Scaling use of health data:
A decentralised approach

Western Cape Government FOR YOU Health and Wellness

THE HEALTH FOUNDATION SOUTH AFRICA

CITY OF CAPE TOWN ISIXEKO SASEKAPA STAD KAAPSTAD

KNOWLEDGE, ATTITUDE AND PRACTICES: ENDPOINT SURVEY: 2024

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

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List of Abbreviations

BMGF	-	Bill and Melinda Gates Foundation
CCT Health	-	City of Cape Town, Health
CDC	-	Community Day Centre
CHC	-	Community Health Centre
CHW	-	Community Health Workers
DTTC	-	Desmond Tutu TB Centre
EHIS	-	Electronic Health Information Systems
EN	-	Enrolled Nurse
ENA	-	Enrolled Nursing Assistant
HCWs	-	Healthcare Workers
HSRC	-	Human Science Research Council
MHS	-	Metro Health Services
NGO	-	Non-Governmental Organisation
NPO	-	Non-Profit Organisation
PEoU	-	Perceived Ease of Use
PHC	-	Primary Health Care
PHDC	-	Provincial Health Data Centre
PU	-	Perceived Usefulness
SPV	-	Single Patient Viewer
TAM	-	Technology Acceptance Model
MHS/WCGHW	-	Western Cape Government: Health and Wellness

Executive summary

The implementation of electronic data systems is key to strengthening healthcare services, improve patient experiences and health outcomes overall. However, research has shown that implementation can be challenging and that health worker knowledge, training, and notably, acceptance of electronic systems can hinder effective uptake. We report on health workers' tracked knowledge of, attitude towards, and perceptions towards electronic health information systems in the Cape Town area after the final round of surveys (endpoint survey).

Baseline survey: The Western Cape Government: Health and Wellness (MHS/WCGHW) (including Metro Health Services (MHS)) and City Health, City of Cape Town (CCT Health), 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, WCGHW, MHS, and CCT Health 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 survey: The 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.

Methods: The study was implemented by the Desmond Tutu TB Centre (DTTC) in partnership with The Health Foundation, WCGHW, MHS, and CCT Health. A multi-round open cohort panel survey of 'knowledge', 'attitudes', and 'practices' was implemented across multiple health facilities in the Cape Town district in the Western Cape province, South Africa. Health workers participated and provided 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) platform. Two rounds of data were collected – during the midpoint survey (2022-2023) and the final, endpoint survey (2024). Data were analysed making use of Software, Analytic and

Descriptive Statistics Programme (SAS).

Midpoint Survey summary (2022- 2023): A total of 1435 participants initiated the midpoint survey and 1036/1435 (72%) made use of EHIS. EHIS were mostly used for clinical management, tracking of patients, and administration. Analysis among EHIS users showed more than 90% of participants found that EHIS were easy to use. One in four participants reported concerns about accuracy, completeness, and confidentiality when comparing EHIS to paper-based systems. More than a third of participants reported that they did not access EHIS due to time constraints, lack of access to a computer, or limited internet access.

Overall, SPV awareness and use was low, with only 184/921 (20%) of all staff using SPV. Of those aware of SPV, 184/368 (50%) were using SPV. 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%). The report highlighted the need for communicating and marketing the benefits of using EHIS and SPV as part of patient management, confirming both the confidentiality and accuracy of EHIS systems; providing targeted education and training across the services; and provide on-site user support, especially with regards to SPV use.

Endpoint Survey summary (2024): A total of 1107 surveys were completed. Most participants were employed by MHS/WCGHW or CCT Health (90%). Of these participants, 74% were clinical staff, 18% were support staff and 6% were management staff. Participants were mostly female (>75%) and in the 25-44-years-old age bracket.

There was increase in EHIS usage from the midpoint survey. Users who did not use EHIS reported mostly that they did not need it as part of their job. Barriers to EHIS usage, including time constraints (29%) and access to computers (26%) persist, although the most notable challenge is the reported lack of access to internet services as 42% of participants reported that they had limited internet access. EHIS is used primarily for clinical care (73%), tracking patients (72%), admin purposes (59%) and 80% of HCWs make use of desktops. However, 6% of HCWs also make use of their personal phones to access EHIS, which might be driven by limited internet access.

Of the 16 EHIS options presented to HCWs, the three platforms with the highest reported usage were NHLS (62%), followed by SPV (51%) and PREHMIS (37%). This was a marked

increase for SPV from the midpoint survey, where 20% of users reported using SPV.[1] PREHMIS use is driven primarily by CCT Health staff, as 91% of HCWs use the platform.

Perceived usefulness of EHIS and ease of use remains high (>90%), although ~1 in 4 participants still felt that paper records were either more accurate, complete, and confidential than electronic records. However, confidence in EHIS completeness was higher among CCT Health staff (78%) than MHS/WCGHW staff (69%). In terms of training and support, 85% of HCWs reported that they could get help with EHIS when needed, and 72% reported that they had the training they needed – an increase from 64% at the midpoint survey. ~90% of EHIS users reported that they understood the principles of quality improvement, used it in their day-to-day activities, and as part of their job.

There has been a notable increase in awareness and usage of SPV. When probed about awareness of SPV, 72% of HCWs noted that they had heard of the platform – an increase from 40% at the midpoint survey. Of all HCWs, 50% were using SPV, more than double HCWs at the midpoint survey. Notably, of those aware of SPV, 69% were using the platform.

While SPV awareness and usage has increased, there are still several gaps. Most (88%) of HCWs reported that they have access to SPV when they need it. However, 61% of HCWs reported that they are not using SPV to its full capacity and 60% felt that they would use SPV more if they received feedback on their usage. However, the impact of training was also visible. When comparing those with and without SPV training, HCWs who were trained were more likely to report that they had access to all the features they need to in SPV, indicating that training leads to increased awareness of features.

The overall impact of extensive training initiatives was evident in the endpoint survey. Specifically, 2/3 of HCWs reported having received training, mostly in person (77%) in the last two years. In the midpoint survey, 47% of HCWs reported that they had the training they needed to use SPV. At the endpoint survey, this increased to 61%. However, CCT Health staff were much more confident in the training they received (72% reported having the training they need) compared to MHS/WCGHW staff (54% reported having the training

[1] Participants asked about all systems used at this point. Detailed analyses on SPV awareness and usage based on a separate question [5.1 Do you use the SPV?].

they need). In terms of support, 53% of health workers reported that they contact their colleagues as a first step – highlighting the importance of peer support.

There is a notable gap in terms of access – 27% of users indicated that they did not have their own username or SPV profile. This challenge was much more pronounced for MHS/WCGHW staff (1 in 3) than it was for CCT Health staff (1 in 10). More than 50% of those without access reported that they have not requested or do not know how to request access – indicating an opportunity for intervention. However, despite these challenges, SPV usage, awareness and training has increased, and the users reported positive experiences with the platform overall.

Key recommendations from the endpoint survey: Internet access continue to present a challenge to EHIS access and capacity and this needs to be strengthened. Overall, health workers are comfortable in using EHIS, although there are still some concerns related to accuracy and confidentiality and health workers need continued reassurance and evidence of the quality of electronic data.

For SPV, it is evident that many users still do not have access to usernames and profiles and there is a clear need for continued and streamlined logistical support for SPV access.

In addition, there is a need for a specific focus on MHS/WCGHW, as CCT Health employees reported higher EHIS usage, better access to SPV usage, feel better trained, and overall, more confident in using EHIS.

Acknowledgements

We wish to thank our partners, The Health Foundation, City of Cape Town, Metro Health Services and Western Cape Government Health for their inputs and support throughout the entire survey process.

In addition we would like to acknowledge the role and contribution of the Grant's Research Committee who provided invaluable insights and reviewed and commented to ensure that the survey ran smoothly.

Special thanks to the funders and all the participants who took the time to participate in the survey to give us the invaluable information that the survey gathered.

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. EHIS has been found to improve service quality, staff efficiency and effectiveness, and in reducing organizational expenses. While the use of electronic systems is generally presented as a means to improve health service delivery overall, there are often challenges with the implementation of electronic systems. 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. However, health worker knowledge and attitudes also contribute to the efficiency of electronic health system implementation and the clinical work being carried out. The Technological Acceptance Model (TAM) was originally designed to assess why individuals were not 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. 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. Other key attributes determining acceptance include individual user attributes and system attributes.

The establishment of the PHDC in the Western Cape has led to an increase in health-related information that is now accessible to aid clinical care, programme management, and operational decision-making. However, there is little evidence that this increase in data availability results in more efficient usage of data and improvement in health outcomes. It is suggested that to develop a culture of effective data use, barriers to data use needs to be identified and removed and to increase the demand for data.

The Western Cape Government Health and Wellness (MHS/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. During August 2021 to January 2022 the Human Science Research Council (HSRC), in partnership with The Health Foundation (THF), Western Cape Government: Health and Wellness (MHS/WCGHW) (including Metro Health Services (MHS)) and City Health, City of Cape Town (CCT Health) undertook a baseline survey with 1974 health workers to assess data use knowledge, attitude, and practices of health workers.

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. Two surveys were implemented, the midpoint survey (2023) and an endpoint survey (detailed in this report).

2. Study Aim

The endpoint 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 (updated) 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 at the end of the data collection period,
c) Develop an understanding of the variables that influence data system usage, and their interplay,
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. Two health authorities manage care programmes; MHS/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), all utilising a variety of EHIS to provide care for residents in the province. In the Western Cape, Afrikaans, Xhosa, or English are spoken by most residents and most health workers are fluent in English.

3.2. Design

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

3.3. Context

The endpoint survey was implemented by the Desmond Tutu TB Centre (DTTC), Stellenbosch University, in partnership with The Health Foundation (THF), MHS/WCGHW, and CCT Health. This work builds on a baseline study conducted by the HSRC in 2021 and the midpoint survey (2022-2023) to provide a snapshot of the state of data use in Cape Town to guide electronic health data system development and capacity development. This survey was implemented to track the changes in knowledge, attitude, and practices of health workers in Cape Town, South Africa. The project included three rounds of surveys. In this report, we present findings from the final, endpoint survey (2024).

3.4. Sampling logic and sample size

Staff from public clinics, satellite clinics, community day centres, community health centres, and hospitals were eligible for inclusion. Initially facilities identified specifically by research

partners were targeted, however, facilities for recruitment were expanded to include all eligible MHS/WCGHW and CCT Health facilities. In total, 58 Facilities - 27 MHS/WCGHW facilities and 31 CCT Health facilities - were visited for in-person participation.

A few clinics (<8) were excluded due to safety concerns and ongoing renovations. Three major hospitals (MHS/WCGHW) were selected for in-person participation.

All eligible staff within the district, including those working at management level (provincial, district and sub-district offices), and those working at facility level were invited to participate. At the end of the 10-week data collection period, 1118 health workers accessed the endpoint survey, and 1107 participants completed the survey. The analysis focused primarily on support, clinical or management staff from MHS/WCGHW and CCT Health.

3.5. 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 place at a time and place convenient to the participants, aiming for minimal disruption of health 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).

Section 6: SPV training and support

Section 7: Quality improvement

A copy of the questionnaire is provided in Appendix A. The same survey was used from baseline to endpoint, with minor changes made to ensure relevance and recording of selected additional information from non-EHIS users.

3.6. 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 were conducted, both the sample and the data collection method differed. The mid- and endpoint approach was similar and comparable.

3.7. 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 (MHS/WCGHW) and City (CCT Health). Where relevant, staff employed by district support organisations or 'other' authorities are noted separately.

Staff categories used throughout the endpoint 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 / Pharmacist Assistant / Pharmacy manager, Counsellor (HIV/TB/HAST), Lay counsellor, Breastfeeding counsellor
Support:	Administrative Staff (clerks, reception), HR, Finance, Health Information Officer Community Health Worker / CHW Supervisor / CHW Team Leader
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 Endpoint Survey

4.1. Consort diagram: Endpoint

A total of 1118 participants accessed the questionnaire. Eleven questionnaires had missing data/items and were excluded (see *Figure 1*). We included 1107 completed questionnaires - 669/1107 (60%) participants were employed by MHS/WCGHW, and 326/1107 (29%) participants were employed by CCT Health, while 112/1107 (10%) were employed by district support organisations (NGOs/NPOs) or 'other' employers.

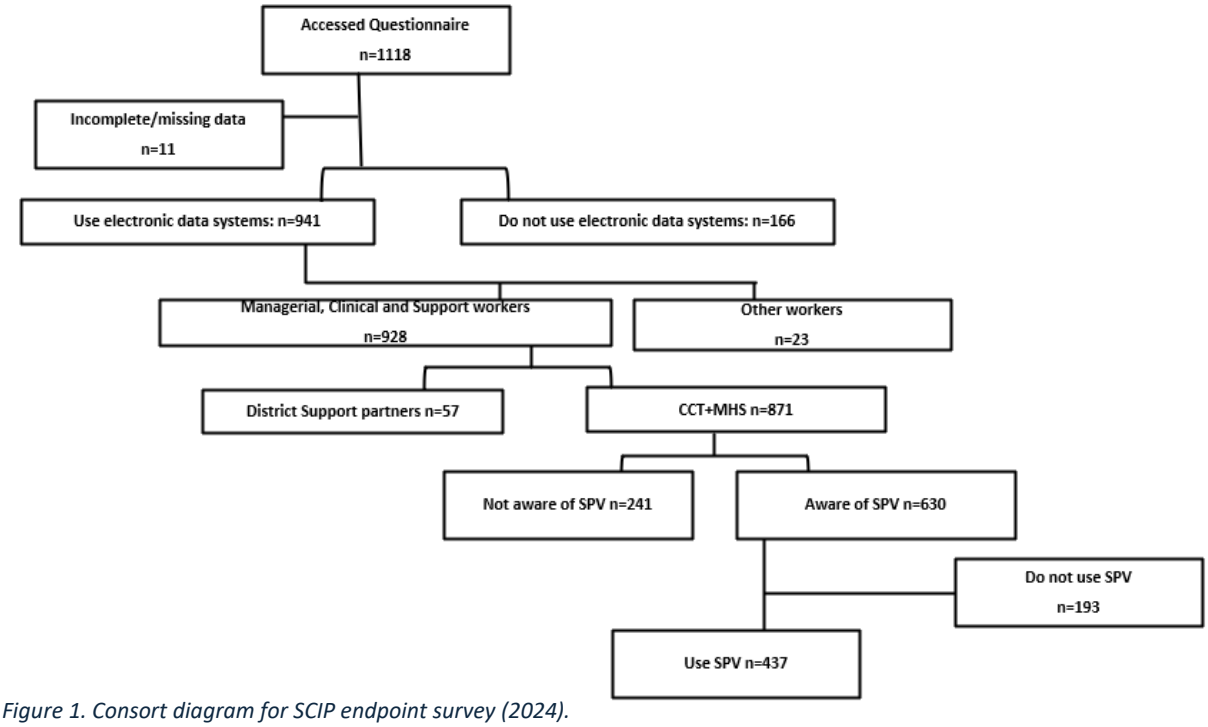

Figure 1. Consort diagram for SCIP endpoint survey (2024).

Clinical, management, and support staff made up 1084/1107 (98%) of eligible participants and 23/1107 (2%) were 'other' workers and were excluded from further analysis. 941 participants indicated that they used EHIS, including 928 clinical, management and support staff. Of clinical, management, and support staff using electronic health information systems, 871/928 (94%) were employed by MHS/WCGHW or CCT Health. Of these, 630/871 (72%) were aware of SPV, and 437 were using SPV.

Key components of the consort diagram across the survey rounds are presented in Table 1. Staff employer representation was fairly consistent across survey rounds, with staff from MHS/WCGHW representing 60% - 69% of participants across survey rounds. While more

participants made use of the online link for baseline participation, the midpoint and endpoint survey were comparable. There has been a marked increase in the number of participants aware of and using SPV. A detailed discussion on SPV use is included in the *Single Patient Viewer* section on page 22.

Table 1. Participants in the SCIP KAPS survey across cohorts.

	Baseline	**Midpoint**	**Endpoint**
Eligible questionnaires	1746	1435	1107
Employer: MHS/WCGHW CCT Health Other	 1202(69%) 450 (26%) 94 (5%)	 892 (62%) 334 (23%) 209 (15%)	 669 (60%) 326 (29%) 112 (10%)
Mode of data collection: Staff Assisted (tablet) Online/QR code	40% in person 790 1184	90% in person 1272 165	87% in person 976 142
Included in dataset for analysis on EHIS	1716	1386	1107
Electronic system use Uses EHIS	 1479 (86%)	 1014 (71%)	 941 (85%)
SPV users (from EHIS users)	334/1479 (23%)	184/1014 (18%)	437/941 (46%)

4.2. Participant composition and representation

The participant profile was comparable for the mid- and endpoint surveys. Staff were well represented across the three categories (clinical, management, support) employed by the different health authorities.

For the midpoint survey, 1435 surveys were completed, with clinical staff making up the largest proportion of participants. The endpoint survey yielded 1107 completed surveys, with similar representation:

Midpoint:	Clinical (71%)	Management (6%)	Support (21%)
Endpoint:	Clinical (74%)	Management (6%)	Support (18%)

For the endpoint survey, a breakdown of all health worker cadres per role and employer is provided in Table 2 below. Cadres of staff with most representation in the overall endpoint cohort includes professional nurses (n = 221), clinicians (n = 151) and admin staff (n = 189).

Table 2: Endpoint survey staff cadres

Role	**Total (n = 1107)**	**CCT Health (n = 326)**	**MHS/WCGHW (n = 669)**	**Other (n = 112)**
Management				
Clinical manager	17	12	5	0
District Programme/Management	1	0	0	1
Health Information Manager	3	2	1	0
Operational /Facility manager	33	12	20	1
Sub-district Prog/ Management Support	13	12	1	0
Clinical				
Allied health professional	46	4	40	2
Clinical Nurse Practitioner	102	25	76	1
Clinicians (Doctors/specialists)	151	18	125	8
Community Health Worker	8	1	2	5
Counsellor	36	2	5	29
Enrolled Nurse / EN Assistant	137	48	79	10
Pharmacy	112	28	78	6
Professional Nurse	221	93	114	14
Support staff				
Administrative Staff	189	63	104	22
Health Information Officer	15	4	9	2
Other	23	2	10	11

4.3. Demographic profile: Gender, age, and years of employment

As expected, the majority of participant who accessed the endpoint survey are female (866/1107; 78%), with 235/1107 (21%) indicating male, and 6/1107 (1%) participants indicating 'other' or preferred not to say.

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

Midpoint female:	CCT Health (84%)	MHS/WCGHW (79%)	Other (85%)
Endpoint female:	CCT Health (82%)	MHS/WCGHW (77%)	Other (76%)

In the endpoint survey, most participants (700/1107; 63%) were between the ages of 25 and 44. Most participants in the endpoint survey have been employed in their current role for more than 10 years (351/1107; 32%) with 228/1107 (21%) employed in their current role for 3-5 years, and 227/1107 (21%) employed in their current role 6-10 years - Figure 2.

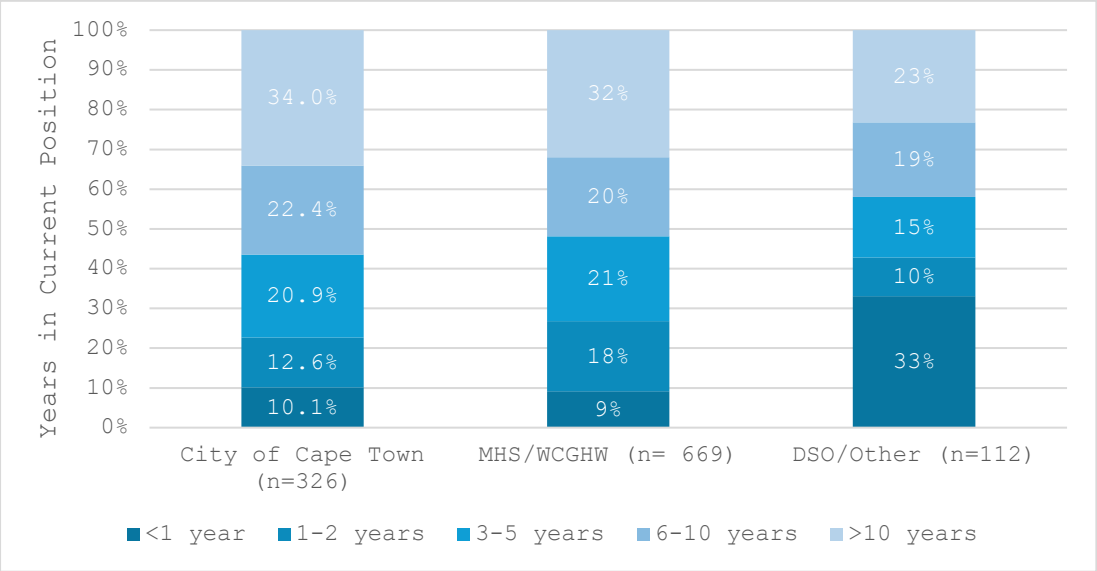

Figure 2. Years in service and employer.

4.4. Electronic Health System Usage

4.4.1. Time using EHIS

Participants were asked to report on EHIS use. In the *midpoint* survey, 1036/1435 (72%) had made use of EHIS and 397/1435 (28%) reported not having used EHIS at all. At the *endpoint* survey, 941/1107 (85%) of participants reportedly made use of EHIS. Of all endpoint participants, 181/1107 (16%) have been using EHIS for less than a year, 365/1107 (33%) for 1 - 5 years, 195/1107 (18%) for 6 – 10 years, and 200/1107 (18%) for more than 10 years.

4.4.2. Non-usage of EHIS

There were 166/1107 (15%) participants who reported that they did not use EHIS at all. When looking at specific staff categories, most of these were among clinical workers (148/166; 89%). Among all clinical worker participants (from all employers) 148/813 (18%) 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: Community Health Workers (7/8; 88%) and Counsellors (25/36; 69%) – which is expected due to job role and function. In the midpoint survey, Enrolled Nurse/Enrolled Nursing Assistants (EN/ENA) (135/228; 59%) were among the highest non-users. In the endpoint survey, the percentage of ENs and ENAs not using EHIS had decreased (58/137; 42%). Similarly, the percentages of Allied Health Professionals and Professional Nurses with non-usage had also decreased from the midpoint survey to the endpoint survey - Allied Health Professionals from 13/46; 28% to 42/77; 55% and Professional Nurses from 71/262; 27% to 30/221; 14%. Medical doctors/clinicians (147/151; 97%) are the cadres of health staff with the highest reported EHIS usage - Figure 3.

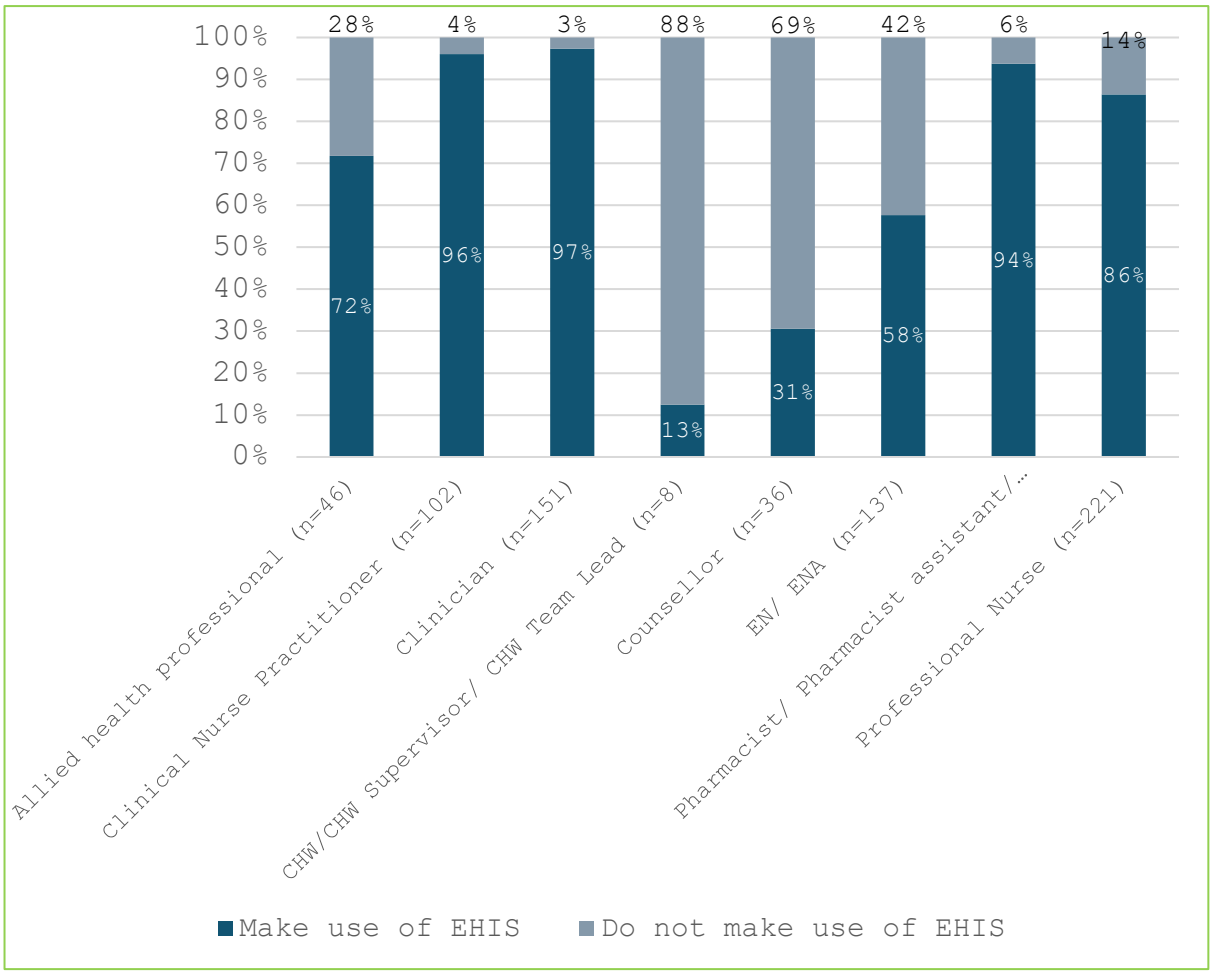

Figure 3. Clinical Health Workers and EHIS use – endpoint survey.

When asked about reasons for not using EHIS, health workers reported mostly that they do need EHIS as part of their job (86/166; 52%), while 77/166; 46% reported that they did not have access to EHIS - Figure 4 (multiple options possible).

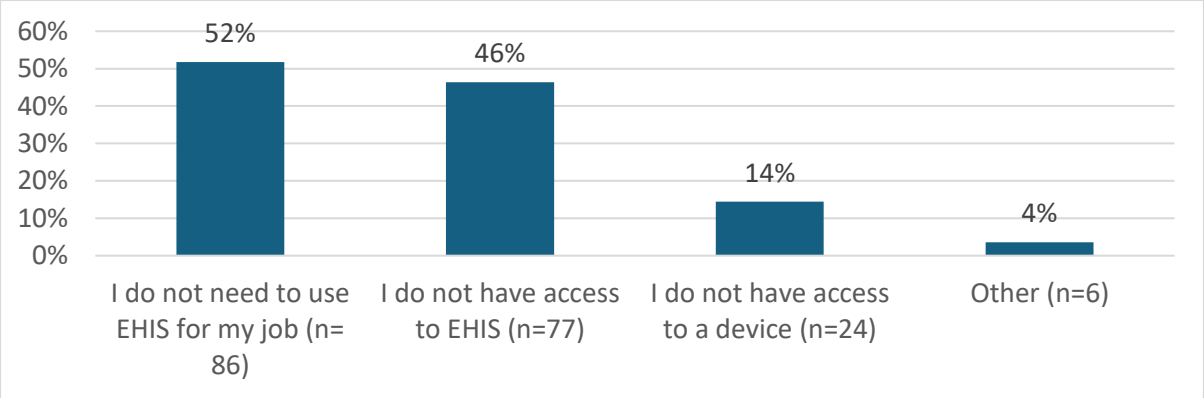

Figure 4. Health worker reasons for not using EHIS – endpoint survey.

Upon closer investigation of staff categories who fall within the non-users, we found that those who reported not needing EHIS included mostly ENs/ENAs (35/86; 41%) or counsellors (13/86; 15%). Similarly, those who reported not having access to EHIS were ENs/ENAs (20/77; 26%) or professional nurses (19/77; 25%) - Table 3. The 6 participants who noted "other" reasons for not using EHIS noted that it was either due to lack of training or not being computer literate.

Table 3 Staff cadres and reasons for not using EHIS – endpoint survey.

Do not need EHIS	Do not have access to EHIS:	Do not have access to device:
ENs/ENAs (35/86)	EN/ENA (20/77)	ENA/EN (5/22)
Counsellors (13/86)	Professional Nurse (19/77)	Professional nurse (3/22)
Professional nurse (9/86)	Pharmacist (4/77)	Clinician (1/22)
Allied Health Professionals (7/86)	Clinician (2/77)	

For the remainder of the report, the analysis based on the 871 clinical, management, and support staff employed by MHS/WCGHW or CCT Health, using EHIS, as it was in the baseline and midpoint surveys.

4.4.3. Rating of own skills

Of EHIS users, 350/871 (40%) rated their skills as 'above average' or 'advanced'. This is lower than at the midpoint survey (57%). This could partly be attributed to increase in number of 'new' (or newly reported) users now using EHIS. Of all staff, 454/871 (52%) rated themselves as 'average', and only 67/871 (8%) rated themselves as 'entry level', showing that there is opportunity to improve both user confidence and skill.

4.4.4. Attitude towards EHIS vs paper-based records

Most health workers (689/871; 79%) 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 which is slightly more than those in the midpoint survey (697/921; 76%). Of health workers, 173/871 (20%) were cautious/hesitant (*will use it if they can see a difference or don't like change but will use if required*). Very few (<2%) of staff reported that they *avoided EHIS and would prefer paper-based data*.

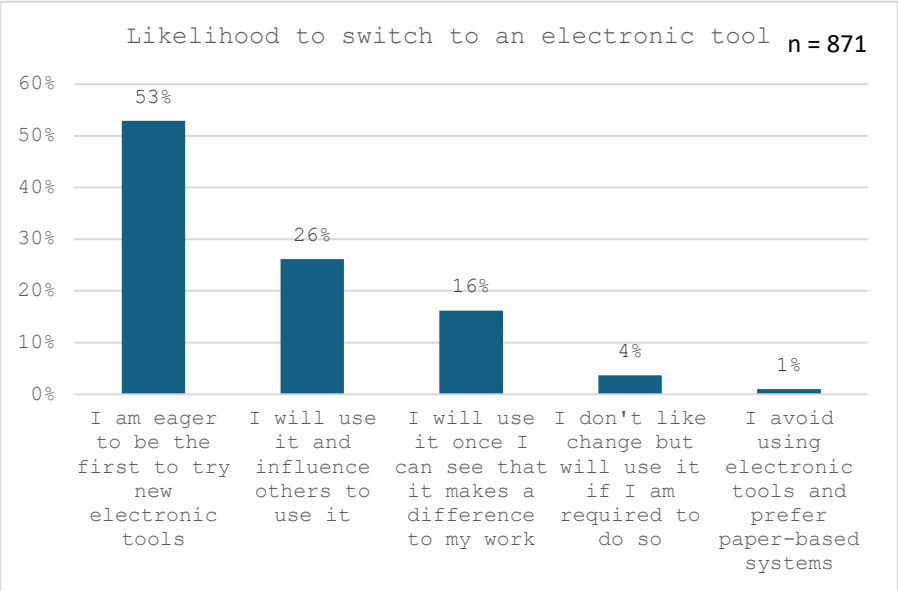

Figure 5. Likelihood to switch to electronic tools.

At the endpoint survey, 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 - Figure 6. Overall, 678/871; 78% reported that EHIS is more accurate than paper records; 629/871; 72% reported that EHIS is more complete than paper records; and 620/871; 71% reported that patient confidentiality is easier to maintain with EHIS than paper records. However, confidence in EHIS was much higher for CCT Health employees (78%) than those working for MHS/WCGHW (69%) – Figure 7.

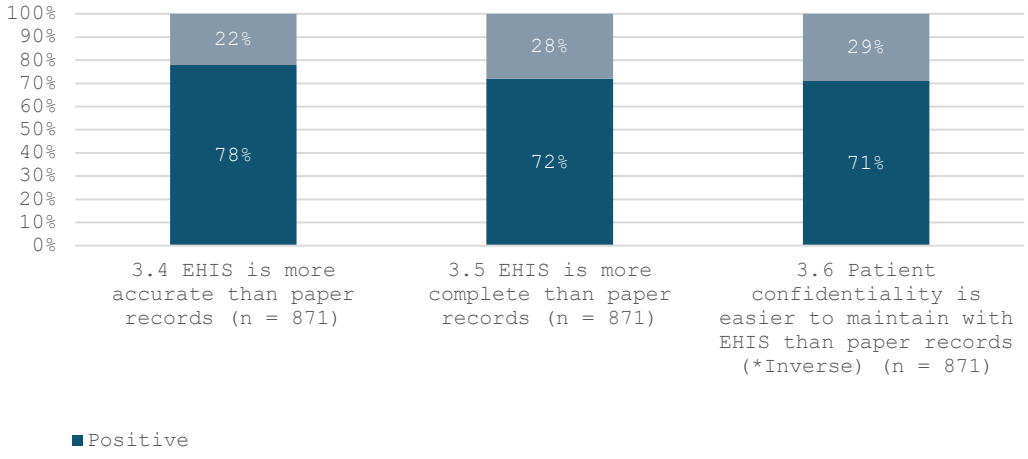

Figure 6. Health worker perceptions of EHIS vs paper records.

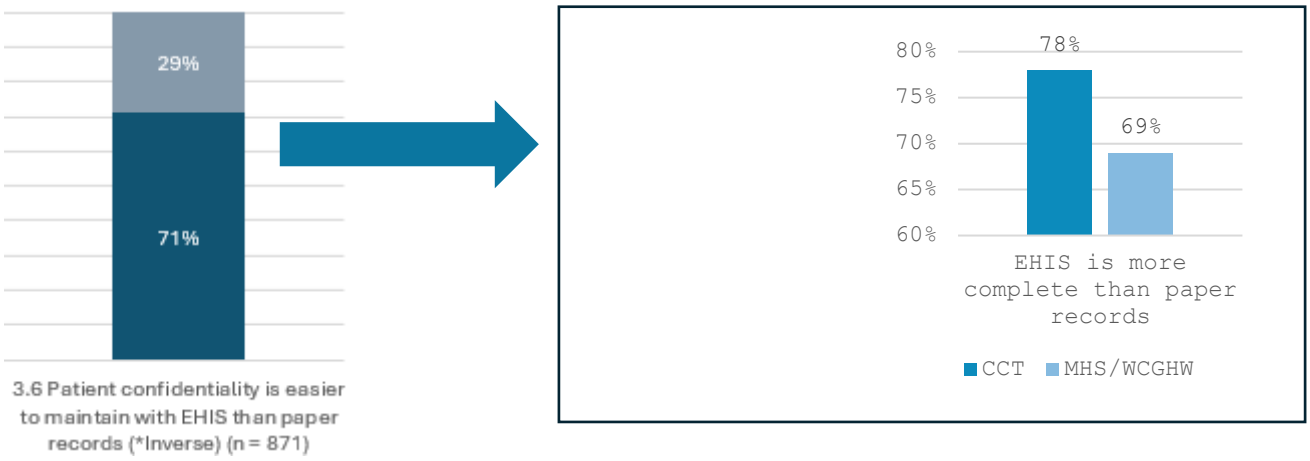

Figure 7. Breakdown of confidentiality (paper vs electronic) for CCT vs MHS/WCGHW.

4.4.5. Reason for using EHIS

Health workers reported making use of EHIS primarily for clinical care (73%) – a statistically significant improvement of 11% (p= <0.001) from the midpoint survey; to track patients (72%) – again, a statistically significant 11% (p= <0.001) more than at the midpoint; for admin purposes (59%) – 7% more than midpoint (p= 0.002); for data collection/validation (51%) – 9% increase (p= <0.001) from the midpoint survey - Figure 8.

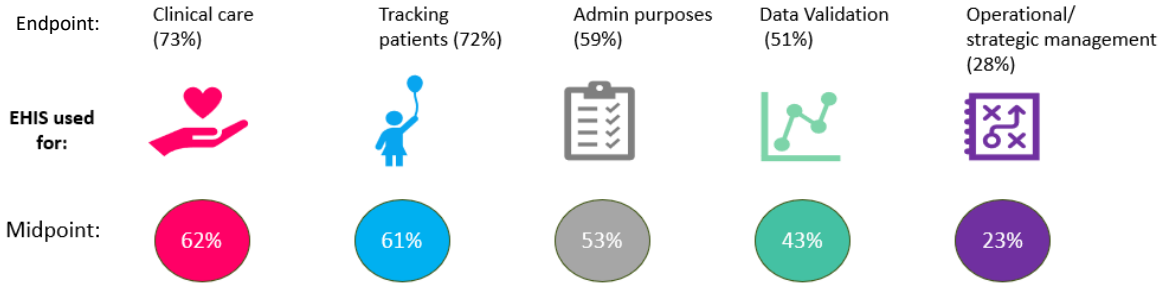

Figure 8. EHIS usage among health workers – endpoint survey.

4.4.6. EHIS systems used

Health workers were provided with a list of 16 EHIS platforms, including Single Patient Viewer (SPV), and asked to indicate the systems that they made use of, with multiple options possible. The "other" option was also added, although no additional platforms were

identified using this option.

Overall, NHLS received the highest response rate (542/871; 62%), followed by SPV. During previous survey rounds, few participants indicated SPV use, indicating a marked increase in uptake of SPV since the midpoint survey[2]. PREHMIS is used almost exclusively by CCT Health staff - 282/310 (91%) participants from CCT Health indicated that they used PREHMIS. PHCIS is used in MHS/WCGHW facilities - 201/561 (36%) of MHS/WCGHW clinical, management and support staff indicated that they used this system. The combined EHIS usage is reported in Figure 9.

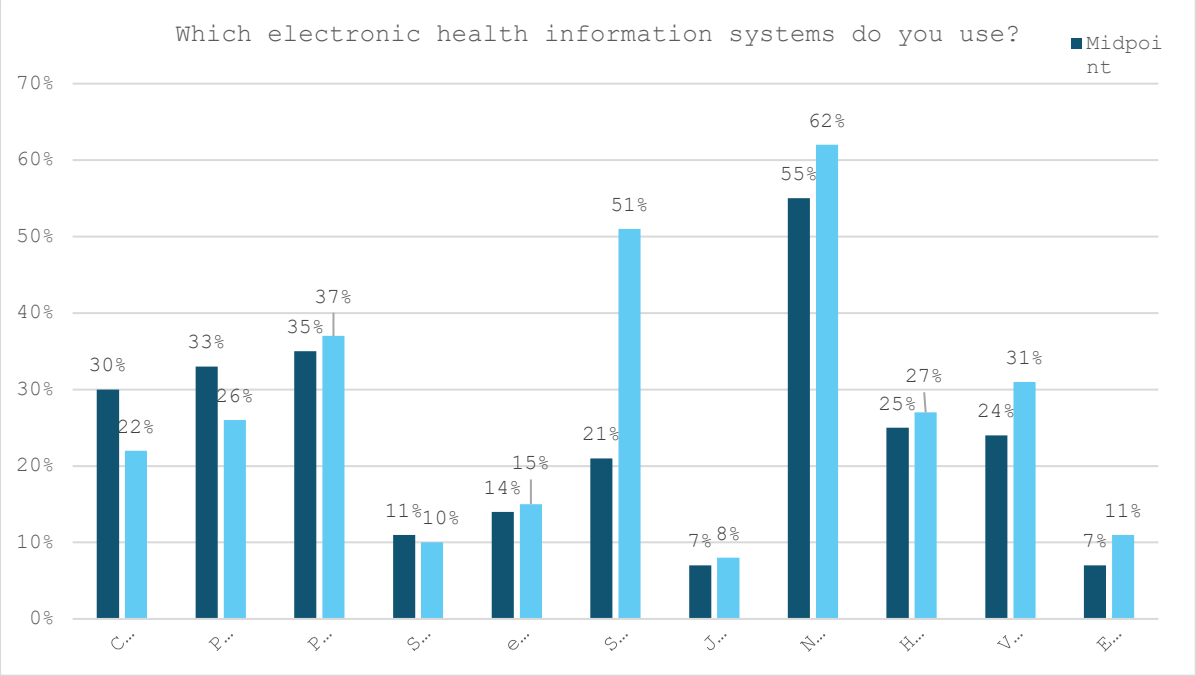

Figure 9. EHIS systems used by health workers - midpoint vs endpoint survey.

[2] Detailed analysis on SPV use and awareness among clinical, support and admin staff from CCT Health and MHS/WCGHW is described in the section on page 22. Reported SPV usage might differ slightly between this section (specific EHIS systems used) and SPV-specific questions due to participant error.

4.5. EHIS: perceived usefulness and perceived ease of use

Clinical, management, and support EHIS users employed by MHS/WCGHW and CCT Health reported on perceived usefulness and ease of use of EHIS, with additional questions on training, support and access.

4.5.1. Perceived usefulness of electronic health information systems

Participants reported overall positive responses to perceived usefulness of EHIS. More than 90% of participants noted that EHIS makes it easier for them to do their work (823/871; 94%), improved the quality of their work (815/871; 94%) and helped them to access information quickly (834/871; 96%). This was the experience of health workers across categories - Figure 10. These figures are similar to those of the midpoint survey, indicating consistent positive attitudes towards perceived usefulness of EHIS overall – Figure 11.

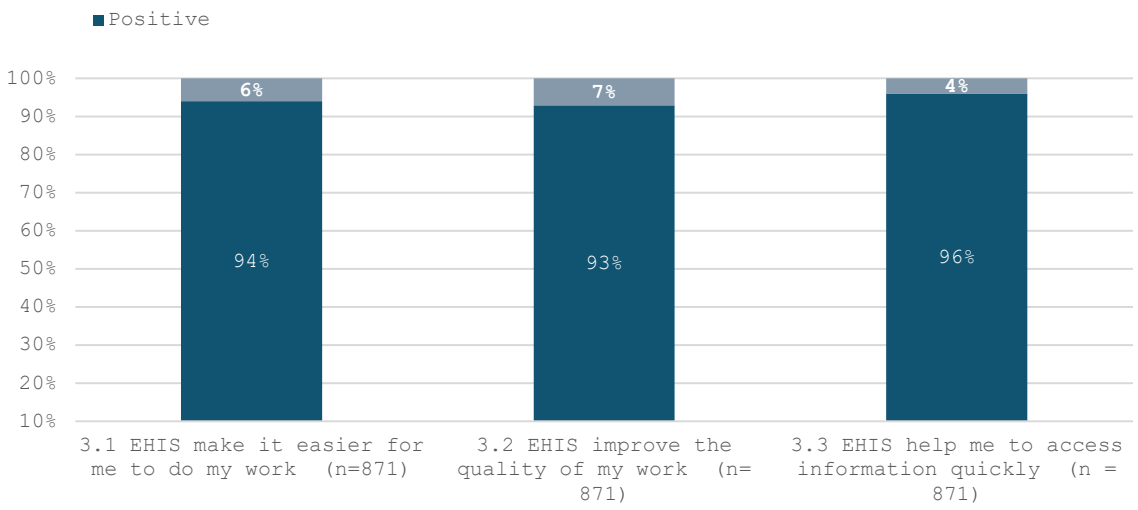

Figure 10. Perceived usefulness of EHIS from all health workers – endpoint survey.

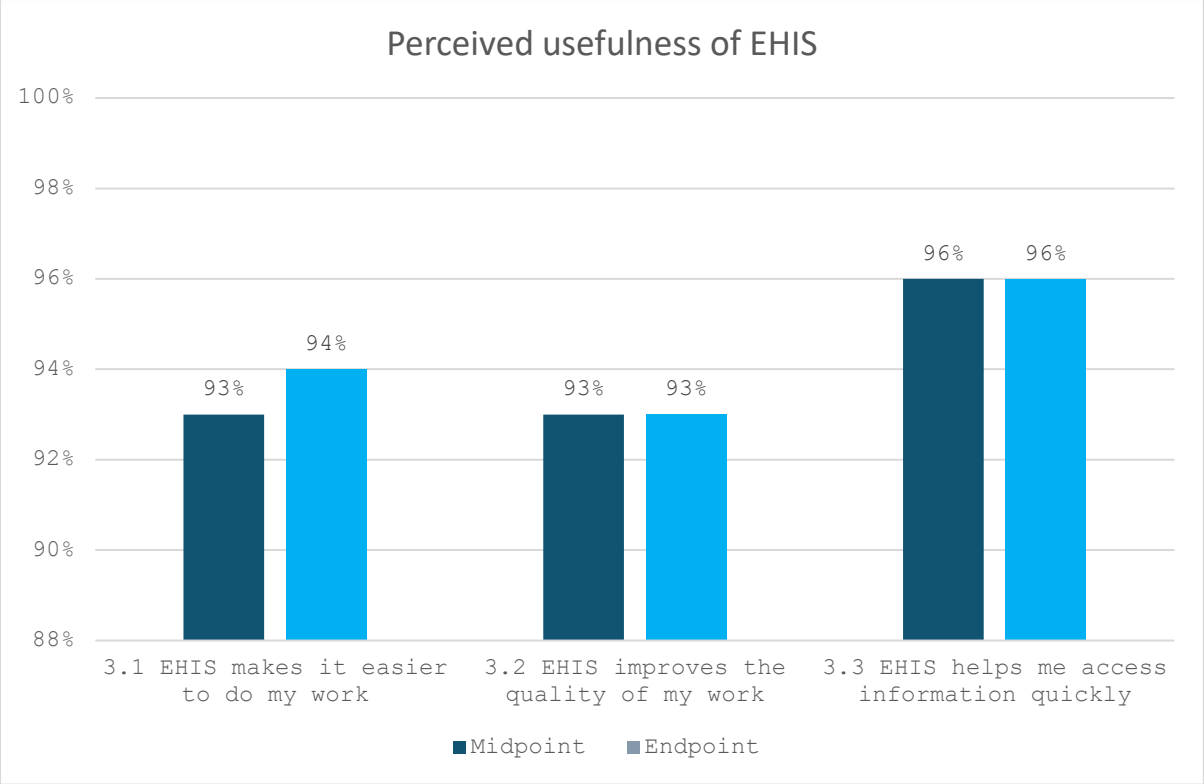

Figure 11. Perceived usefulness of EHIS - midpoint vs endpoint.

4.5.2. Perceived ease of use of EHIS

More than 90% of health workers reported that EHIS is easy to use (801/871; 92%) and that they found it easy to learn to use EHIS (805/871; 92%) - Figure 12. Reported ease of use is fairly consistent from the midpoint to the endpoint survey, with significantly fewer (p-value = 0,004) health workers reportedly feeling anxious about using EHIS (100/871; 11% vs 149/921; 16%) - Figure 13.

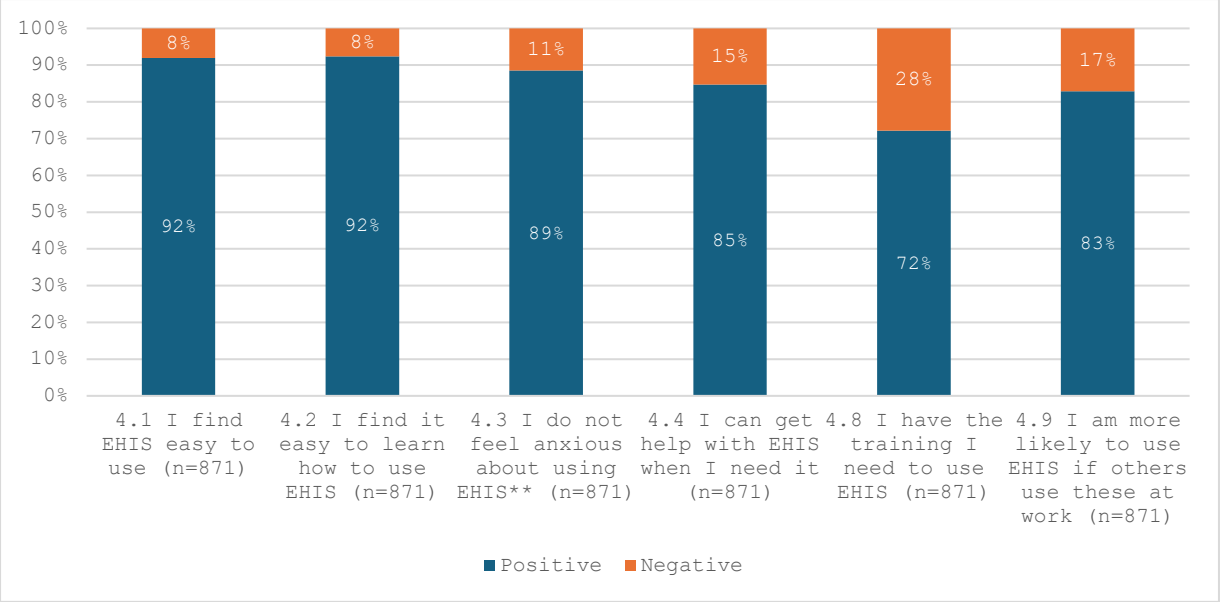

Figure 12. Perceived ease of use - endpoint survey.

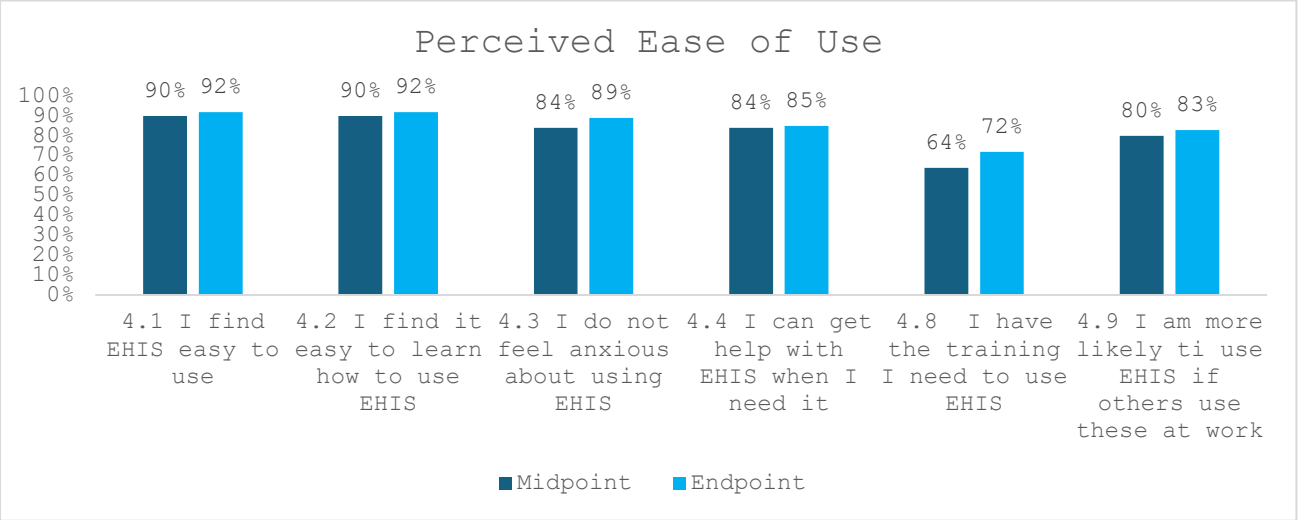

Figure 13. Perceived ease of use - midpoint vs endpoint survey.

4.6. Training and Support

In addition to ease of use, participants also reported on training received and support available when using EHIS. More than two thirds of participants (629/871; 72%) noted that they had the training they needed to use EHIS. This is a significant increase (p= <0.001) from the midpoint survey (584/921; 63%) which indicates that more staff felt that they have received (adequate) training on the use of EHIS since the midpoint survey took place. This pertains to both CCT Health and MHS/WCGHW staff – where both groups reported receiving adequate training – 230/310; 74% for CCT Health and 398/561; 71% among MHS/WCGHW

staff. In addition, fewer than 1 in 6 (133/871; 15%) of participants reported that they could not get help with EHIS when needed for EHIS.

Overall, the data shows positive feedback from health workers in terms of training and support received.

4.7. Access to infrastructure

Access to EHIS is dependent on access to available time, devices (computers), and internet. During the endpoint survey, more than a quarter of participants indicated that they did not use EHIS as often as they would like due to time constraints (250/871; 29%) or lack of access to a computer (226/871; 26%). However, most striking was the more than 40% of users reporting that they did not use EHIS as often as they would like due to lack of internet access (364/871; 42%) - Figure 14. This issue was slightly more pronounced in MHS/WCGHW employees where 44% of employees did not have access to internet.

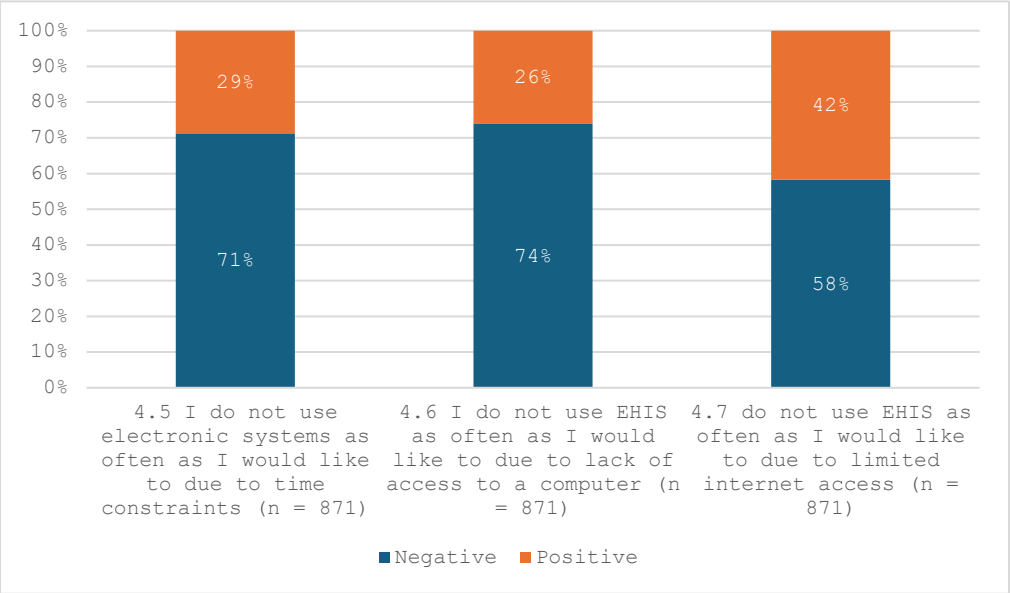

Figure 14. Reasons for not using EHIS - endpoint survey.

4.8. Principles of Quality Improvement

At the endpoint survey, four questions were asked to assess reported perceptions of quality improvement among all EHIS users (managerial, clinical and support staff) from all employers. Most health workers (849/928; 91%) reported that they understand the principles of quality improvement, 882/928 (95%) feel that quality improvement methods

are an important part of providing care, and 830/928 (89%) use EHIS for quality improvement as part of their job. However, 749/928 (81%) reported using quality improvement methodologies in their day-to-day activities – Figure 15.[3]

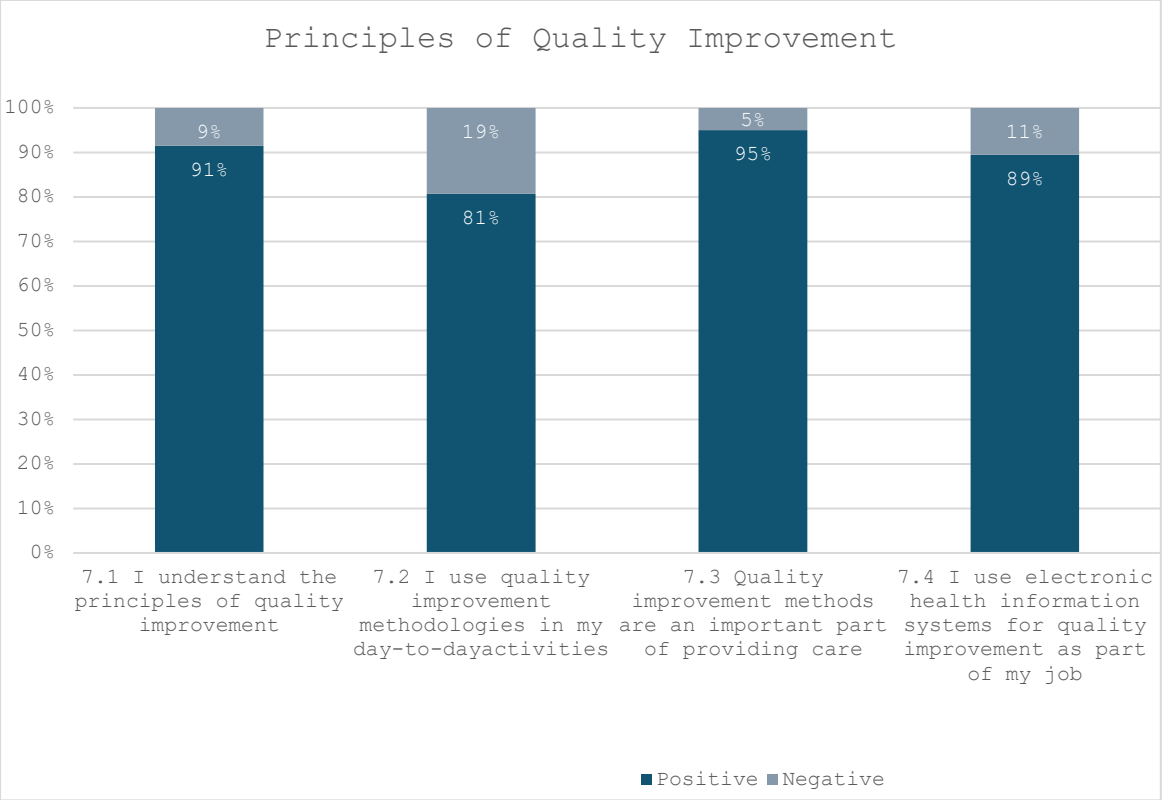

Figure 15. Principles of quality improvement – endpoint survey.

[3] It should be noted that quality improvement was not defined in the survey.

4.9. Single Patient Viewer

4.9.1. 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 MHS/WCGHW or CCT Health using EHIS, 630/871 (72%) reported that they were aware of SPV. This is a dramatic and significant increase since the midpoint survey - 368/921 (40%).

Similarly, there was a significant increase in terms of the number of users using SPV (aware and not aware of SPV) – at the midpoint 184/921 (20%) were using SPV compared to 437/871 (50%) participants reported using SPV at the endpoint (p= <0.001).

This means among those who are *aware of SPV*, usage also increased. Of the 630 participants who indicated that they have heard of SPV, 437 indicated that they were using SPV (69%) compared to 184/368 (50%) at the midpoint – Figure 16.

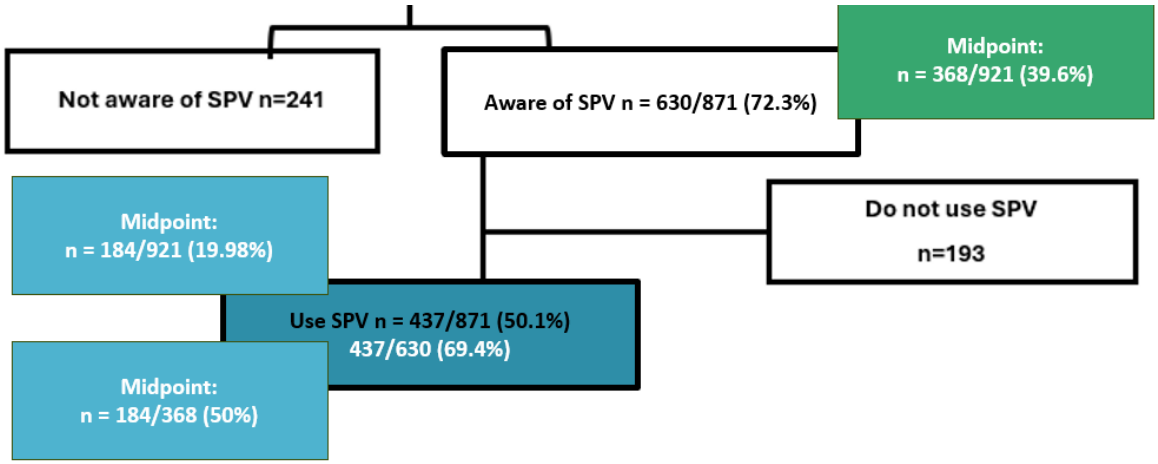

Figure 16. Flow diagram: SPV awareness and use midpoint vs endpoint survey.

While there were significantly more health workers aware of and using SPV, health workers from CCT Health were more likely to be aware of SPV than their counterparts – Table 4.

Table 4. SPV awareness and use among employment categories – endpoint survey.

	CCT Health	MHS/WCGHW	ALL
Health Workers aware of SPV	238/310 (77%)	392/561 (70%)	630/871 (72%)
Health Workers using SPV	163/310 (53%)	274/561 (49%)	437/871 (50%)
Health Workers aware of SPV and using SPV	163/238 (68%)	274/392 (70%)	437/630 (69%)

This increase in SPV use was evident across staffing categories, with all categories of staff using SPV doubling (or more), although usage remains lowest among support staff – Table 5.

Table 5. SPV use among staff categories- midpoint vs endpoint survey.

SPV users **(CCT Health, MHS/WCGHW)**	**Midpoint (Nov 22 – Jan 23)** **(n = 921)**	**Endpoint (Aug 24 – Oct 24)** **(n = 871)**
Management staff	24/76 (32%)	53/63 (84%)
Clinical clinic staff	144/582 (25%)	342/633 (54%)
Support	16/263 (6%)	42/175 (24%)

4.9.2. Perceived usefulness of SPV

Health workers using SPV reported an overwhelming positive response to perceived usefulness of SPV - Figure 17. The majority of participants (412/437; 94%) reported that SPV helped manage patients better, and 422/437 (97%) that SPV is useful for getting patient information from other facilities while (385/437; 88%) reported that SPV is user friendly.

There were significantly higher (p = <0.001) positive responses for "*SPV is useful for following up on missing lab results*" - 373/437 (85%) at the endpoint compared to 67% at the midpoint survey – Table 6. Anecdotally, this increase in positive responses has been partially attributed to the documented NHLS data breach and staff mentioned becoming more reliant on SPV as NHLS was either unavailable or not deemed secure. There had also been an increase in a positive response for "*SPV is useful for drawing reports*" – 335/437

(77%) since the midpoint survey (67%) and fewer health workers reported that SPV is "*slow to use*" – 61/437 (14%) in the endpoint survey compared to 23% in the midpoint survey – Figure 18.

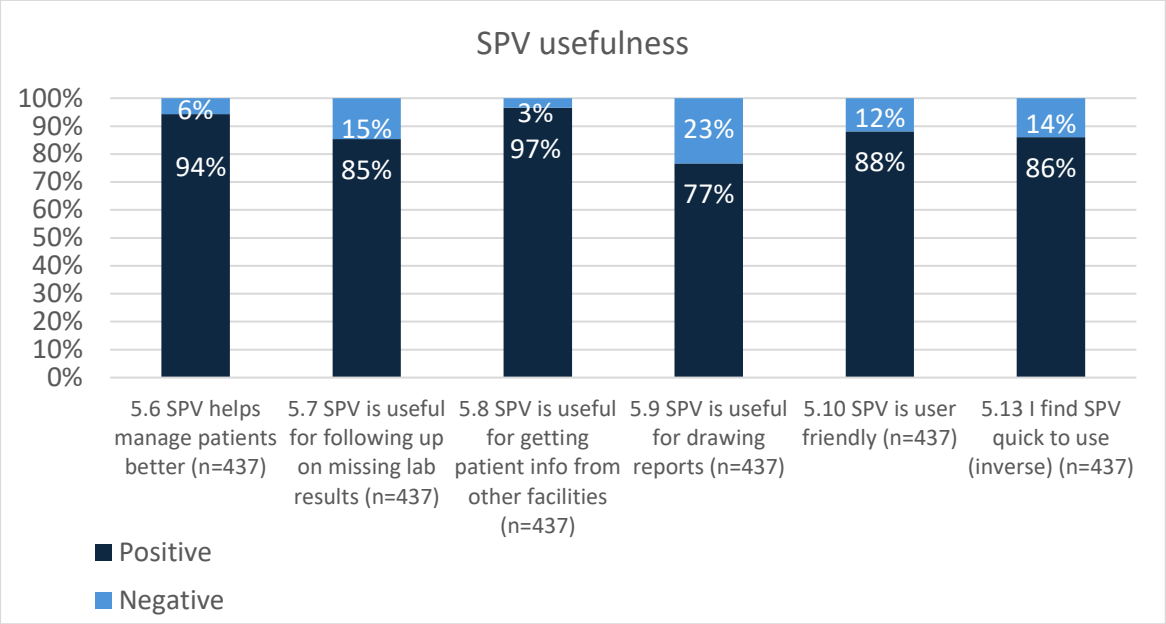

Figure 17. Perceived usefulness of SPV – endpoint survey.

Table 6. Usefulness of SPV for following up on lab results - midpoint vs endpoint survey.

Year \ SPV is useful for following up on missing lab results	Negative	Positive	Total
2023 (n = 184)	61 (33%)	123 (67%)	184
2024 (n = 437)	64 (15%)	373 (85%)	437

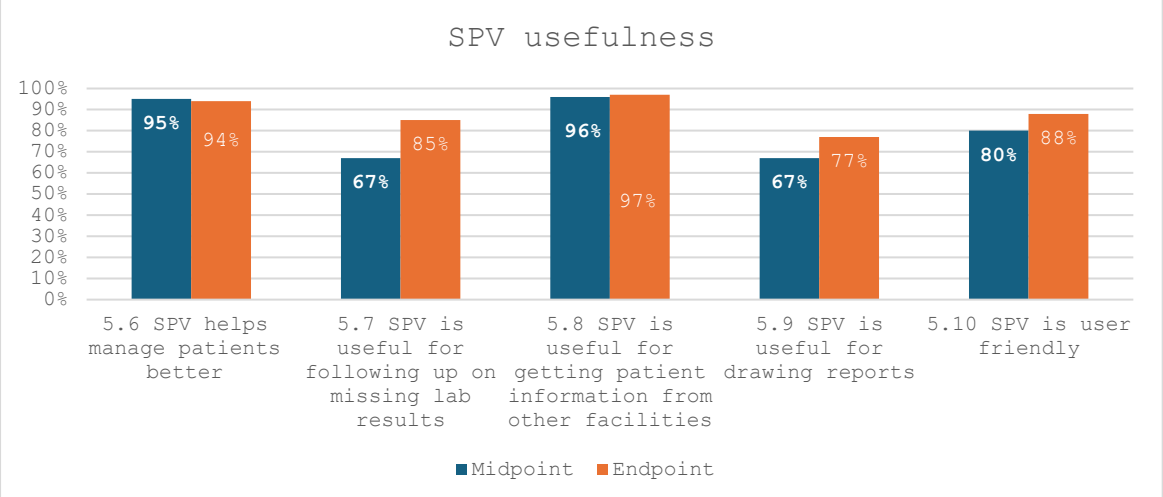

Figure 18. Perceived usefulness of SPV - midpoint vs endpoint.

4.9.3. SPV use and support

The majority of participants indicated that they have access to SPV when they need it – 386/437; 88%. While health workers reported mostly positive responses to SPV usefulness, 268/437 (61%) of SPV users reported that they did not use SPV to its full capacity. While there has been improved utilisation of SPV, there is still opportunity for intervention.

In terms of support, health workers reported that there were still some gaps in current systems: One in three users (159/437; 36%) reported that they would use it more if there was someone available to support with queries, while 40% (176/437) of users indicated that they would SPV more if they received feedback on SPV use - Figure 19.

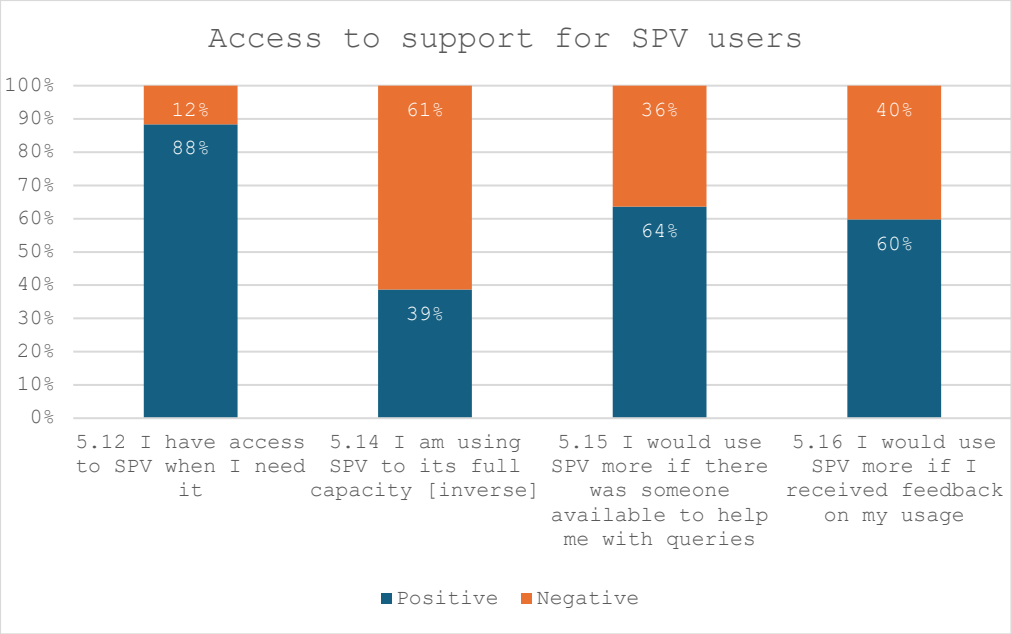

Figure 19. Support for SPV users - endpoint survey

When health workers were questioned on who they contact first if they experience problems with SPV, 232/437 (53%) of health workers reported that they contact their colleagues – highlighting the importance of peer support. This is the preferred sense of support for staff both from CCT Health and MHS/WCGHW. The support email is also a valued source of support as close to 1 in 3 participants would make use of this mode of support. However, more health workers from CCT Health 65/163 (40%) reported using the email compared to those from MHS/WCGHW (72/274; 26%). Although the least preferred option, ~1 in 8 participants reported using the PHDC as their first point of contact for SPV support, indicating the usefulness of this resource. Few participants noted "other" forms of

support, and when asked to clarify, this included facility managers, coordinators, NHLS, grant seconded staff, colleagues and on-site IT support – Table 7.

Table 7. Point of contact for SPV support for SPV users: CCT Health vs MHS/WCGHW at endpoint

5.22 Who do you contact first if you experience problems with SPV?	My colleagues	Other/missing (specify)	The provincial health data centre	The support email
CCT Health (n = 163)	75 (46%)	7 (4%)	16 (10%)	65 (40%)
MHS/WCGHW (n = 274)	157 (57%)	8 (3%)	37 (14%)	72 (26%)
Total (n = 437)	232 (53%)	14 (3%)	53 (12%)	138 (32%)

4.9.4. SPV use and training

Of all participants *aware* of SPV, 289/630 (45%) had received training, which is a significant increase from the midpoint survey (133/368; 36%). Most participants 259/289 (91%) reported that they received training in the past two years.

For CCT Health, 156/163 (95%) of health workers using SPV received training, and 131/156 (84%) of those received in-person training, and all but three (153/156; 98%) received training in the past two years. For MHS/WCGHW, 133/274 (49%) of health worker using SPV received training, with 106/133 (80%) receiving training in the past two years.

This increase in training since the midpoint reflects the impact of efforts to rollout SPV training since the midpoint survey took place. Participants were trained primarily in person 222/289 (77%), although the online and Mylearn platforms were also utilised by some health workers – Table 8.

Table 8. Training platforms for training received - endpoint survey.

	Received SPV training (n = 289)
In-person	222/289 (77%)
Online (e.g. via Teams)	79/289 (28%)
Using the MyLearn platform	14/289 (6%)

When asked about having received the training that participants need to use SPV, 265/437 (61%) reported a positive response. When considering employers, CCT Health staff were significantly more likely to report having received adequate training – Table 9. This indicates

a need, specifically for MHS/WCGH staff for SPV training.

Table 9. Health workers reported receiving adequate SPV training to use SPV.

5.11. I have the training I need to use SPV	**No**	**Yes**
CCT Health (n = 163)	45 (28%)	118 (72%)
MHS/WCGHW (n = 274)	127 (46%)	147 (54%)

4.9.5. SPV training and relationship to using SPV to its full potential

We assessed the relationship between participants who have received SPV training and their self-reported assessment of using SPV to its full capacity. Among users without SPV training, 35% participants noted that they were using SPV to its full potential. Among users who received SPV training, 42% noted that they were using SPV to its full potential, indicating that increased training potentially leads to increased familiarity with the programme – Table 10.

Table 10. Using SPV to its full potential for those with and without SPV training at the endpoint survey.

	5.14 I am using SPV to its full potential/as fully as I could (inverse)*	
	Using to full potential	*Not using to full potential*
No SPV training	67/195 (35%)	128/195 (66%)
SPV Training received	102/242 (42%)	140/242 (58%)

**Original question: I am not using SPV as fully as I could*

Similarly, participants who have received training were more likely to report that they had access to all the features on SPV, while those who did not receive training were more likely to be unsure if they had access to all the features. This indicates the value of training and optimal use of SPV - Table 11.

Table 11. Access to all features on SPV for those with and without training.

	5.5 Do you currently have access to all the features and functionalities on SPV you require for your job/role?		
	No	Not sure	Yes
No SPV training	25/195 (13%)	67/195 (34%)	103/195 (53%)
Received SPV training	32/242 (13%)	50/242 (21%)	160/242 (66%)

4.9.6. SPV and challenges with usernames

After the midpoint survey, specific questions were added to assess access to SPV, including barriers related to usernames. Among all SPV users, 116/437 (27%) did not use their own login details to access SPV. Although sample sizes are small when looking at staff categories, we found that 2/53 (4%) of management SPV users, 100/342 (29%) of clinical SPV users, and 14/42 (33%) of support staff SPV users did not have their own login details or usernames. The lack of access to usernames was much more pronounced in MHS/WCGHW staff (37% without access to username) than CCT Health staff (10% without access to username). This indicates an opportunity for intervention – specifically among clinical and support staff who use SPV that still need to be provided with their own login details.

Among the 116 users from CCT Health and MHS/WCGHW who indicated that they did not have their own user names, the following reasons were provided: *"request for SPV login details is still being processed"* (53/116; 47%), *"not requested login details"* (34/116; 29%), "*unsure how to request a username or access"* (26/116; 22%), *"no WCG email"* (7/116; 6%), and *"request for SPV login details has been denied"* (5/116; 4%) - Figure 20.

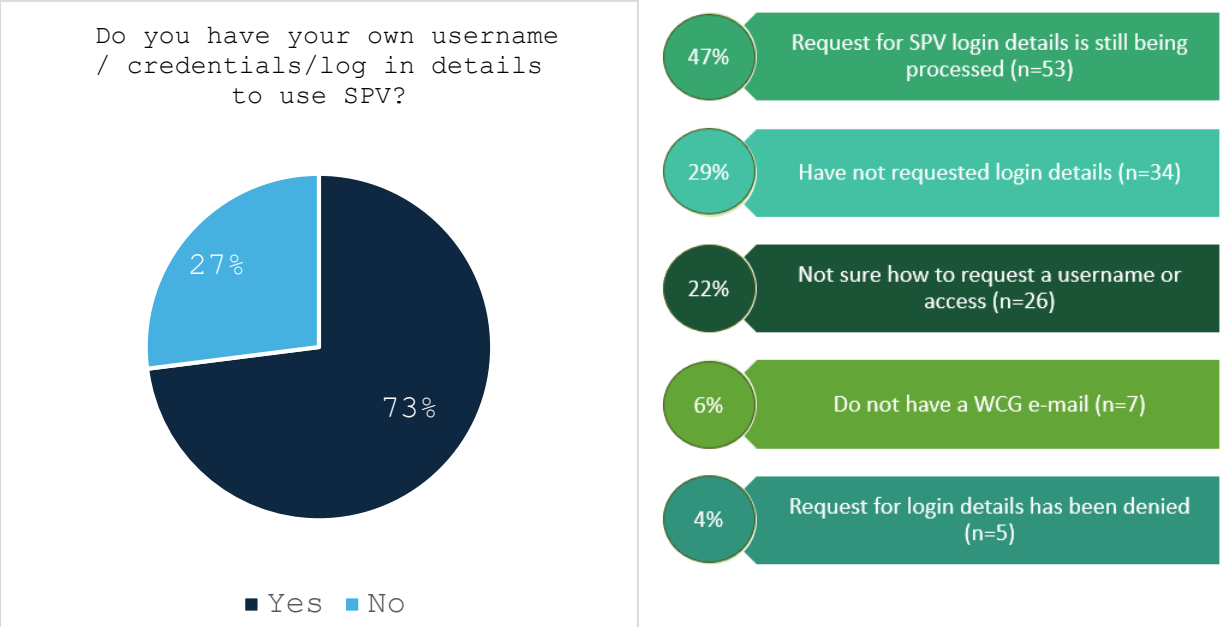

Figure 20. SPV username access and reasons for not having usernames - endpoint survey.

4.9.7. SPV: Access to all functionalities

Among SPV users, 263/437 (60%) reported that they currently have access to all the functionalities on SPV that they require for their job/role When considering the employer CCT Health staff had lower reported scores for access to all SPV functionalists (87/163; 43%) when compared to MHS/WCHGW staff (176/274; 64%) – Figure 21. This could potentially be attributed to HCWs with more training (like City Health staff) being more aware of the functionalities that they do not have access to.

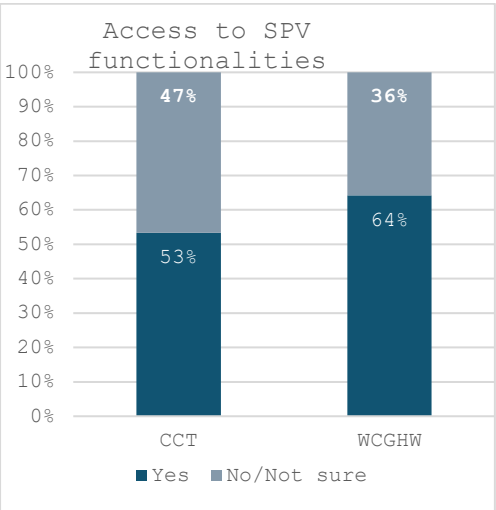

Figure 21. Access to SPV functionalities at the endpoint survey - CCT Health vs MHS/WCGHW staff.

5. Discussion

During the endpoint survey, 1107 health workers completed the survey. While there has been an increase in EHIS usage, there are still some cadres of staff with low levels of EHIS usage due to their scope of duties. While access to EHIS has improved, lack of access to internet is reported as a barrier to EHIS by 42% of participants, indicating an opportunity for intervention.

For clinical, management, and support staff from CCT Health and MHS/WCGHW, the overall perceptions of EHIS ease of use and perceptions of usefulness for EHIS was positive. 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 than EHIS and more than a quarter noted that paper-based records were seen as more complete and confidential than EHIS. This indicates, to some extent, a continued valuing of paper-based systems and there is still a need to highlight the reliability and value of EHIS during training sessions.

There have been reported increases in training, and the potential impact thereof can be seen in different domains. In the midpoint survey, 36% of participants felt that they did not have the training that they needed to use EHIS. This decreased to 28% in the endpoint survey.

There has been a significant increase in both SPV awareness and usage since the midpoint survey, which ca be partially attributed to the increase in the roll-out and training of the use SPV. More health workers that are aware of SPV have had training on SPV than those in the midpoint survey. The majority of these health workers received in-person training, while ~1/4 received online training.

There has been a general increase in positive responses towards SPV usage since the midpoint survey with regards to its usefulness. The positive trend could potentially or partially be attributed to the NHLS data breach, forcing health workers to turn to SPV when other systems were unavailable or deemed not secure. This can be seen specifically in the positive response for "*SPV is useful for following up on missing lab results*" increased from 67% in the midpoint survey to 85% in the endpoint survey.

One immediate and amenable gap identified is the lack of SPV username/log in details for more than ¼ of HCWs. This was much more pronounced in WCGHW/MHS employees, where one in three did not have their own username (compared to 1 in 10 for CCT Health). Anecdotally, some health workers mentioned that they feel that this is a breach of patient/data confidentiality. There is a need for facilitating user access.

6. Recommendations

To increase the usage and effectiveness of electronic health systems, it is recommended that internet connectivity is strengthened and ensure access to electronic devices within healthcare facilities. Efforts should focus on providing users with usernames and profiles for SPV, specifically in MHS/WCGHW facilities. In addition, continued access to both technical and logistical support is needed. Streamlined troubleshooting services for SPV features must be prioritized to minimize disruptions. Additionally, ongoing, effective training is critical. By improving connectivity, device access, and support systems, healthcare facilities can optimize the use of SPV and foster more efficient workflows.

Appendix A: SCIP Endpoint Survey

Confidential

ScIP KAPS Questionnaire

Please complete the survey below.Thank you!

Now Hidden field

Scaling use of health data: A decentralised approach

Stellenbosch University

Western Cape Government FOR YOU

THE HEALTH FOUNDATION

'Scaling use of Health data' - Data Use Survey

The Scaling use of health data: a decentralised approach project builds on work undertaken over the last 3 years to increase effective data utilisation to improve TB, HIV and diabetes outcomes. The project implemented by the Western Cape Government Health and Wellness and the City of Cape Town is launching the Knowledge, Attitudes and Practices (KAPs) end point survey which will run from 19 August to 31 October 2024.

This is a follow up to the baseline and mid-point surveys that provided valuable insights about your knowledge and the use of the various healthcare information systems, tools, reports and the uptake and use of the Single Patient Viewer (SPV) in particular.

We encourage you to participate by completing the online questionnaire. This is the final of three rounds of surveys. 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 taking part in the survey. The survey should take about 12-15 minutes and is DATA FREE (i.e., it won't use your cellphone, smart device, laptop or computer data)

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, RHS 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

Survey

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 ◯ Rural Health Services, Western Cape Government Health and Wellness ◯ City of Cape Town ◯ District support partner (NGO, CBO, NPO) ◯ Other
1.1.1 If other, please 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
1.2.1 Where do you mostly work?	◯ Sub-Structure ◯ MHS ◯ Provincial office ◯ Rural Health Services ◯ Sub-District ◯ District (CCT) office ◯ Other
1.2.2 If other, please specify	_____

1.3 Which of these most closely reflects your job description?	◯ 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 (social worker, physiotherapist, occupational therapist, dentist, nutritionist, oral hygienist, radiographer, psychologist, etc.) ◯ Pharmacist / Pharmacist Assistant / Pharmacy manager ◯ Counsellor (HIV/TB/HAST), Lay counsellor, Breastfeeding counsellor ◯ Other (Select one)
1.3.1 If 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 Sex	◯ Female ◯ Male ◯ Other ◯ Prefer not to say ◯ Prefer to self-describe
1.5.1 If self-describe, please specify	_____
1.6 Please indicate your age at your last birthday	_____ (In Years)
Section 2: Electronic Health Information System Usage (eg 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 "I do not use electronic health information systems at all")	◯ I do not use electronic health information systems at all ◯ Less than 1 year ◯ 1-5 years ◯ 6-10 years ◯ More than 10 years

2.1.1 You have indicated that you do not use Electronic Health systems at all, please indicate why not	☐ I do not need to use electronic health systems for my job ☐ I do not have access to electronic health systems (username/profile/programme) ☐ I do not have access to a device (computer/phone/tablet) ☐ Other (please specify)
2.1.2 If other, please specify	_____
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, (Electronic DR-TB, TB Register) ☐ Tier.Net ☐ CBS Referral App ☐ Kibana dashboard ☐ CARES ☐ Other (please specify)
2.2.1 If other, please specify	_____
2.3 How would you rate your ability/skill in using electronic health information systems?	○ Entry level ○ Basic skills ○ Advanced (above average)
2.4 What is your most likely response to a 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
2.5.1 If other, please 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
2.7.1 If other, please specify	_____

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 = Disagree strongly to 5 = Agree strongly)

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

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 = Disagree strongly to 5 = Agree strongly)

4.1 I find electronic health information systems easy to use	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
4.2 I find it easy to learn how to use electronic health information systems	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
4.3 I feel anxious about using electronic health information systems	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
4.4 I can get help with the systems when I need it	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
4.5 I do not use electronic systems as often as I would like to due to time constraints	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
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	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
4.7 I do not use electronic systems as often as I would like to due to limited internet access	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
4.8 I have the training I need to use electronic systems	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
4.9 I am more likely to use electronic systems if others use these at work	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly

Section 5: Single Patient Viewer Usage

5.1 Are you aware of the Single Patient Viewer (SPV)?	◯ 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 ☐ Providing clinical care ☐ Accessing medical/legal information ☐ Training ☐ Follow-up care ☐ Research ☐ Data validation ☐ General admin (Tick all that are applicable)
5.3 Do you use the Single Patient Viewer (SPV)?	◯ Yes ◯ No
5.4 Do you have your own username /credentials/log in details to use SPV?	◯ Yes ◯ No
5.4.1 You have indicated that you use SPV, but you do not have your own username/credentials, could you please indicate why?	☐ I am not sure how to request a username/access ☐ My request for SPV login details has been denied ☐ My request for SPV login details is still being processed ☐ I have not requested login details, but I still use SPV through the username/login details of a colleague ☐ Other (specify)
5.4.2 If other, please specify	_____
5.5 Do you currently have access to all the features and functionalities on SPV you require for your job/role?	◯ Yes ◯ No ◯ Not sure
5.5.1 If no, why not?	_____
Please tell us whether you disagree or agree with the following statements, and how strongly you disagree or agree (from 1 = Disagree strongly to 5 = Agree strongly)	
5.6 SPV helps manage patients better	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.7 SPV is useful for following up on missing lab results	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly

5.8 SPV is useful for getting patient information from other health facilities	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.9 SPV is useful for drawing reports	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.10 SPV is user-friendly	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.11 I have the training I need to use SPV	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.12 I have access to SPV when I need it	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.13 I find SPV slow to use	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.14 I am not using SPV as fully as I could	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.15 I would use SPV more if there was someone available to help me with queries	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.16 I would use SPV more if I received feedback on my usage	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.17 SPV use has been established as a norm for clinicians	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly

5.18 SPV use has been established as a norm for managers	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.19 The use of SPV is strongly supported by management	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.20 I find SPV data to be accurate and reliable	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
5.21 Have you ever escalated any issues/challenges while using SPV?	◯ Yes ◯ No
5.22 Who do you contact first if you experience problems with SPV?	◯ My colleagues ◯ The support email ◯ The provincial health data center ◯ Other (specify)
5.22.1 If other, please specify	_____

6: SPV training and support. Please answer the following questions on SPV training

6.1 Have you received ANY training on SPV? (tick all that apply)	☐ Yes, using the MyLearn platform, ☐ Yes, online (e.g. via Teams), ☐ Yes, in-person ☐ No
6.1.1 When did you receive SPV training?	◯ In the last two years ◯ More than 2 years ago

7. Quality Improvement

Our final few questions will focus on quality improvement in the workplace.
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)

7.1 I understand the principles of quality improvement	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
7.2 I use quality improvement methodologies in my day-to-day activities	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly

7.3 Quality improvement methods are an important part of providing care	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly
7.4 I use electronic health information systems for quality improvement as part of my job	◯ Disagree strongly ◯ Disagree somewhat ◯ Not sure ◯ Agree ◯ Agree strongly

Thank you for participating in the survey.

If you have any questions about the survey, please contact Dr Lario Viljoen, Sociobehavioural Lead, Desmond Tutu TB Centre, Stellenbosch University (lario@sun.ac.za)

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