%). While these cadres are expected to have lower usage of EHIS because of the scope of their duties, there is also low reported use of EHIS amongst Allied Health Professionals (42/77; 54.5%) and Professional Nurses (71/262; 27.1%), indicating that there is scope to include these health workers in future EHIS roll-out initiatives. Medical doctors (clinicians) are the cadre of health staff with the highest reported EHIS usage - 134/135; 99.2% (*Figure 6*).

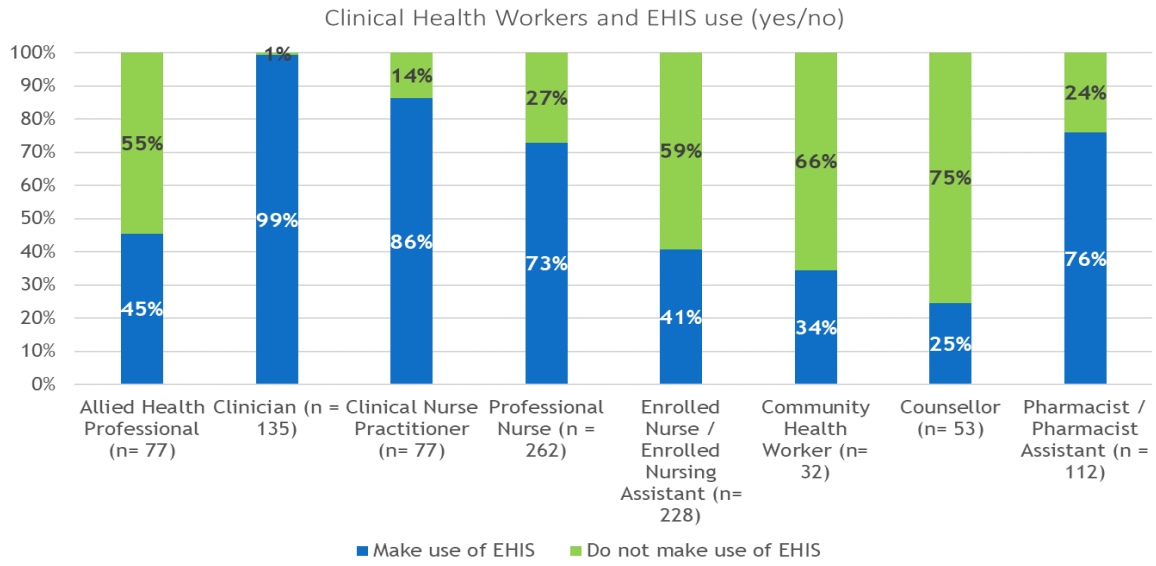

Figure 6. Clinical Workers and EHIS use

Electronic Health Systems Usage

For the remainder of the report, we refer to the 921 clinical, management, and support staff employed by WCGHW or CCT Health, using EHIS.

Rating of own skills

Of EHIS users, 496/921 (53.9%) rated their skills as 'above average' or 'excellent' (*Figure* 7). Of all staff, 354/921 (38.4%) rated themselves as 'average', showing that there is opportunity to improve user confidence and skill. Support staff from CCT Health, 39/84 (46.4%), and support staff from WCGHW 67/197 (34%) were significantly more likely than other staff categories to rate their abilities as 'excellent'.

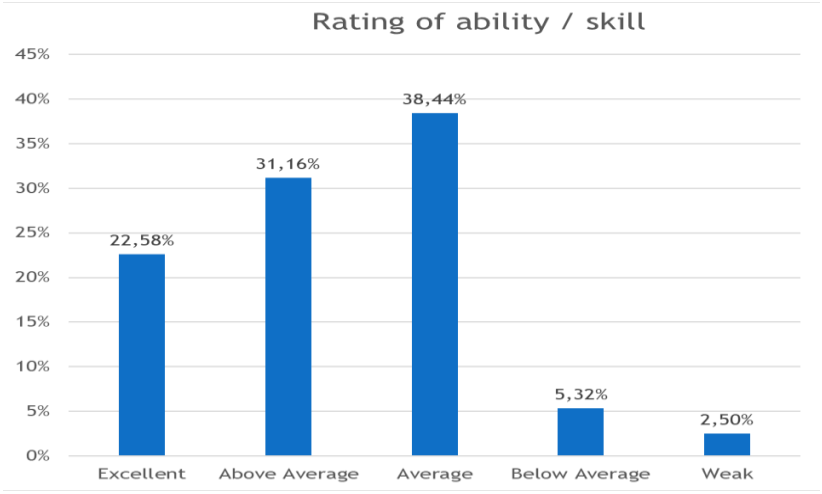

Figure 7. Rating of ability and skill

Likelihood to switch from a paper-based system to an electronic tool

Most health workers (697/921; 75.7%) had a positive response (*eager to use* or *will influence others to use it*) when asked about the likelihood of switching from a paper-based system to an electronic tool, while (210/921; 22.8%) were cautious/hesitant (*will use it if they can see a difference* or d*on't like change but will use if required*). A small proportion (<2%) of staff reported a negative response.

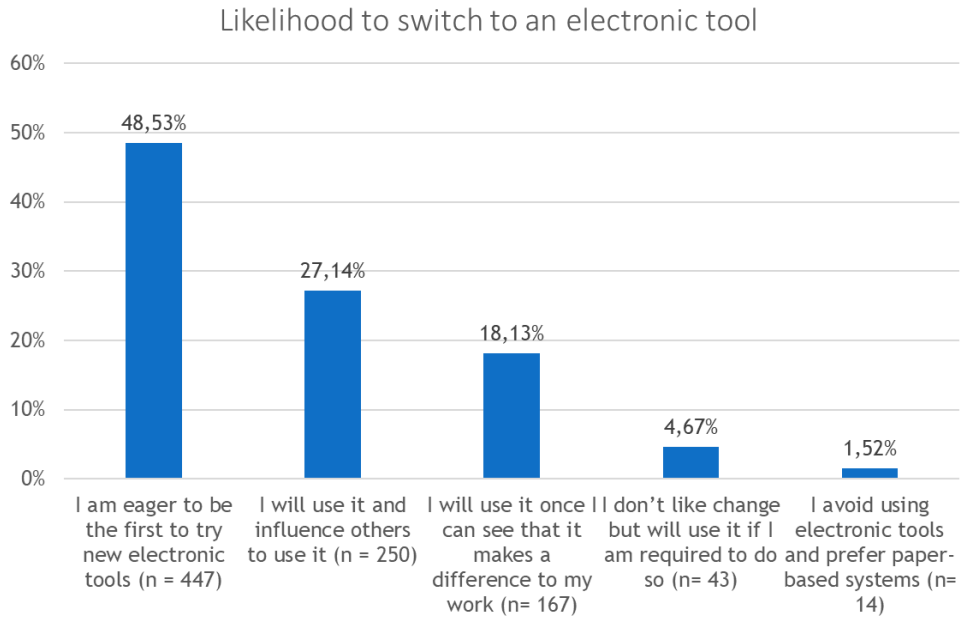

Figure 8. Likelihood to switch to an electronic tool

Reason for using EHIS

Health workers reported making use of EHIS primarily for clinical care (64.3%); to track patients (62.1%); or for admin purposes (52.7%) (*Figure* 8). There were slight differences for using EHIS between CCT Health and WCGHW staff.

CCT Health clinical staff:	Tracking patients (69%)	Clinical care (68%)	Admin (53%)
WCGHW clinical staff:	Tracking patients (55%)	Clinical care (81%)	Admin (35%)

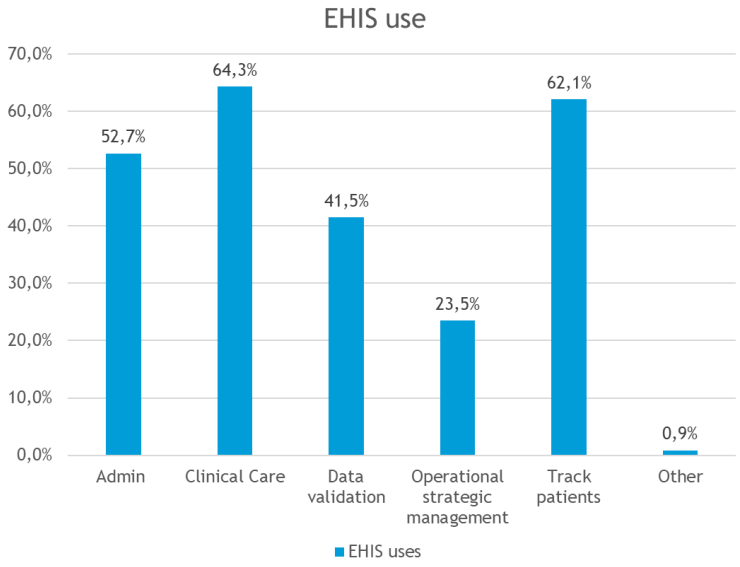

Figure 9. Reason for using EHIS

EHIS systems used

Health workers were provided with a list of 14 EHIS systems, including Single Patient Viewer (SPV), and asked to indicate the systems that they made use of (multiple options possible). NHLS received the highest response rate (519/921; 56.4%), followed by PREHMIS (314/921; 34.1%) and PHCIS (302/921; 32.8%).[12] PREHMIS is used almost exclusively by CCT Health staff - 244/277 (88.1%)

[12] When asked about systems use at this point in the questionnaire, 197 clinical, management, and support staff from WCGHW and CCT Health reported using SPV. However, when asked about SPV usage in Section 5 of the questionnaire, only 184 users reported using SPV. Responses related to SPV use and knowledge are based on the SPV usage response in Section 5 (n = 184).

participants from CCT Health indicated that they used PREHMIS. PHCIS is used in WCGHW facilities - 279/644 (43.3%) of WCGHW clinical, management and support staff indicated that they used this system. The combined EHIS usage is reported in *Figure 10*.

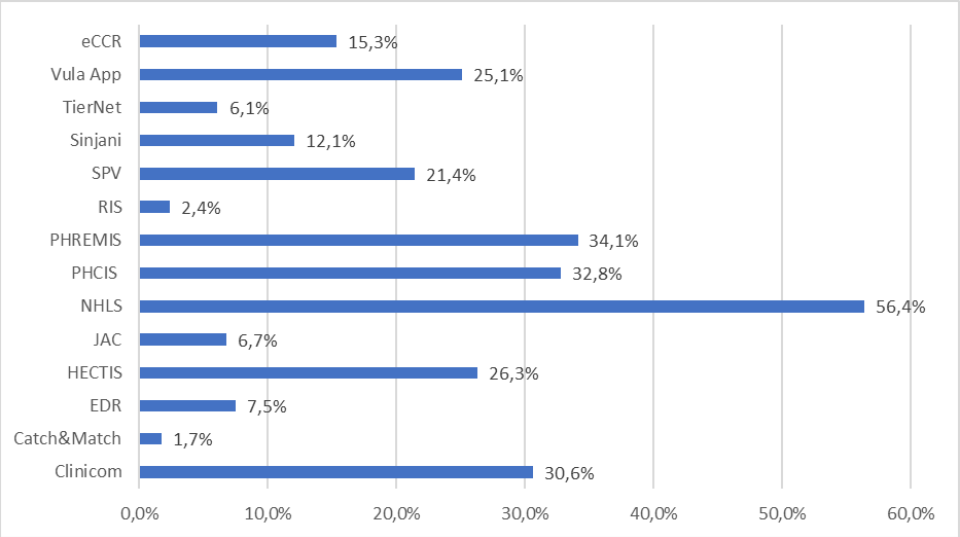

Figure 10. EHIS systems used

4.4 EHIS: perceived usefulness and perceived ease of use

Clinical, management, and support EHIS users employed by WCGHW and CCT Health reported on perceived usefulness, were asked to compare EHIS to paper-based systems, reported on ease of use of EHIS, as well as training, support and access.

Perceived usefulness of electronic health information systems

Participants reported overall positive responses to perceived ease of use of EHIS. More than 90% of participants noted that EHIS makes it easier for them to do their work (860/920; 93.5%), improved the quality of their work (856/921; 92.9%) and helped them to access information quickly (887/920; 96.4%). This was the experience of health workers across categories (*Figure 11*).

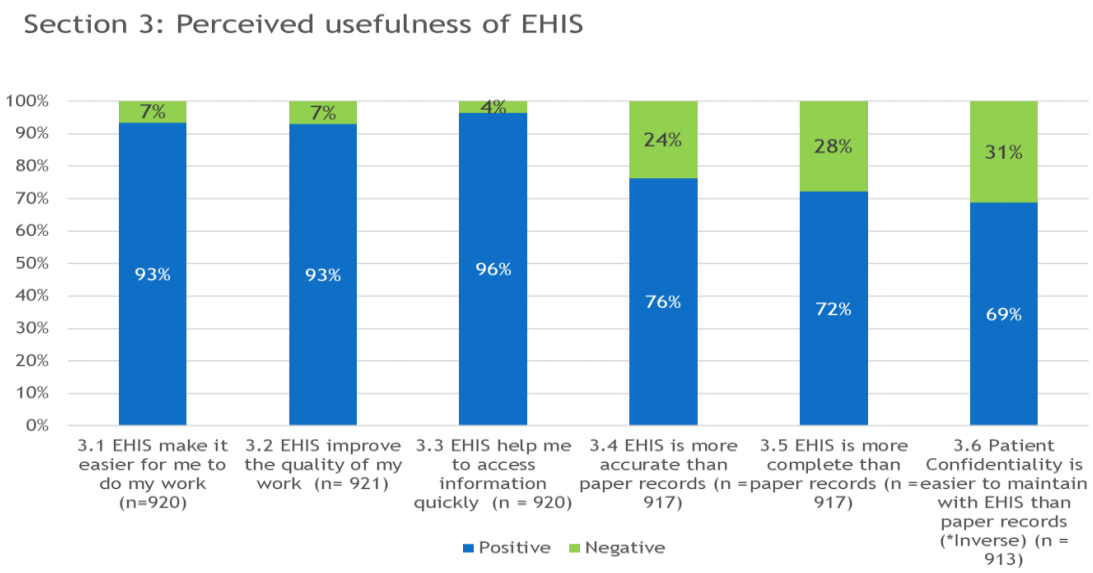

Figure 11. Perceived Usefulness of EHIS

Comparing EHIS to paper-based systems

Regardless of the positive response to ease of use, more than a quarter of participants reported some concerns when comparing EHIS to paper-based systems, indicating that, at least for some, paper is still seen as a more reliable form of record keeping (see *Figure 11* above). Overall, 700/917 (76.3%) reported that EHIS is more accurate than paper records; 662/917 (72.2%) participants reported that EHIS is more complete than paper records; and 628/913 (68.8%) reported that patient confidentiality is easier to maintain with EHIS than paper records.

Perceived ease of use of EHIS

More than 90% of health workers reported that EHIS is easy to use (832/921; 90.3%) and that they found it easy to learn to use EHIS (833/921; 90.4%). However, 22.2% (18/81) health workers aged 55 and older had negative response to 'easy to learn EHIS' (p-value: <0.05). It should also be noted that 1 in 6 (149/921; 16.2%) health workers reportedly felt anxious about using EHIS (*Figure 12*).

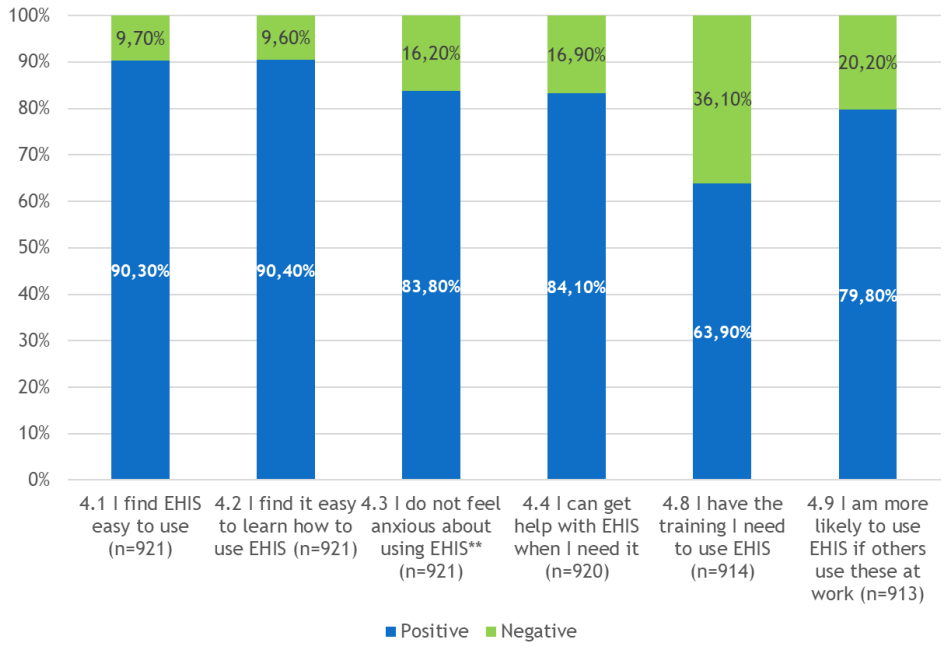

Figure 12. Perceived Ease of Use

Training and Support

In addition to ease of use, participants also reported on training received and support available when using EHIS. More than a third of participants (330/914; 36.1%) noted that they did not have the training they needed to use EHIS. Clinical staff specifically noted that they needed more EHIS training – 259/578 (44.8%) reported that they did not have the needed *training*. In addition, 146/920 (15.9%) of participants reported that they did not have the needed EHIS *support* (*Figure 12* above). The data also showed that staff would be more inclined to use EHIS if their colleagues did as well - 729/913 (79.8%).

Training is associated with perceived usefulness of EHIS, as participants who reported that they did not have the training they needed, reported significant negative responses to items on perceived usefulness of EHIS (see *Table 3*).

Table 3. Relationship between perceived usefulness and training

	HW reporting that they do not have the training they need to use EHIS [Negative responses]	p value
3.1 Electronic health information systems make it **easier** for me to do my work	43/330 (13,03%)	<0.0001
3.2 Electronic health information systems improve the **quality** of my work	37/330 (11, 21%)	0.0001
3.3 Electronic health information systems help me to access information **quickly**	20/330 (6,06%)	0.0008

When considering factors that impacted anxiety around using EHIS, it was found that there was no significant relationship between training and feeling anxious (see *Table 4* below).

Table 4. Relationship between training and anxiousness

	HW reporting ANXIOUS when using EHIS [negative responses]	p value
4.8. I have the training I need	55/149 (19,46%)	0.7699

Access to infrastructure

Access to EHIS is dependent on access to available time, computers, and internet. During the midpoint survey, almost a third of participants indicated that they did not use EHIS as often as they would like due to time constrains (314/918; 34.2%); lack of access to a computer (328/918; 35.7%) and internet (400/915; 43.7%) (Figure 13). Anecdotally, participants noted that planned power outages (loadshedding) also hindered access to EHIS, as not all facilities had access to generators or alternative power sources.

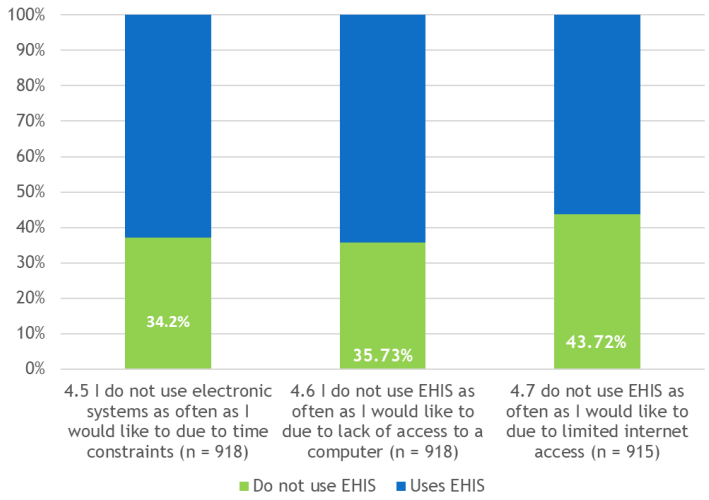

Figure 13. EHIS Access

4.5 SPV usage and training

Awareness and usage of SPV

All EHIS users were asked about awareness and use of SPV (where 'use' refers to indicating 'yes' when asked if they used SPV). Of clinical, management, and support staff employed by WCGHW or CCT Health, 368/921 (39.6%) reported that they were aware of SPV and 184/921 (19.98%) reported using SPV. SPV usage and awareness is relatively low across CCT Health and WCGHW facilities, however, usage appears to be consistent amongst clinical health staff cadres from baseline to midpoint (*Table 5*).

Table 5. Comparison of SPV Awareness between the baseline and midpoint Survey

	Baseline (Oct 21 – Jan 22)		Midpoint (Nov 22- Jan 23)	
SPV users (CCT Health, WCGHW)	299/1358	22%	184/921	20%
Management	84/312	27%	24/76	32%
Clinical	134/533	25%	144/582	25%
Support	79/513	15%	16/263	6%

Perceived usefulness of SPV

Health workers using SPV reported a positive response to perceived usefulness of SPV (*Figure 14*). The majority of participants (174/183; 95.1%) reported that SPV helped manage patients better, and 177/184 (96.2%) that SPV is useful for getting patient information from other facilities while 79.8% reported that SPV is user friendly.

There was a lower positive response for "*SPV is useful for following up on missing lab results*" - 123/184 (67%) and for "*SPV is useful for drawing reports*" - 123/183 (66.8%), although these functions are cadre specific. For instance, only half of health who work in hospital settings reported that "*SPV is useful for finding lab results*". Related, 30% of WCGHW employed staff reported that SPV is useful for finding lab results. However, 42/182 (23%) of health workers reported that SPV is "slow".

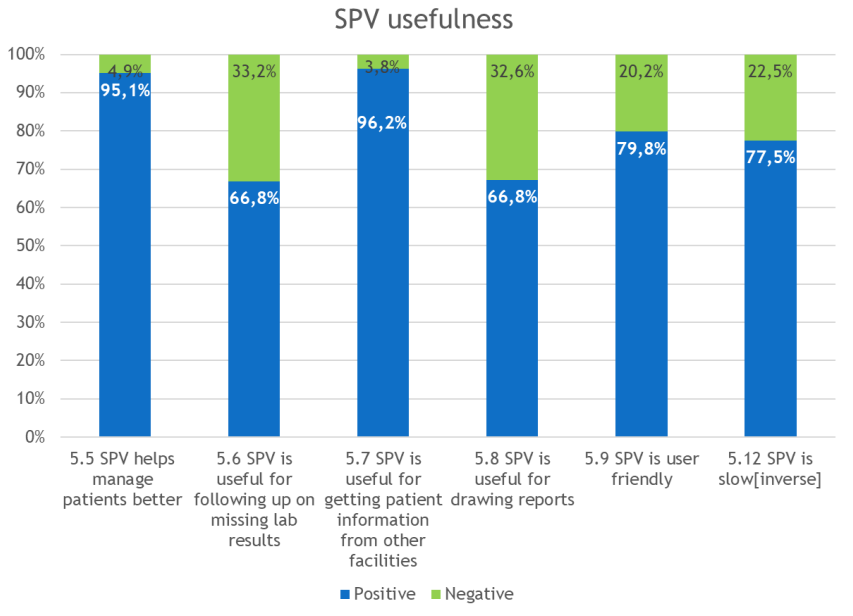

Figure 14. Perceived usefulness of SPV

SPV use and support

While health workers reported mostly positive responses to SPV usefulness, >70% (130/181) of SPV users reported that they did *not* use SPV to its full capacity, indicating that health workers are aware that SPV can be better utilised. In terms of support, health workers using SPV reported that they would use it more if (a) if there was someone available to support with queries (101/181; 55.8%) and (b) they received feedback on SPV use (80/101; 44.2%) (*Figure 15*).

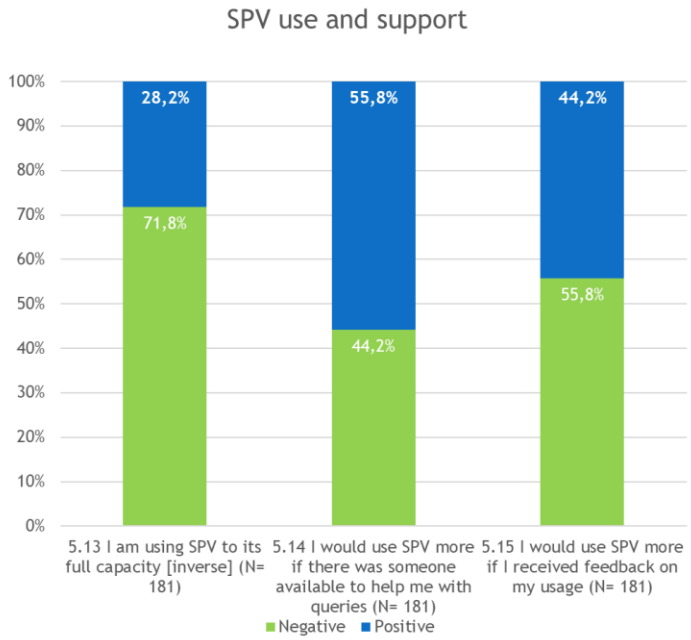

Figure 15. SPV Support

SPV as the norm

To explore to what extend SPV has been integrated into facilities, health workers were asked if SPV has been established as the norm for either clinicians or managers (*Figure 16*).

Norm amongst clinicians

Among SPV users, 110/182 (60.4%) reported that SPV was established as the norm for clinicians. While 86/143 (60.1%) of clinical workers reported that SPV was the norm amongst clinicians, 11/23 (47.8%) of managers reported that SPV was the norm among clinicians.

Norm amongst managers

Among SPV users, 53/182 (29.1%) had a positive response when asked if SPV has been established as a *norm for managers***,** which means that more than 70% of SPV users do not see it as the norm amongst managers. Specifically, 32/143 (22.4%) of *clinical staff* report that SPV is the norm amongst

managers. However, 10/23 (43.5%) of *management staff* reported that SPV is the norm amongst managers.

Manager support of SPV

112/182 (61.5%) of SPV users had positive responses when asked if "*the use of SPV is strongly supported by management*". This means almost 40% of health workers did not report that SPV was strongly supported by management. Specifically, only 78/143 (54.5%) of clinical staff report that SPV is supported by managers. However, 20/23 (87%) of management reported that SPV is supported by managers.

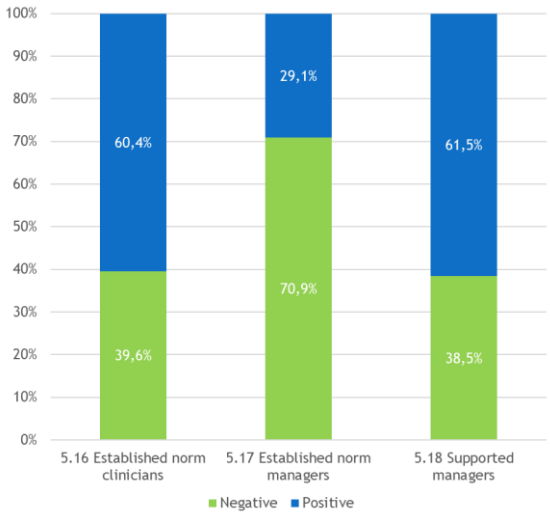

Figure 16. SPV as the norm in facilities

SPV use and training

Only 133/368 (36%) of health workers *aware* of SPV had received training (including in the last two years, or more than two years ago). Of health workers using SPV, 83/184 (45.1%) did *not* receive training and 17% of health workers who have received SPV training (including in the last two years, or more than two years ago) reported *not currently using SPV* (*Table 5*). Separately, more than half of health workers using SPV report that they do *not* have the training they need to use SPV (*Figure 17*). Specifically, 62% of clinical staff reported that they did not have the training they need.

Table 6. SPV Use and training

5.3 Have you received training on the use of the SPV?	SPV user (No) n = 184	SPV user (Yes) n = 184
No	152 (83%)	83 (45%)
Yes (in the last 2 years)	26 (14%)	84 (46%)
Yes (more than 2 years ago)	6 (3%)	17 (9%)

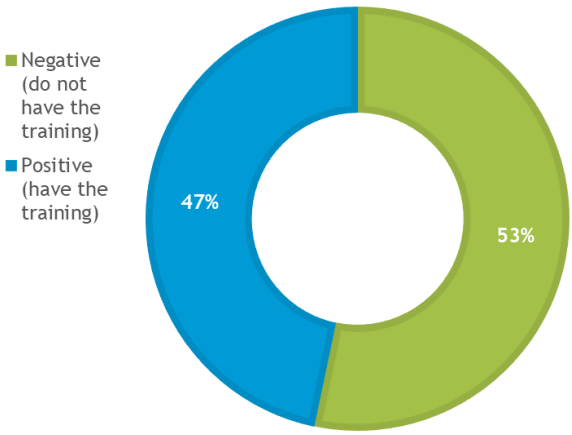

Figure 17. SPV training needed to use SPV

Health workers who reported to have received adequate SPV training (*Figure 17*) were significantly more likely to report that SPV was useful to manage patients (82/86; 95.4%. p-value: 0.02), and for drawing reports (66/87; 75.9%. P-value: 0.01) than those who didn't report having received adequate training.

5. Comparison of Baseline Survey (Round 1) to Midpoint Survey (Round 2)

We provide an overview of data from baseline to midpoint, although, as noted above, caution is needed as sampling and the data collection strategy differed between R1 and R2 and there were limitations to the baseline dataset.

Participants

The baseline survey yielded 1974 healthcare worker responses. The majority of these responses came from staff in administrative positions while clinical staff such as nurses and doctors were

underrepresented. For the midpoint survey, 1435 surveys were completed, with clinical staff making up the largest proportion of participants.

Compared to the baseline survey, more clinical staff participated in the midpoint survey:

Baseline:	Clinical (35%)	Management (20%)	Support (44%)
Midpoint:	Clinical (71%)	Management (6%)	Support (21%)

Participants gender profiles were similar from CCT Health, although more female participants participated from WCGHW and other/DSOs:

Baseline female:	CCT Health (83%)	WCGHW (69%)	Other (71%)
Midpoint female:	CCT Health (84%)	WCGHW (79%)	Other (85%)

Similarly, most participants for both rounds were between the ages of 25 and 44. From CCT Health staff, 67% were in this age category at baseline while 64% were in this age category at the midpoint survey. Similarly, 58% of WCGHW staff were in this category at baseline compared to 61% at midpoint.

EHIS usage

During the baseline survey, 1485/1974 (75.2%) of all participants indicated that they used EHIS,[13] compared to 1036/1435 (72.1%) of all participants during the midpoint survey. In the baseline, there were 1378 EHIS users (clinical management and support staff) employed by CCT Health or WCGHW compared to 921 users in the midpoint survey.

During the baseline, participants reported that they used EHIS primarily for clinical care (46.4%) or to track patients (47,9%). In the midpoint survey, health workers reported making use of EHIS primarily for clinical care (64.3%) and to track patients (62.1%).

In terms of skills and ability, responses were fairly consistent. During the baseline survey, 57% of participants indicated that they considered their EHIS skills to be above average or excellent, compared to 54% of participants in the midpoint survey. Related, 35% of participants rated themselves as 'average' in the baseline survey, compared to 38% of participants in the midpoint survey.

EHIS: Perceived usefulness comparison

When clinical, management, and support staff from CCT Health and WCGHW using EHIS were asked to report on the *perceived usefulness* of EHIS, feedback was consistently positive in both baseline

[13] Excluding participants who left the remainder of the survey blank

and midpoint surveys (see *Figure 18* below), with >90% reporting that EHIS makes their work easier, improves the quality of their work, and that it helps to access information quickly.

However, in both the baseline and the midpoint surveys, health workers noted concerns about EHIS when compared to paper-based systems in terms of confidentiality, accuracy, and completeness. There were no discernable differences between staff categories across items, with the exceptions of "*EHIS is more complete than paper records"* where management staff reported lower levels of agreement in both baseline and midpoint surveys – baseline: 182/290; 62.8% and midpoint: 50/76; 65.8% - compared to the average of baseline 66% and midpoint 72%. However, the improvement in "*EHIS is more accurate than paper records"* was more noticeable in clinical workers (baseline 63.5% to midpoint 77.1%) than in management staff (baseline 64.4% to midpoint 72.3%) and support staff (baseline 73.6% to midpoint 75.9%)

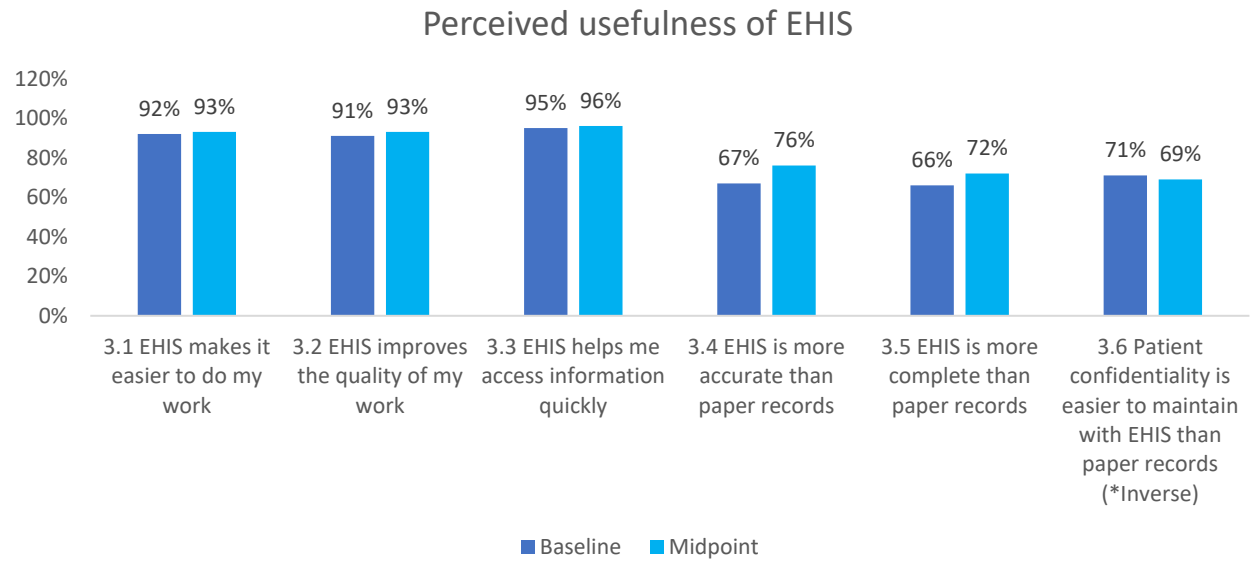

Figure 18. Perceived Usefulness of EHIS

EHIS: Perceived ease of use comparison

When asked about perceived ease of use of EHIS, responses from participants were fairly consistent, with slightly more positive responses for items "*EHIS is easy to use*" (86% in baseline vs 90% in midpoint), "*not feeling anxious"* about using EHIS (74% in baseline vs 84% in midpoint). This was most notable for clinical staff where positive responses increased from 75.2% in baseline to 86.1% at the midpoint survey.

In terms of training and support, there has been a slight increase in participants noting that they can "*get help with EHIS when needed*" (81% in baseline vs 84% in midpoint) as well as reported *training* received for EHIS (59% in baseline vs 64% in midpoint survey). The increase in "*I have the training I*

need to use EHIS" is most notable for management staff, where positive responses increased from 51.4% in baseline to 70.7% at midpoint survey.

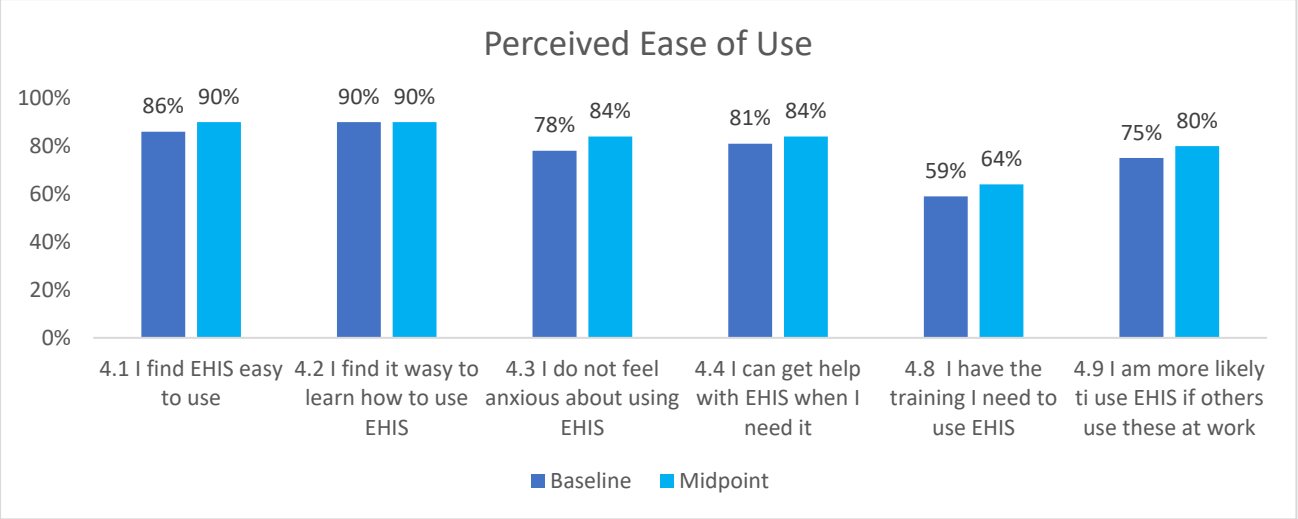

Figure 19. Perceived Ease of Use

**To note: 4.3 is phrased differently in the Baseline Survey and the inverse is reported.*

SPV usage: Comparison

During the baseline survey, 627/1974 (31.8%) participants reported awareness of SPV, of which 299/672 (44.5%) participants reported that they were using SPV. At the midpoint survey, 368/1435 (25.6%) health workers reported that they were of SPV, and 184/368 (50%) reported that they were using SPV.

There was a slight increase in positive responses from participants from baseline to midpoint in terms of attitudes towards SPV use, although there are limitations to the small sample. Of participants who indicated that they use SPV, 76% reported that SPV is user-friendly and that it helps them to: Manage their patients better (87%), get information from other facilities (90%) find lab results (77%), access management reports (73%). Management staff specifically had increased positive responses to *SPV helps manage patients better* (baseline: 75.6% to 87.5%); while both management and clinical staff had increased positive responses to *SPV is not slow* (management: 45.8% to 73.9%; clinical: 45.5% to 78.3%). While both clinical and management staff indicated improved positive responses to "*SPV is user friendly"*, there was a decrease for support staff (93.1% to 75%).

Comparatively, in the midpoint survey, 80% reported that SPV is user-friendly and that it helps health workers to: manage their patients better (95%), get information from other facilities (96%), and drawing reports (80%). There was a slight decrease in SPV users reporting that SPV is useful for following up on missing lab results (67%). The most notable decrease for *following up lab results* was among support staff (baseline 85.9% to 68.8% at midpoint).

SPV: Baseline vs Midpoint

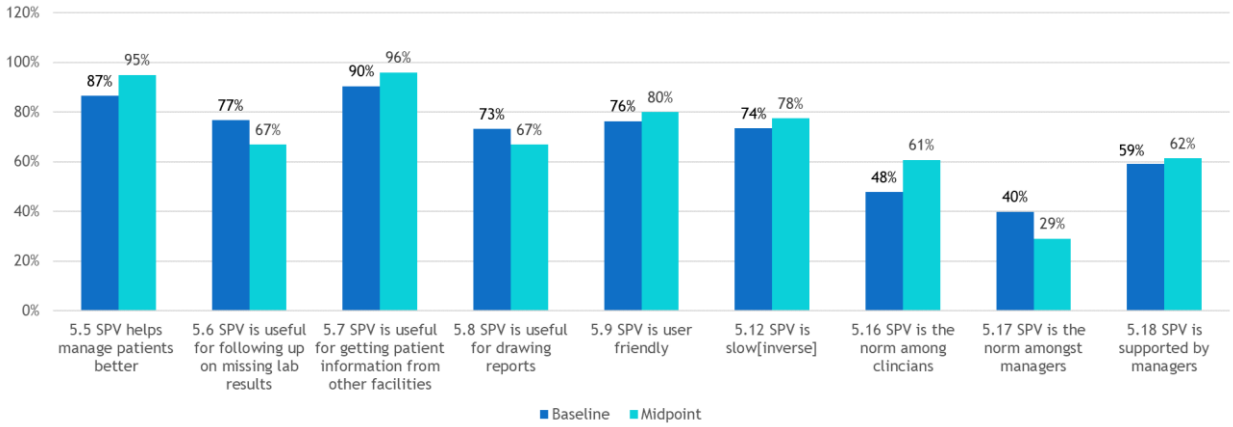

Figure 20. SPV Baseline vs Midpoint

Baseline: 299 users of SPV (clinical, support, management, from MHS/WCGHW + CCT)
Midpoint:184 users of SPV (clinical, support, management, from MHS/WCGHW + CCT)

6. Discussion

During the midpoint survey, 1435 health workers completed the survey. Clinical, management, and support staff made up the majority of participant (1388/1435; 96.7%). Although more than 70% of health workers (1036/1435; 72.1%) reported that they used EHIS at least some of the time, amongst clinical staff participating in the survey, almost one third did not use EHIS at all (349/988; 35.4%), showing a gap in EHIS usage. Some cadres of staff had low levels of EHIS because of the scope of their duties (for instance, Community Health Workers – 34%, Enrolled Nurse Practitioners - 41%). However, Allied Health Professionals (42/77; 54.5%) and Professional Nurses (71/262; 27.1%) also had relatively lower response rates. This indicates that there is scope to include these health workers in future EHIS roll-out initiatives.

Access to infrastructure continues to present a challenge to health workers. More than a third of participants indicating that they did not use EHIS as often as they would like due to lack of access to a computer or limited internet. Clinical workers (>50%) specifically noted that lack of access to internet prohibited EHIS use, although this was also conflated with challenges related to access to electricity because of rolling electricity blackouts (loadshedding).

For clinical, management, and support staff from CCT Health and WCGHW, the overall perceptions of EHIS *ease of use* and perceptions of *usefulness* for EHIS was positive, yielding >90% across several measures. However, while it has increased slightly from baseline to midpoint, almost a quarter of health workers noted that paper-based records were seen as more accurate, complete, and confidential than EHIS, indicating that there is a need to highlight the reliability and value of EHIS during training sessions. Overall, there was an association between training and perceived usefulness of EHIS, which shows that training continues to be beneficial to users.

Findings showed that close to 1 in 6 (16%) of EHIS users reported feeling anxious about using EHIS. When considering factors that impacted anxiety around using EHIS, there was no significant relationship between training and feeling anxious. This means that current training is *not* addressing anxiety that health workers feel when using EHIS and that additional measures need to be taken to help health workers with confidence in using EHIS. This is especially relevant for older health workers (>55 year) who also reported significant negative response to EHIS is 'easy to learn' (18/81; 22.2%).

In terms of SPV awareness and use, there is still a notable gap and opportunity for efforts to communicate the value and applicability of SPV for health workers across cadres. While <20% of health workers were aware of SPV, only half of health workers aware of SPV was using the programme. Health workers using SPV had mostly positive responses in terms of the ease of use and usefulness of SPV. While SPV training should be adapted to address the specific needs and requirements of different health cadres, the data highlight that there is opportunity to focus on SPV use for lab results, specifically in hospital settings, where the positive responses were slightly lower when compared to participant feedback on other SPV functions. Notably, more than 70% of staff noted that they were not using the programme to its full capacity.

There were also gaps in terms of training: several health workers (17%) who received training for SPV were not using the programme. This could be either due to lack of access to computers, or, as informally reported, several health workers not having access to their own user profile. Almost half of health workers using SPV did not receive any training, indicating that informal or self-training is taking place. Half of health workers using SPV indicated that they would use it more if (a) if there was someone available to offer support and (b) they received feedback on their usage, highlighting the importance of support when implementing new systems.

The data also showed the extent to which SPV has been established as the norm for use in health facilities. We found that, although clinical users reported, at least to some degree (i.e., 60%), that *SPV is the norm for clinicians*, more than half of management reported that it is *not the norm*

amongst clinicians. Additionally, SPV is *not* reported as the established norm for managers, either by clinicians or management which shows that clinicians do not see managers using SPV as the 'go-to' programme and managers do not use SPV as their programme of 'choice'/'norm'.

Importantly, almost half of clinical staff report that SPV is not supported by management. However, management staff report that they are supportive of SPV use (>80%). This could reflect that managers are generally supportive of the use of SPV, but that SPV is not routinely used, due to other factors (access, roll-out, uptake by staff, or other). Overall, the role out of SPV and establishing SPV as the norm is a process that is likely to take time. The findings suggest that SPV training should focus on management staff (top-down approach) to help establish the notion that SPV should be used as the norm for all groups – clinicians and managers.

7. Recommendations

Based on the findings of from the midpoint survey, the following recommendations were co-developed with representatives from CCT Health, WCGHW and THF:

1. Communication surrounding EHIS should enhance confidentiality and accurate information as this was noted as a concern among health workers.
2. As there are different training needs at both CCT Health and WCGHW facilities, training should be tailored to the needs of those facilities and the different staff cadres.
3. Training should also be implemented with all newly appointed staff within a specific timeframe (e.g., within 6 months of a health worker starting at a facility).
4. Health workers highlighted the need for support. Standard operation procedures (SOPs) should be put into place as a first point of reference for any health worker looking to access EHIS (including SPV).
5. A contactable individual should also be identified that would be able to assist health workers should they need help/assistance with EHIS.
6. Clear communication on the impact of EHIS on workflow should be shared, specifically through directives from governance structures.
7. Training programmes should be tailored to staff needs at facilities. Practical sessions should be encouraged where health workers are able to have an interactive session between the trainer and EHIS in order to alleviate anxiety related to using EHIS.

SPV training

1. Follow-up mentoring and support should be made available to staff that have been trained.
2. Training offered for new cohorts should be customised to fit their needs and priorities.

3. Support pathways should be identified within facilities for users that require assistance. Staff should also be aware of who they can contact should they need additional help or IT assistance/ support.
4. Recommendations to the PHDC and for policy changes needs to be considered at an organisational level. Management is key in the implementation plan as they are able to facilitate/ encourage staff buy in.
5. The current usage guides for SPV need to be updated.
6. Ensuring that health staff have access to their own user profiles/accounts.
7. Health system awareness on good practice measures need to be incorporated into training (e.g.: prohibiting usage of login credentials that are not yours)

Connectivity and EHIS Access

1. Revisit audit of available infrastructure to identify facility-specific needs (computers, internet, laptops, etc.)
2. Revise Policy which allows for a wider range of staff cadres that have access to cell phone allowance to allow them to access the EHIS platforms via usage of their own devices (especially in instances where facilities are impacted by loadshedding).
3. Develop a loadshedding-readiness plan with key implementation partners.

8. Next steps

In anticipation of the final round of the SciP study (2024), the questionnaire will be adapted to better capture barriers to EHIS usage, challenges related to SPV training, and information on access to user profiles. The final report will be made available in Q2 of 024.

Appendix A. SciP KAPS Midpoint Survey

'Scaling Data use to Improve Patient Care' - Data Use Survey

This survey is being undertaken by The Health Foundation (THF) in collaboration with the Desmond Tutu TB Centre (Stellenbosch University). It is part of the Western Cape Government: Health (WCGH), Metro Health Services (MHS) and City of Cape Town (CCT) project *'Scaling Data use to Improve Patient Care'*. The survey aims to develop an understanding of people's use of electronic health information systems. The survey results will be used to improve the design and use of these systems, to make your work easier and to enable better patient care.

We invite you to take part in the survey through completion of an online questionnaire. Your participation is entirely voluntary, and you are free to decline to participate or to stop completing the questionnaire at any time. We do not anticipate any risks with you taking part in the survey. The survey should take about 15 minutes.

The Desmond Tutu TB Centre (Stellenbosch University) will administer the survey and analyze the results. Your **individual responses will remain confidential** and will not be shared with anyone. Only summary data will be shared. We ask you to be as honest as possible in your responses so that WCGHW, MHS and CCT can address your needs more effectively.

By clicking START SURVEY you are confirming that you:
- Are over 18 years old;
- Have read and understood the above explanation about the study;
- Agree to participate in the survey; and
- Consent to the information you provide being used by researchers to evaluate changes in the use of electronic health information systems over time

Section 1: Participant Profile – Please provide us with some background information about you		
1.1	Who is your employer?	☐ Metro Health Services / Provincial Department of Health, Western Cape Government Health and Wellness ☐ City of Cape Town ☐ District support partner (NGO, CBO, NPO) ☐ Other (specify)_____
1.2	Where do you spend most of your time at work?	☐ Hospital ☐ Clinic / CDC / CHC (Community Day / Health Centre) ☐ Community-based services ☐ Sub-district / sub-structure / district office

		☐ Provincial office
1.3	Which of these most closely reflects your job description? (select one)	☐ Operational Manager/Facility manager/assistant facility manager ☐ Clinical Manager ☐ Health Information Manager ☐ District Programme / Management Support ☐ Sub-district Programme / Management Support (e.g. trainers, HAST coordinators) ☐ Clinician (doctor, including specialist) ☐ Clinical Nurse Practitioner ☐ Professional Nurse ☐ Enrolled Nurse / Enrolled Nurse Assistant / Other Nurse ☐ Administrative Staff (clerks, reception, data capturer, finance) ☐ Health Information Officer / Information Management Officer ☐ Community Health Worker / CHW Supervisor / CHW Team Leader ☐ Allied health professional (e.g. social worker, physiotherapist, occupational therapist, dentist, nutritionist, oral hygienist, radiographer, psychologist) ☐ Pharmacist / Pharmacist Assistant / Pharmacy Manager ☐ Counsellor (HIV/TB/HAST) / Lay counsellor / Breastfeeding counsellor ☐ Other (please specify)_____
1.4	How many years have you worked in this position?	☐ Less than 1 year ☐ 1-2 years ☐ 3-5 years ☐ 6-10 years ☐ More than 10 years
1.5	Gender	☐ Female ☐ Male ☐ Other ☐ Prefer not to say ☐ Prefer to self-describe
1.6	Please indicate your age at your last birthday	____ years

Section 2: Electronic Health Information System Usage (e.g. PHCIS, PREHMIS, CLINICOM, SPV, Catch & Match)		
2.1	**How long** have you been using electronic health information systems in your work? (skip remainder of questions if "Not at all")	☐ Not at all ☐ Less than 1 year ☐ 1-5 years ☐ 6-10 years ☐ More than 10 years

2.2	Which electronic health information systems do you use? (multiple responses allowed)	☐ PHCIS (Primary Health Care Information System) ☐ PREHMIS (Patient Record and Health Management Information System) ☐ Sinjani ☐ CLINICOM ☐ eCCR (Electronic Continuity of Care Record) ☐ SPV (Single patient viewer) ☐ NHLS (National Health Laboratory Services) ☐ HECTIS ☐ Vula App ☐ Catch and Match ☐ EDR, ETR (Electronic DR-TB, TB Register) ☐ Tier.Net ☐ JAC ☐ RIS (Radiology Information System)
2.3	How would you **rate your ability/skill** in using electronic health information systems?	☐ Weak (minimal skills) ☐ Below average (basic skills only) ☐ Average (comfortable with using systems) ☐ Above average (use systems with ease) ☐ Excellent (advanced skills)
2.4	What is your **most likely response** to switch from a paper-based system to an electronic tool?	☐ I am eager to be the first to try new electronic tools ☐ I will use it and influence others to use it ☐ I will use it once I can see that it makes a difference to my work ☐ I don't like change but will use it if I am required to do so ☐ I avoid using electronic tools and prefer paper-based systems
2.5	What is your main **device for accessing** electronic health information?	☐ Work laptop computer ☐ Work desktop computer ☐ Work smart phone ☐ Work tablet ☐ Personal laptop computer ☐ Personal desktop computer ☐ Personal smart phone ☐ Personal tablet ☐ Other ___(specify)
2.6	How **often do you use** electronic health information systems?	☐ Rarely ☐ A few times a month ☐ A few times a week ☐ About once a day ☐ Several times a day

2.7	What do you use electronic health information systems for? (multiple responses allowed)	☐ For operational / strategic management (e.g., monitoring targets, surveillance) ☐ To track patients (e.g. linkage to care, missed appointments) ☐ For clinical care of patients ☐ For administrative purposes ☐ Data collection / validation ☐ Other____

Section 3: Perceived usefulness of electronic health information systems

Please tell us whether you disagree or agree with the following statements, and how strongly you disagree or agree (from 1=strongly disagree to 5=strongly agree)

		1= Disagree strongly	2=Disagree somewhat	3=Not sure	4=Agree	5=Agree strongly
3.1	Electronic health information systems make it **easier** for me to do my work					
3.2	Electronic health information systems improve the **quality** of my work					
3.3	Electronic health information systems help me to access information **quickly**					
3.4	Patient information is **more accurate** in electronic health information systems than paper records					
3.5	Patient information is **more complete** in electronic health information systems than paper records					
3.6	It is **harder to maintain patient confidentiality** with electronic health information systems than paper records					

Section 4: Perceived ease of use of electronic health information systems

Please tell us whether you disagree or agree with the following statements, and how strongly you disagree or agree (from 1=strongly disagree to 5=strongly agree)

		1= Disagree strongly	2=Disagree somewhat	3=Not sure	4=Agree	5=Agree strongly
4.1	I find electronic health information systems **easy to use**					
4.2	I find it **easy to learn** how to use electronic health information systems					

4.3	I feel **anxious** about using electronic health information systems					
4.4	I can **get help** with the systems when I need it					
4.5	I do not use electronic systems as often as I would like to due to **time constraints**					
4.6	I do not use electronic systems as often as I would like to due to **lack of access to a computer / other device**					
4.7	I do not use electronic systems as often as I would like to due to **limited internet access**					
4.8	I have the **training** I need to use electronic systems					
4.9	I am more **likely to use** electronic systems if **others** use these at work					

Section 5: Single Patient Viewer Usage						
5.1	Are you **aware** of the **Single Patient Viewer (SPV)?** (Skip 5.2 onwards if = "No")	☐ Yes ☐ No				
5.2	As far as I am aware the **Single Patient Viewer (SPV)** can be used for the following: (tick all that are applicable)	☐ Drawing management reports ☐ Viewing the dashboard ☐ Viewing a patient's x-ray ☐ Finding out what medication a patient is on ☐ Identifying Loss To Follow up Up (LTFU) patients that are not yet on treatment ☐ Sending a message to a community health worker ☐ Making telephone calls to patients				
5.3	Have you received training on the use of the **Single Patient Viewer (SPV)?**	☐ Yes (in the last two years) ☐ Yes (more than two years ago) ☐ No				
5.4	Do you use the **Single Patient Viewer (SPV)?** (If no skip 5.5 onwards)	☐ Yes ☐ No				
Please tell us whether you disagree or agree with the following statements, and how strongly you disagree or agree (from 1=strongly disagree to 5=strongly agree)						
		1= Disagree strongly	2=Disagree somewhat	3=Not sure	4=Agree	5=Agree strongly

5.5	SPV helps manage patients better					
5.6	SPV is useful for following up on missing lab results					
5.7	SPV is useful for getting patient information from other health facilities					
5.8	SPV is useful for drawing reports					
5.9	SPV is user-friendly					
5.10	I have the training I need to use SPV					
5.11	I have access to SPV when I need it					
5.12	I find SPV slow to use					
5.13	I am not using SPV as fully as I could					
5.14	I would use SPV more if there was someone available to help me with queries					
5.15	I would use SPV more if I received feedback on my usage					
5.16	SPV use has been established as a norm for clinicians					
5.17	SPV use has been established as a norm for managers					
5.18	The use of SPV is strongly supported by management					

Thank you for participating in the survey.

If you have any questions about the survey, please contact

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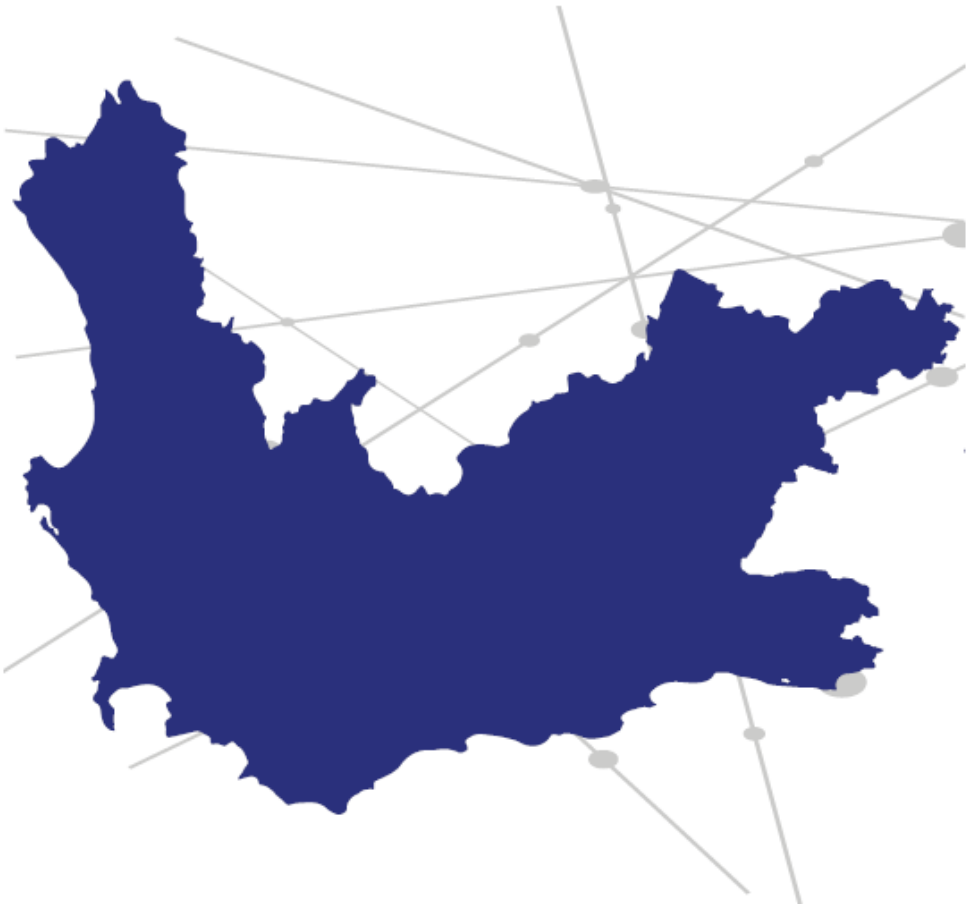

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