



EAC Regional Centre of Excellence for
Vaccines, Immunisation and Health Supply
Chain Management (EAC RCE-VIHSCM)

TRACER STUDY REPORT

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Abbreviations

EAC:	EAST AFRICAN COMMUNIT
EAC RCE-VIHSCM:	EAST AFRICAN COMMUNITY REGIONAL CENTRE OF EXCELLENCE FOR VACCINES, IMMUNISATION AND HEALTH SUPPLY CHAIN MANAGEMENT
GAVI:	GAVI, THE VACCINE ALLIANCE
HSCM:	HEALTH SUPPLY CHAIN MANAGEMENT
MHSCM:	MASTER'S IN HEALTH SUPPLY CHAIN MANAGEMENT
UNICEF:	UNITED NATIONS CHILDREN'S FUND
WHO:	WORLD HEALTH ORGANIZATION

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EXECUTIVE SUMMARY

The East African Community Regional Centre of Excellence for Vaccines, Immunisation and Health Supply Chain Management (EAC RCE-VIHSCM) was officially launched in 2016 to train health supply chain (HSC) leadership in EAC Partner States. This paradigm shift called for equipping (HSC) leadership with essential knowledge, skills and competencies through short-term professional courses and master's degree programmes. In 2017, the Centre admitted its First Cohort of Master's in Health Supply Chain Management (MHSCM). Even if the centre was formally launched in 2016, on 16th November 2015 the Centre opened its doors for the first professional short course titled General Health Supply Chain Management supported by the Bill & Melinda Gates Foundation through JSI. In line with its mandate to build public sector capacity, the Centre offers scholarships to professionals from EAC Partner States working in public institutions, guided by a regional quota system. This explains the predominance of public sector representation in its offerings.

In accordance with the regulations of the University of Rwanda and the Rwanda Higher Education Council, a tracer study was conducted to follow up on and assess the relevance of the training programmes. Specifically, the study assessed the relevance of both the Master's in Health Supply Chain Management (MHSCM) and the short-term professional courses offered between January 2019 and December 2023.

The study utilized a convergent parallel mixed-methods design where quantitative and qualitative data were collected simultaneously, analyzed separately and combined during the presentation and interpretation of the findings. All graduates of the first three cohorts of the MHSCM and their employers, plus all trainees of the short-term professional courses were considered for this study. Eighty-three (83) MHSCM Graduates and 320 short-term professional courses trainees participated in the quantitative survey. Besides, sixteen (16) MHSCM Graduates, sixteen (16) short-term professional course trainees, and four graduate employers were purposely selected to participate in the qualitative part. Quantitative data were collected through an online survey questionnaire using SurveyMonkey. Qualitative data were collected through two focus group discussions among MHSCM Graduates, two focus group discussions among short-term professional courses trainees, and four Key informant interviews among graduate employers. Quantitative data were analysed using descriptive statistics while thematic analysis was used to analyze qualitative data.

The following section highlights key findings of the study.

Master's in Health Supply Chain Management (MHSCM) Programme

Pre-enrollment employment sectors	<ul style="list-style-type: none"> The majority of MHSCM candidates were drawn from public institutions (91.46%) with limited representation from NGOs (4.88%), multilateral organizations (2.44%), and private institutions (1.22%).
Graduate satisfaction with the Programme	<ul style="list-style-type: none"> Nearly all graduates (98.75%) reported that the curriculum was comprehensive and up-to-date. Overall, 93.80% expressed satisfaction with the learning experience (50.00% very satisfied and 43.80% satisfied).
Post-Graduation employment and mobility	<ul style="list-style-type: none"> Nearly two-thirds (58.97%) of graduates remained at their original employer after graduation; of these, 58.70% transitioned into new positions, and 88.89% received promotions. Among those who changed institutions (41.03%), nearly half (41.38%) remain in the public sector, while others have moved to NGOs (27.59%) and multilateral organizations (17.24%). Among those who changed their institutions, the majority (65.52%) reported changing once, while 27.59% have changed the employer twice.
Job satisfaction and work environment	<ul style="list-style-type: none"> Overall, the majority, 89.40% of the graduates, were delighted with their current job (36.80% were very satisfied and 52.60% were satisfied). The majority, 81.50%, were happy with their work environment (21.10% very satisfied and 60.50% satisfied). 84.20% were satisfied with opportunities for career advancement in their current positions (39.50% very satisfied and 44.70% satisfied). Slightly more than half (53.90% were satisfied with their current job salary (10.50% very satisfied and 43.40% satisfied). Additionally, 27.60% were neutral while 14.50% were dissatisfied. Nearly half (59.20%) were satisfied with other job benefits (5.30% very satisfied and 53.90% satisfied) while 28.90% were neutral. Majority (84.20%) believed their employers valued the skills acquired through the MHSCM Programme (40.80% very satisfied and 43.40% satisfied). 81.30% were satisfied with the recognition of their contributions at their workplace (33.30% very satisfied and 48.00% satisfied). 92.10% were satisfied with their relationships with colleagues and team dynamics (38.20% very satisfied and 53.90% satisfied).

<p>Application of knowledge and skills gained in the current position</p>	<p>Overall, graduates reported extensive use of acquired knowledge and skills across several skill categories assessed as follows:</p> <ul style="list-style-type: none"> • Technical skills: All graduates reported having used these skills. Of these, 38.20% to a very large extent, while 53.90% to a large extent applied the technical skills acquired. • Leadership and management skills: All graduates reported having used these skills, with 43.20% to a very large extent, and 47.30% to a large extent applied the leadership and management skills. • Communication skills: All graduates reported having used these skills with 48.70% to a very large extent, and 43.40% to a large extent. • ICT skills: Almost all graduates reported to having used these skills with 32.90% to a very large extent, and 44.70% to a large extent applied these skills. • Problem-solving skills: All graduates reported having used these skills with 51.30% to a very large extent, and 42.10% to a large extent applied these skills.
<p>MHSCM Programme relevance</p>	<ul style="list-style-type: none"> • Nearly all graduates (96%) indicated that their current role is aligned with the MHSCM Programme (75% of very closely related, 11.80% closely related and 9.20% moderately related). • Most (97.40%) reported that the programme prepared them well for their roles, with 40.80% stating they were very much prepared, 48.7% indicating they were prepared to a great extent, and 7.9% saying they were moderately prepared.
<p>Relevance of MHSCM Programme to Graduates' career progression</p>	<p>Graduates reported high contribution of the MHSCM Programme to their career progression as follows: The program contributed to enhanced technical expertise (83.1%), leadership (74.7%), research capabilities (72.3%), professional networking (73.5%), and international exposure (55.4%).</p>
<p>Acquired knowledge and skills' application challenges in current work</p>	<p>Graduates reported varying levels of challenge in applying the knowledge and skills acquired during their Master's of HSCM Program to their current work as follow:</p> <ul style="list-style-type: none"> • 55.40% indicated that applying academic knowledge to their jobs was not challenging at all, while 29.70% found it slightly challenging. • 67.57% of respondents felt that meeting job requirements based on the knowledge gained from the MHSCM Programme was not challenging at all. Only 22.97% found it slightly challenging • 58.11% reported that aligning the skills gained from the Master's HSCM Program with industry expectations was not challenging at all, while 28.38% found it slightly challenging.
<p>Perceived MHSCM programme gaps</p>	<ul style="list-style-type: none"> • 71.10% indicated that there are no perceived gaps in the MHSCM Programme, while 56% believed that the curriculum was sufficiently comprehensive in terms of course offerings. • Nonetheless, 58.70%, emphasized the need for more hands-on learning. • 85.30% advocated for additional training or refreshers to stay aligned with current work requirements. • The following courses/topics were reported to be underemphasized, hence needing to be improved: integration of technology in health supply chain management, health supply chain management optimization, cold chain management, strategic procurement, supply planning, field placement, and quantification.
<p>Employers' perceptions about the performance of MHSCM Program graduates.</p>	<p>The employers reported overall satisfaction with MHSCM graduates' performance, especially that the programme enhanced the graduates' technical skills and leadership and management skills.</p>

Short Course Training

Country of origin	<ul style="list-style-type: none"> • 28.75% are from the Republic of Rwanda • 19.06% from the Republic of Kenya • 18.75% from the United Republic of Tanzania • 16.56% from the Republic of Uganda • 8.44% from the Republic of South Sudan • 6.56% from the Republic of Burundi. • 1.88% from non-EAC countries.
Institutions affiliation	<ul style="list-style-type: none"> • 23.44% from health facilities • 22.81% from Immunisation Programme/EPI • 16.56% from National Medical Stores/supply chain entities • 10.94% from Ministry of Health central level • 9.06% from National Medicine Regulatory Authorities
Short Term Training participation	<ul style="list-style-type: none"> • 62.81% attended Immunization Supply Chain • 50.31% attended Cold-Chain Equipment Management • 14.38% attended Solar Direct-Driven Cold Chain Equipment Management • 11.30% attended Humanitarian Supply Chain Management • A small number of trainees attended the remaining courses (Use of Minilabs Equipment, Global Standards for Traceability of Health Products and Technologies, and Governance, Leadership, Transparency and Accountability in Pharmaceutical Procurement in EAC Region).
Satisfaction of the training	<ul style="list-style-type: none"> • Almost all (98.01%) trainees reported that the courses attended were comprehensive and up-to-date. • 93.36% reported that they are satisfied with the professional courses (52.16% very satisfied and 41.20% satisfied).
Quality of the training	<ul style="list-style-type: none"> • 90.66% admired the course content (materials/resources) (47.33% excellent and 43.33% very good). • 90% appreciated the training delivery methods (44.00% excellent and 46.00% very good). • 47.14% reported that the trainer's performance was excellent, and 42.42% reported it to be very good. • 20.89% reported that the course duration was excellent, and 36.30% reported it to be very good. 36.30% also reported it to be good.
Change in knowledge and skills after attending the short course training	<ul style="list-style-type: none"> • Overall, 99.67% of trainees believed that their knowledge and skills had changed. 17.29% reported exceptional change, 73.22% reported significant change, 7.80% reported moderate change, and 1.36% reported slight change in knowledge and skills after attending the professional courses.

<p>Applying knowledge and skills gained from the training at work</p>	<ul style="list-style-type: none"> • In general, almost all (99.67%) trainees reported applying the knowledge and skills gained from the training at work. 46.60% reported that they always apply the knowledge and skills gained, 38.44% frequently apply, 13.27% sometimes apply the knowledge and skills, and finally, 1.36% reported that they rarely apply the knowledge and skills gained from the training at work.
<p>Adoption of techniques and methodologies learnt from the course</p>	<ul style="list-style-type: none"> • 89.12% reported that they have adopted the techniques and methodologies learnt from the course.
<p>Reported impact of professional courses on competencies, job performance, and career development</p>	<ul style="list-style-type: none"> • Most (98.64%) of trainees reported that the training they attended had an impact on knowledge and skills utilization in their current work (21.43% exceptional impact, 69.39% significant impact, and 7.82% moderate impact). • 97.97% of the trainees reported that the training had enhanced job competencies (20.34% exceptional impact, 71.19% significant impact, and 6.44% moderate impact) • 98.95% reported that the training impacted their professional advancement (20.98% exceptional impact, 68.18% significant impact, and 9.79% moderate impact). • 95.80% reported that the training had an impact on their institutions (23.16% exceptional impact, 58.60% significant impact, and 14.04% moderate impact). • Majority (83.51%) of trainees reported that the professional course training initiated some changes in their respective institutions.
<p>Areas for improvement</p>	<ul style="list-style-type: none"> • Some trainees indicated areas for improvement, and these include some changes in the course content, additions of hands-on/practical sessions, increasing the duration of some courses, and increasing access to the courses.

I. INTRODUCTION

1.1. Background

The East African Community Regional Centre for Vaccines, Immunization and Health Supply Chain Management (EAC RCE VIHSCM), is one of the six centres of excellence of higher learning of the East African Community. Hosted by the University of Rwanda, the Centre was created by the 9th Ordinary Meeting of the EAC Sectoral Council of Ministers of Health through Directive EAC/SCM/Health/Decision/O24. This Directive was fully endorsed in 2014 by the EAC Council of Ministers through Directive No. EAC/CM 29/Decision 35.

The launch of the Centre was informed by the Gavi Supply Chain Strategy^[1], which showed that global immunisation rates had stagnated at around 80% due to several factors, chief among which was a lack of training in supply chain leadership. Further, A Landscaping Assessment Study in the EAC showed that people who manage vaccines and health supply chains are trained as doctors, nurses, pharmacists, etc, but never as supply chain cadres. Thus, the key stakeholders, namely Gavi, German Development Cooperation (BMZ and KfW), the World Health Organisation (WHO), and UNICEF Supply Division (SD), resolved to set up the EAC RCE-VIHSCM to rapidly train and upskill health supply chain practitioners in Anglophone Africa. The founders of the Centre thus partnered with the EAC and the Government of Rwanda, which had the highest immunisation rates in Africa, to set up the centre.

The Centre was established with the following Mission:

“To become an autonomous, well-recognised, top-class, regional “knowledge hub”, providing high-quality pre- and in-service training and disseminating best practices in vaccines, immunisation and health supply chain management. The Centre’s vision is To contribute toward solving existing performance challenges in supply chain management for vaccines and other health commodities through generation of knowledge and its translation into practice, policy and research”

The Centre launched the Master’s in Health Supply Chain Management (MHSCM) Programme in 2017. This Programme is designed to train HSC cadres, working in EAC Partner States by equipping them with essential competencies and knowledge in HSC leadership. The 2-year programme is designed and offered through blended learning. It specifically targets the HSC workforce in the public sector of EAC Partner States (Republic of Burundi, Democratic Republic of Congo, Republic of Kenya, Republic of Rwanda, Federal Republic of Somalia, Republic of South Sudan, United Republic of Tanzania, and Republic of Uganda). The scholarship is offered on equal quota basis to the HSC workforce from each EAC Partner States. The scholarship covers all costs for the awardee to the tune of 15,000 Euro during the 2-year tenure. In return, the awardees pledge to keep serving their countries for at least 3 years after graduation in the HSC domain. Given the regulations of the Grant from German Development Cooperation (BMZ/KfW), the Centre reserves a handful of places each academic year for self-paying or private students

As of December 2024, the Programme had enrolled 282 students in seven intakes. Among these, 135 out of 151 of the first four intakes have graduated. Figure 1 and Figure 2 indicate the numbers of students who were enrolled, graduated and those who are still active per country and per intake.



https://peoplethatdeliver.org/sites/default/files/resource_contents_files/FINAL%20GAVI%20Supply%20Chain%20Strategy%20Evidence%20Review%20Report%201st%20May%202014.pdf

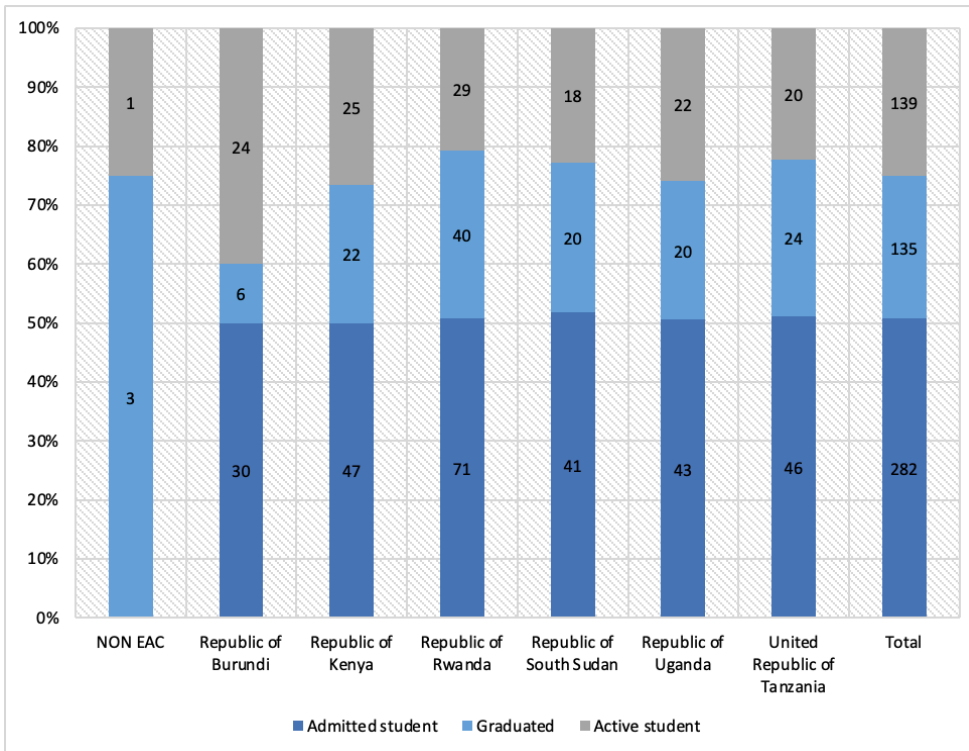


Figure 1: MHSCEM Enrolled, graduated and active students per Country

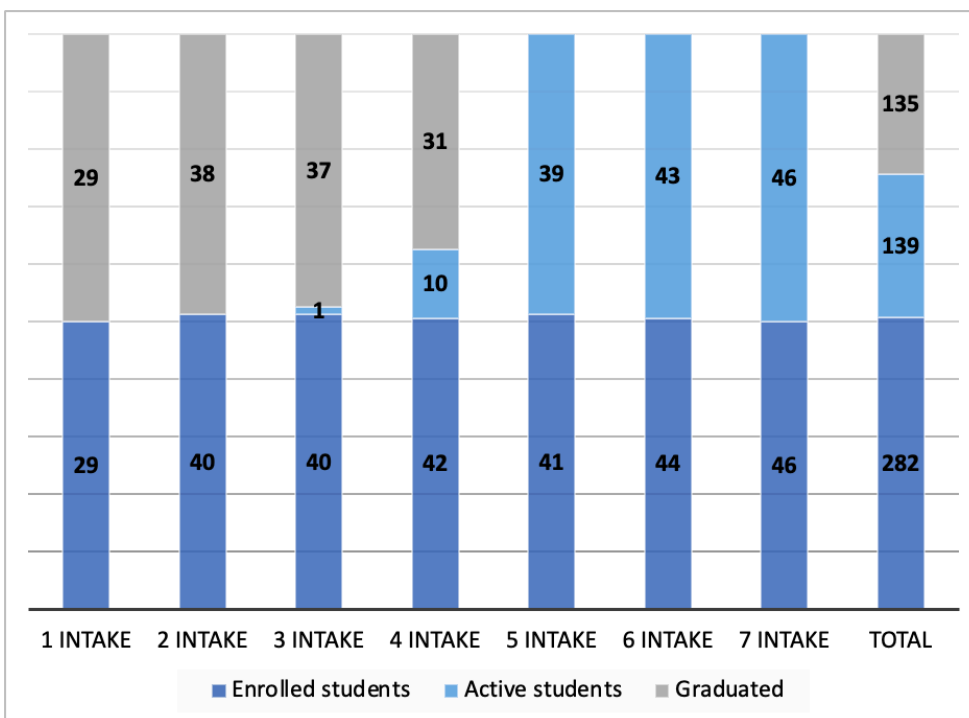


Figure 2: MHSCEM Enrolled, graduated, and active students per Intake

In terms of short term professional courses, the EAC RCE-VIHSCEM has successfully trained 2,664 professionals from November 2015 to December 2024 across a diverse range of specialized short courses tailored to the evolving needs of the health supply chain sector. The Centre trains professionals working in the public health sector across the East African Community (EAC) Partner States. Each Partner State is given an equal opportunity to nominate qualified candidates for the various courses offered. The Centre launched its first short course in General Health Supply Chain Management in November 2015 with support from the Bill & Melinda Gates Foundation through JSI. Scholarships are provided to support participation and the duration of the short courses typically ranges from five to ten days.

Since 2015, these courses have covered critical areas such as General Health Supply Chain Management (HSCM), Immunization HSCM, Forecasting and Quantification, Access-to-Medicines and Vaccines, and Governance, Transparency, and Accountability in Pharmaceutical Sector Procurement. The RCE has also addressed niche areas including Humanitarian Supply Chain Management, Global Effective Vaccine Management Assessment, Global Standards, Traceability and Verification Systems, and Cold-Chain Equipment Management.

The short course training model is built around three delivery modalities: mixed short courses, in-country courses and personalized private short courses to suit organizational needs. In addition to foundational knowledge, a key focus has been on upskilling in highly technical domains such as regulatory sciences, vaccine manufacturing, and quality assurance and quality control.

1.2. Tracer Study

Despite the significant investments in capacity-building programmes, there is limited data on the relevance of these programmes on graduates' competencies and career development. Without comprehensive data, it is challenging to assess whether the training provided aligns with the evolving needs of the health sector and contributes effectively to enhancing health supply chain systems and the vaccine manufacturing ecosystem. The lack of detailed follow-up studies on graduates and trainees means that the EAC RCE-VIHSCM cannot accurately measure the success of its programmes in terms of career progression and practice in the workplace. Testimonies suggest that graduates have benefited from the training, but systematic data collection and analysis are necessary to validate these claims. Additionally, understanding the challenges graduates face in implementing their training can provide valuable insights into potential gaps in the curricula and areas of improvement.

Furthermore, the absence of feedback from employers and other stakeholders limits the ability to gauge the real-world impact of the training programmes. Employers' perspectives on the performance and preparedness of graduates are crucial for assessing the relevance and effectiveness of the training. The feedback can also highlight the strengths and weaknesses of the current programs, guiding future improvements and ensuring that the training remains relevant to industry needs. Without this information, the EAC RCE-VIHSCM may potentially continue with programs that may not fully meet the demands of the health sector. Therefore, it is essential to conduct a tracer study to systematically collect and analyse data on graduates' career trajectories, the applicability of their training, and employer satisfaction. This study will provide the necessary evidence to validate the effectiveness of the programmes, identify areas for improvement, and ensure that the training provided continues to meet the needs of the health sector in the East African region and beyond.

1.3. Purpose of the tracer study

By conducting this Tracer Study, the Centre seeks to better understand the alignment of its training programmes with the current and future needs of HSC workforce in the region. The fundamental drive is to determine the relevance of EAC RCE-VIHSCM training programmes. Hence, it became necessary, among other factors, to identify where past graduates are and assess the extent to which they are utilizing the skills and qualifications they obtained from the Centre. The results will provide critical insights into how well the EAC RCE-VIHSCM prepares graduates for the complexities of the modern health supply chain environment and how it can continue to evolve as a leader in capacity building for HSC workforce. As a quality assurance tool, the tracer study will guide the EAC RCE-VIHSCM on how best to enable past and prospective graduates to upgrade their knowledge and skills by reviewing curricula that are relevant to addressing the labour market needs of private and public sector stakeholders.

1.4. Significance and relevance of the study

This study will provide valuable insights into the outcomes and effectiveness of EAC RCE-VIHSCM training programs by tracking the career paths and achievements of its graduates. This tracer study will help EAC RCE-VIHSCM to assess the alignment between curricula and labour market needs, enabling it to make informed decisions for quality improvement of its training programmes. The understanding of how the Centre's alumni utilize the gained knowledge and skills at the marketplace will enhance its offerings, improve student support services, and better prepare future graduates for successful careers.

The relevance of this study lies in its ability to bridge the gap between education and employment by systematically tracking the professional trajectories of our graduates from above captured programmes. By gathering data on our alumni's experiences, skills utilization, and career progression, this study will provide critical feedback to EAC RCE-VIHSCM's training programmes effectiveness. Furthermore, this tracer study will inform policymakers from the East African Community and beyond about the broader impact of the training initiatives on workforce development in the health sector. Overall, the insights gained from this tracer study will be essential for fostering a dynamic and responsive educational landscape that prepares students for successful careers.

1.5. Aim, and specific objectives

Aim

To determine the quality and relevance of the Master's in Health Supply Chain Management (MHSCM) Programme and training for the workplace, and the uptake of MHSCM Programme graduates by this market.

Specific Objectives:

- 1.To identify current locations and employment sectors of MHSCM Programme graduates.
- 2.To identify the prior employment of MHSCM Programme graduates before joining the Programme.
- 3.To assess the level of satisfaction with the MHSCM Programme and short course training
- 4.To assess the level of satisfaction with the current employment status
- 5.To assess the quality and relevance of the MHSCM Programme and short course training to workplace and career progression.
- 6.To identify gaps in the MHSCM Programme and training and areas for improvement
- 7.To explore employers' perceptions about the performance of MHSCM Programme graduates.

II. METHODOLOGY

2.1. Study design

A concurrent mixed-method study design with quantitative and qualitative approaches was used to determine the quality and relevance of the MHSCM Programme and training for the workplace and career progression.

2.2. Study Population and sampling

Through a census approach, this study involved 96 graduates from the first three cohorts of the MHSCM Programme. Additionally, it included 700 trainees from the following short course training conducted between 2019 and 2023: Immunisation Supply Chain Management, Cold Chain Equipment Management, Humanitarian Supply Chain Management, Governance, Leadership, Transparency and Accountability in Pharmaceutical Procurement, Use of Minilabs Equipment, Global Standards and Traceability of Health Products and Technologies, and Vaccinology. Trainees who attended short courses before 2019 were excluded from the study because the courses offered at the time were not fully owned by the Centre, and their contact information particularly email addresses could not be reliably traced. Most of the email addresses that were retrieved were no longer active, resulting in a high bounce-back rate. As such, this group could not be considered a representative sample of participants from that period. Similarly, trainees who attended after December 2023 were excluded, as it was assumed that the impact of the training would require at least one year to manifest. These individuals will be considered in the next tracer study.

The qualitative part was conducted and involved the following:

- For the MHSCM Programme: two in-depth interviews and three focus group discussions among the purposively selected graduates, and four key informant interviews among employers selected purposively. The characteristics considered for the purposive selection of the RCE graduates included mainly the cohort, country, and workplace.
- Short course training: two focus group discussions were conducted. These were selected based on the courses attended and their nationality to be able to have representations.

The quantity of focus group discussions and interviews was determined by the principle of saturation.

2.3. Data collection tools

The primary instruments for the study included online structured questionnaires for the quantitative components, along with a Focus Group guide, an interview guide, and a key informant guide for the qualitative components. All instruments were adapted from existing literature, particularly previous tracer studies, to ensure alignment and consistency with established methodologies while considering the study's objectives. Prior to the main data collection, a pilot study of the questionnaires was conducted with a few graduates from the fourth cohort and trainees randomly selected to evaluate the clarity, appropriateness, and reliability of the questionnaire for this specific study population. This pilot study allowed for adjustments to questions as needed and confirmed the contextual relevance of the instrument.

2.4. Data Collection Procedure

Before collecting data, the Training Unit of the EAC RCE-VIHSCM provided a complete list of all MHSCM graduates and trainees of short course training, along with their contact information. To inform graduates and trainees about the survey, messages were distributed through various communication channels. The primary channels utilized included email, Alumni WhatsApp groups, and mobile phone contacts of the graduates. Regular reminders were sent via email and Alumni WhatsApp groups to encourage participation in the online tracer survey until it closed.

Following the quantitative survey, the following participants were invited to participate in Focus group discussions:

For the MHSCM Programme:

- a.those that changed the employer after graduation,
- b.those that remained with the same employer after graduation, and they were promoted, and
- c.those that remained in the positions in the same the same employer but were not promoted.

For Short Course training,

Two heterogeneous focus group discussions were conducted and participants were selected based on different courses attended.

Besides, participants for the in-depth interviews and key informant interviews were also selected, and interviewed were respectively.

The researchers reached out to the selected participants to secure their consent for the study. Graduates were contacted via email or phone calls. Focus Group Discussions (FGDs) and interviews took place virtually in English, which allowed all participants from various partner states to engage. All FGDs and interviews were recorded, and notes were documented.

2.5. Data quality, cleaning, and analysis

The collected online data was downloaded in Excel and imported into SPSS for cleaning, coding, and analysis. Descriptive statistics were calculated for the population under study. Summary statistics, such as frequencies, means, standard deviations, modes, and medians, were generated and disaggregated by pre-established categories before analysis.

Thematic analysis was employed. Focus group discussions (FGDs) and interviews were recorded and transcribed, after which inductive coding was applied. Codes were assigned to each transcript and subsequently grouped into necessary sub-themes and overarching themes identified from the transcripts.

2.6. Ethical considerations

Ethical clearance was secured from the UR-CMHS IRB before starting the study. Informed consent was acquired from all participants prior to the study. We clarified that participation would be anonymous and voluntary, and that all collected information would remain confidential. During the focus group discussions, participants were introduced to each other and to the facilitator. As the discussions took place online, verbal consent was obtained before engaging in the audio-recorded session.

III. RESULTS AND INTERPRETATION

3.1. Introduction

To enhance clarity, the results are organized into two primary sections: (1) MHSCM Programme and (2) Short Course Training.

3.2. MHSCM Programme

As per the study objectives, the section examines the MHSCM Programme's effectiveness in preparing graduates for their current roles/responsibilities, current job satisfaction, MHSCM Programme's relevance to their career progression, areas where the MHSCM Programme may have had shortcomings, and recommendations for improvement.

Socio-demographic Characteristics of the Respondents

This tracer study targeted 96 graduates from MHSCM program. . Table 1 shows that 83 graduates participated in the study, which translates into a response rate of 86.45%. The majority of graduates are from Rwanda (33.73%), followed by Kenya (19.28%), South Sudan (15.66%), Uganda (12.05%), and Tanzania (14.46%), respectively. A small proportion (3.61%) of graduates are from non-EAC countries (Malawi and Sierra Leone). Most graduates come from EAC partner states because the Programme was designed to respond to the needs of human resources for health in the area of supply chain of vaccines and medical products in these specific countries.

The majority of the respondents were male (73.49%). Most graduates' age range from 33 years to over 45 years, with the largest group falling into the 36–40 age range (38.55%), followed by 41–45 years (28.92%), 33–35 years (13.25%), and >45 years (19.28%). The graduates were from the first three intakes as 28.92% of the graduates were enrolled in Intake 1 (2018–2019), 36.14% in Intake 2 (2019–2020), and 34.94% in Intake 3 (2020–2021).

These graduates completed their studies in 2023 (40.96%), 2022 (33.73%), and 2019 (25.30%), respectively. It is important to note that 20.73% already had a master's degree before joining the HSCM Programme. This significant proportion of those holding a master's degree at their enrollment in the Programme might indicate that they found it relevant to their job performance.

The graduates had various educational backgrounds prior to joining the graduate HSCM Programme. Given that the HSCM Program focuses on the health products supply chain, it is evident that the majority (81.71%) had a background in Pharmacy. Other educational backgrounds include nursing (4.88%), Public Health (2.44%), and related fields such as Business Studies (3.66%) and Health Systems Management (1.22%). One of the admission criteria for the HSCM Programme is two years of work experience in supply chain management. The graduates possessed extensive work experience before enrolment, with 28.05% having more than 10 years, 48.78% with 6–10 years, and 23.17% having 2–5 years of experience, respectively. The HSCM Programme mainly enrolled candidates from public institutions (91.46%), with a few from NGOs (4.88%), multilateral organizations such as WHO or UN (2.44%), and other private institutions (1.22%). The majority come from public institutions since the Program is an intervention supported by development partners who aid the public servants of the EAC partner states.

Table 1: Socio-demographic characteristics of the respondents

Variables	n(%)
Country of origin (n=83)	
Republic of Burundi	1 (1.20)
Republic of Kenya	16 (19.28)
Republic of Rwanda	28 (33.73)
Republic of South Sudan	13 (15.66)
Republic of Uganda	10 (12.05)
United Republic of Tanzania	12 (14.46)
Non EAC (Malawi and Sierra Leone)	3 (3.61)
Gender (n=83)	
Male	61 (73.49)
Female	22 (26.51)
Marital status (n=83)	
Married	79 (95.18)
Widow(er)	1 (1.20)
Separated	1 (1.20)
Single	2 (2.41)
Respondents' age (n=83)	
Up to 35	11 (13.25)
36 – 40 Yrs	32 (38.55)
41 – 45 Yrs	24 (28.92)
>45 Yrs	16 (19.28)
Students' intake (Academic Year) (n=83)	
Intake 1 (2018–2019)	24 (28.92)
Intake 2 (2019–2020)	30 (36.14)
Intake 3 (2020–2021)	29 (34.94)
Year of graduation (n=83)	
2019	21 (25.30)
2022	28 (33.73)
2023	34 (40.96)

Highest degree before joining the HSCM Programme (n=82)	
Bachelor's degree	65 (79.27)
Master's degree	17 (20.73)
Education Background at enrolment (n=82)	
Pharmacy	67 (81.71)
Nursing	4 (4.88)
Public Health	2 (2.44)
Business studies	3 (3.66)
Environmental Health	1 (1.22)
General Medicine	1 (1.22)
Dental Therapy	1 (1.22)
Health Systems Management	1 (1.22)
Procurement & Logistics Management	1 (1.22)
Other	1 (1.22)
Work experience prior to enrolment (n=82)	
2–5 years	19 (23.17)
6–10 years	40 (48.78)
More than ten years	23 (28.05)
Type of institution worked for before enrolment (n=82)	
Public Sector (Government)	75 (91.46)
Non-Governmental Organization (NGO)	4 (4.88)
Multilateral Organization (e.g., WHO, UN)	2 (2.44)
Other	1 (1.22)
Year of graduation (n=83)	
2019	21 (25.30)

Source of information about the HSCM Programme

Generally, the participants learnt about the MHSCM Programme through various channels. The sources of information included colleagues (51.81%), RCE graduates (27.71%), employers (22.89%) and the RCE website (20.48%), Figure 3.

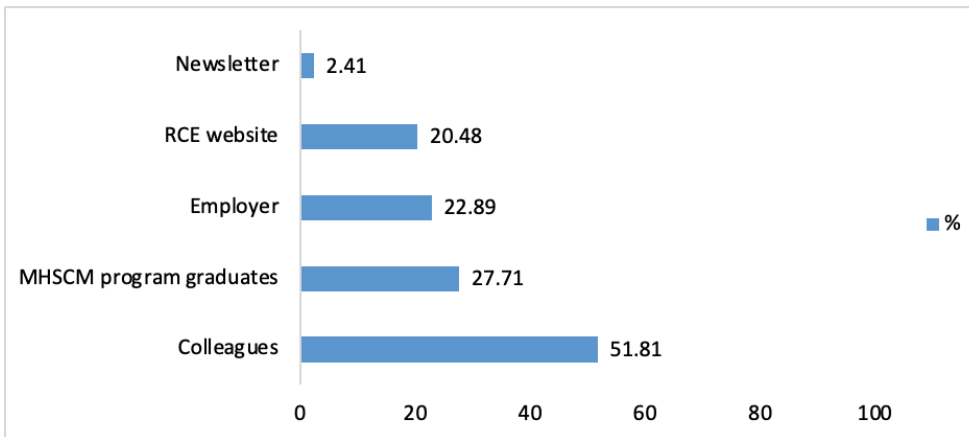


Figure 3: Source of information about the MHSCM Programme (n=82)

Overall graduate's satisfaction with RCE HSCM Programme

Overall, the graduates expressed a high level of satisfaction with the learning experience at the EAC RCE-VIHSCM. A significant number of graduates were very satisfied (50.00%) and satisfied (43.80%) with the MHSCM Programme. In addition, the modules were reported as comprehensive and up-to-date by nearly all respondents (98.75%). Figure 4 provides more details.

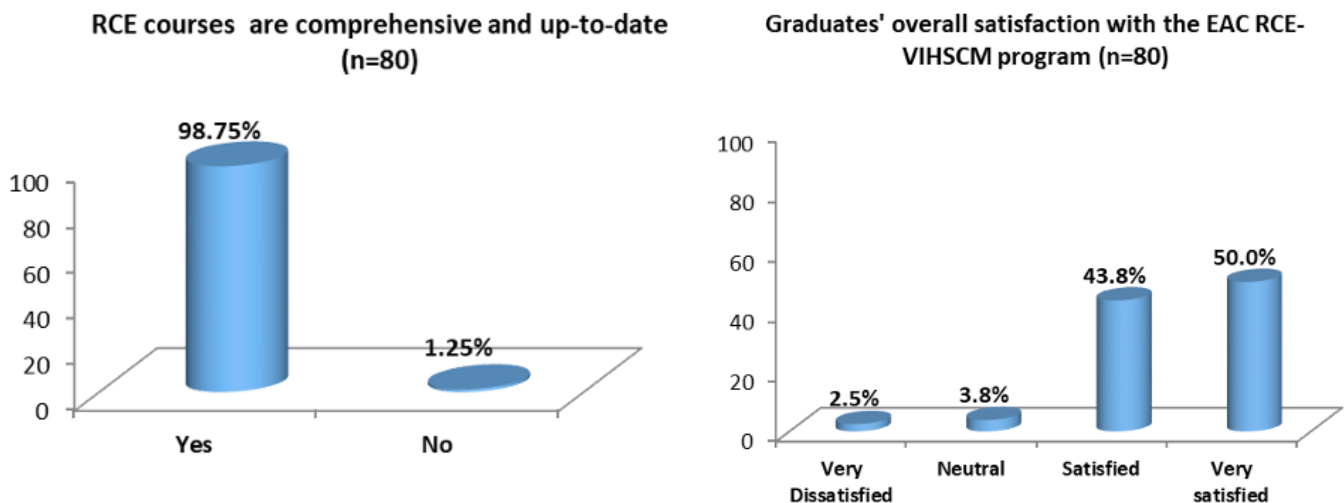


Figure 4: Comprehensiveness of the HSCM Program and overall satisfaction of the graduates

This strong satisfaction level highlights the significance of the Programme needs assessment carried out in 2014, which pinpointed the necessary requirements and guided the curriculum development. Additionally, program delivery is managed by experienced faculty and industry experts.

Graduates' learning experience at the EAC RCE-VIHSCM

The learning and teaching experiences were generally rated excellent and very good by the graduates of the MHSCM. Table 2 indicates that the overall quality of teaching and faculty guidance received favourable feedback, with 33.75% graduates rating it as excellent and 56.25% of graduates rating it as very good., the face-to-face learning was generally excellent (47.50%) or very good (47.50%). The positive experience might be due to the fact that face-to-face learning fosters high level of interaction between learners and the facilitator. The experience with online learning was multifaceted with 26.25%, 48.75% and 22.50% of graduates considering it as excellent, very good and good respectively. This experience can be attributed to poor internet connectivity and ICT facilities in some graduates' work places or competing activities during the class sessions. The examination arrangements are rated excellent (43.75%) and very good (40.00%), indicating that the examination process met the expectations of most participants. Peer collaboration was mainly excellent (33.75%) or very good (45.00%).

While the majority of graduates reported positive learning experiences across most HSCM Programme components, However, the field placement received comparatively lower ratings. Specifically, only 13.75% of graduates rated the field placement as excellent, and 38.75% rated it as very good. A significant portion of graduates (35.00%), rated their experience with field placement as good, while 12.50% reported it as less satisfactory. They propose that field placement be conducted in a different institution from where they work. One graduate stated:

"I was thinking, why not have some of these field visits or attachments in other countries? I know it would be quite costly initially, but perhaps we could consider that there might be a country doing things significantly better than others. Even such an attachment, for instance, if we were to go to a central medical store or any other organization, might offer more learning than what we would get in class". (Participant, FGD 1)

Supervision of field attachment might also be the reason of their reported experience. Another graduate stated:

"You can make a little improvement in how you supervise the field attachment. You know a student remains a student. I think, at least in every country, there are some lecturers. So maybe you can assign for instance your lecturers who are in Tanzania, who come and supervise those field attachment lecturers who are in South Sudan, who go and supervise those field in other countries." (Participant, FGD 2)

Table 2: Learning and teaching experience at the EAC RCE-VIHSCM

Learning experience	Excellent n(%)	Very good n(%)	Good n(%)	Not good n(%)	Poor n(%)
The overall quality of teaching and faculty	27 (33.75)	45 (56.25)	8 (10.00)	0 (0.0)	0 (0.0)
Face to face learning	38 (47.50)	38 (47.50)	4 (5.00)	0 (0.0)	0 (0.0)
Experience with online learning	21 (26.25)	39 (48.75)	18 (22.50)	2 (2.50)	0 (0.0)
Examination arrangements	32 (40.00)	35 (43.75)	13 (16.25)	0 (0.0)	0 (0.0)
Field placement	11 (13.75)	31 (38.75)	28 (35.00)	10 (12.50)	0 (0.0)
Quality of peer collaboration while	27 (33.75)	36 (45.00)	16 (20.00)	1 (1.25)	0 (0.0)

Modules' delivery efficiency at EAC RCE-VIHSCM

The graduates were asked to rate the efficiency of module delivery in the HSCM Program, as presented in Table 3. While most modules received high ratings, with over 75% of graduates rating them as excellent or very good, field attachment and research project supervision received more mixed feedback. Specifically, 52.6% of graduates rated field attachment as good or not good, while 42.5% provided similar ratings for research project supervision.

The data regarding module delivery efficiency at EAC RCE-VIHSCM shows generally favorable feedback, especially for modules like "Introduction to Health Supply Chain Management," "Health Products and Technologies Selection," and "Strategic Procurement," which received high ratings. In contrast, the Field Attachment and Research Project Supervision modules garnered mixed reviews, indicating potential improvements needed in field placements and research supervision. Nevertheless, the overall positive feedback highlights the programme's success in addressing students' needs in health supply chain management.

Table 3: Modules delivery efficiency at EAC RCE-VIHSCM

Modules delivery efficiency	Excellent n(%)	Very good n(%)	Good n(%)	Not good n(%)	Poor n(%)
Introduction to Health Supply Chain Management (n=80)	37 (46.30)	33 (41.30)	9 (11.30)	1 (1.30)	0 (0.0)
Health Products, Technologies Selection, Quantification, and Procurement (n=80)	32 (40.00)	32 (40.00)	14 (17.50)	2 (2.50)	0 (0.0)
Health Products and Technologies Storage and Distribution (n=79)	41 (51.90)	22 (27.80)	16 (20.30)	0	0 (0.0)
Introduction to Human Resources Management (n=80)	31 (38.80)	33 (41.30)	14 (17.50)	2 (2.50)	0 (0.0)
Field Attachment (n=80)	14 (17.50)	23 (28.70)	35 (43.80)	7 (8.80)	1 (1.30)
Equipment Management (n=79)	23 (29.10)	41 (51.90)	31 (39.20)	2 (2.50)	0 (0.0)
Resources Management (n=78)	24 (30.80)	40 (51.30)	13 (16.70)	1 (1.30)	0 (0.0)
Leadership and Personal Management (n=80)	29 (36.30)	34 (42.50)	15 (18.80)	2 (2.50)	0 (0.0)
Strategic Procurement (n=79)	31 (39.20)	31 (39.20)	16 (20.30)	1 (1.30)	0 (0.0)
Applied Research Methods (n=80)	26 (32.50)	35 (43.80)	17 (21.30)	2 (2.50)	0 (0.0)
Optimization of Health Supply Chain Systems (n=79)	26 (32.90)	33 (42.80)	19 (24.10)	1 (1.30)	0 (0.0)
Integration of technology in Health Supply Chain Management (n=79)	25 (31.60)	38 (48.10)	15 (19.00)	1 (1.30)	0 (0.0)
Research project supervision (n=80)	20 (25.00)	26 (32.50)	23 (28.70)	11 (13.80)	0 (0.0)

Current locations and employment sectors

shows that the vast majority (97.50%) of MHSCM program graduates remain employed, while only two (2.50%) are no longer employed due to contract expiration or are working as independent consultants.

Of the 78 graduates still employed, 58.97% remained at the same organization as before enrolment into the Program, while 41.03% have moved on to different organizations. Among the 46 graduates who transitioned to a new position within their organization, 58.70% took on new roles, while 41.30% stayed in their previous positions. The job transition was considered a promotion for 88.89% of those who moved, while 11.11% did not experience a promotion. The data reveals a high employment retention rate among graduates, with most still employed. In terms of changing employers after graduation, 65.52% of the 29 graduates who changed their employers, had changed once, 27.59% had changed twice, and 6.90% had changed three times. Regarding the type of organization graduates are currently working for, 39.29% are employed in the public sector (government), 17.86% in the private sector, 32.14% in non-governmental organizations (NGOs), and 10.71% in multilateral organizations like WHO or the UN.

Many of the graduates remained with the same organization. However, a significant portion has transitioned into new positions, with most of these transitions being promotions. This progression underscores the value of the MHSCM qualification in a sector where advanced skills are highly sought after. These results indicate that the Program increased their job opportunities and career development. The fact that more than 60% of those who changed employers moved to non-public institutions highlights the need to reassess staff retention strategies within the public sector.

As for the year they joined their current employers, 3.45% joined in 2018, 17.24% in 2020, 20.69% in 2021, 13.79% in 2022, 13.79% in 2023, and 31.03% in 2024. Regarding work experience in their current positions, 41.38% have been in their roles for up to 1 year, 31.03% for between 1 and 3 years, and 27.59% for more than 3 years. [Table 4](#) provide more details.

Table 4: Employment status after graduation

Variables	n(%)
Still employed (n=80)	
Yes	78 (97.50)
No (Contract expired and Independent Consultant)	2 (2.50)
Graduate is still employed at the same organisation as before enrolment (n=78)	
Yes	46 (58.97)
No	32 (41.03)
Graduate transitioned to a new position within the organisation after graduation (n=46)	
Yes	27 (58.70)
No	19 (41.30)
The Job transition represent a promotion (n=27)	
Yes	24 (88.89)
No	3 (11.11)

Frequency of changing the employer after graduation (n=29)	
Once	19 (65.52)
Twice	8 (27.59)
Three times	2 (6.90)
Current type of Organization working for (n=28)	
Public Sector (Government)	12 (41.38)
Private Sector	4 (13.79)
Non-Governmental organisation (NGO)	8 (27.59)
Multilateral Organization (eg WHO, UN)	5 (17.24)
The year the graduate joined the current employer (n=29)	
2018	1 (3.45)
2020	5 (17.24)
2021	6 (20.69)
2022	4 (13.79)
2023	4 (13.79)
2024	9 (31.03)
Work experience in the current position (n=29)	
Up to 1 Year	12 (41.38)
Between 1-3 years	9 (31.03)
Above 3 years	8 (27.59)

Graduates were asked to what extent they believe the HSCM Programme contributed to the reported promotions. From the qualitative findings, graduates indicated that this programme played a significant role in the reported promotions. Some graduates mentioned:

“The skills and knowledge I gained from the course could account for about 80% of my promotion. This is based on the fact that as we completed the courses, my work improved significantly. With this improvement, I received some recognition and recommendations. I found that even before finishing the course, I had already been acknowledged for my good work, which made it easier to get promoted.”(Participant, FGD 1)

“I can confidently say that the HSCM programme contributed to over 90% of my promotions” (Participant, FGD 1)

Level of satisfaction of MHSCM Programme graduates with their current employment status

The graduates expressed varying levels of satisfaction with different aspects of their current jobs as presented in Table 5. A significant majority (52.60%) reported being satisfied with their overall job, with 36.80% indicating that they were very satisfied. Only a small portion (9.20%) felt neutral, and a minimal number (1.30%) were dissatisfied. When it comes to their work environment, 60.50% of the respondents were satisfied, and 21.10% were very satisfied, while 15.80% felt neutral, and 2.60% were dissatisfied. Regarding career advancement opportunities, 39.50% of graduates were very satisfied, 44.70% satisfied, and a smaller proportion (13.20%) were neutral, with 2.60% expressing dissatisfaction.

Salary satisfaction showed more mixed results, with only 10.50% very satisfied, but 43.50% were satisfied. Many respondents (27.60%) felt neutral about their salaries, while 14.50% were dissatisfied, and 3.90% were very dissatisfied. Regarding job benefits, 53.90% were very satisfied, and 28.90% satisfied, with only 9.20% neutral and 2.60% dissatisfied. When asked about their employer's satisfaction with the skills acquired during the Master's HSCM Program, 39.70% of graduates felt that their employers were very satisfied, while 42.30% thought their employers were satisfied. Only 12.80% were neutral, and 2.60% expressed dissatisfaction.

Satisfaction with recognition for workplace contributions was another positive aspect, with 38.20% very satisfied and 53.90% satisfied. Only 7.90% felt neutral, and 1.30% were dissatisfied. Similarly, regarding relationships with colleagues and team dynamics, 38.20% were very satisfied, and 53.90% were satisfied, while 7.90% felt neutral.

These responses highlight that while most graduates were generally satisfied with their jobs and the recognition they received, there were areas such as salary and certain work conditions where satisfaction levels were more mixed.

In terms of satisfaction, graduates expressed high levels of contentment with the professional growth opportunities the program had provided. However, a notable concern was the dissatisfaction with compensation, specifically regarding salaries and other benefits. The MHSCM graduates came from different EAC countries, with different labor conditions and socio-economic stability. It is believed that addressing these concerns could improve retention rates and job satisfaction, which is crucial for long-term career development in the sector.

Table 5: Graduates' job satisfaction

Variables	Very satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
Overall satisfaction with your current job	28(36.80)	40(52.60)	7(9.20)	1(1.30)	0 (0.0)
Satisfaction with the work environment	16 (21.10)	46 (60.50)	12 (15.80)	2 (2.60)	0 (00)
Satisfaction with opportunities for career advancement in your current position	30 (39.50)	34 (44.70)	10 (13.20)	2 (2.60)	0 (0.0)
Satisfaction with your job salary	8 (10.50)	33 (43.40)	21 (27.60)	11 (14.50)	3 (3.90)

Satisfaction with other job benefits	4(5.30)	41 (53.90)	22 (28.90)	7 (9.20)	2 (2.60)
Perceived employer satisfaction with the skills you gained during the MHSCM Programme	31 (40.80)	33 (43.40)	10 (13.20)	1 (1.30)	1 (1.30)
Satisfaction with the recognition for your contributions at the workplace	25 (33.30)	36(48.00)	13 (17.30)	1 (1.30)	0 (0.0)
Satisfaction with your relationships with colleagues and team dynamics	29 (38.20)	41 (53.90)	6 (7.90)	0 (0.0)	0.(0.0)

Consistent with the quantitative findings, graduates also expressed job satisfaction during the focus group discussions:

“I would say that I am very satisfied with my current job and work environment. There are a few challenges, but I think we live for those challenges and they make work interesting.” (Cohort 1, FGD 1)

I'm actually very satisfied at work. I am satisfied with the level of support I'm receiving from my immediate supervisors. I also feel valued and respected by my colleagues. Furthermore, I believe that my tasks and responsibilities align well with my skills, expertise, and career goals. I find my work quite meaningful and impactful. Additionally, I'm content with the rewards I receive for my current efforts.”(Participant, FGD 1)

Relevance of the MHSCM Programme to their professional requirements and career progression

The relevance of the RCE HSCM Program to the graduate current job and career progression is reported in the following, indicating the application of the knowledge and skills gained in the current position

Application of knowledge and skills gained in the current position

Regarding the application of knowledge and skills gained in their current positions, the majority of MHSCM Programme graduates reported a high application across several skill categories, [Table 6](#) Reference source not found.. In technical skills, 38.20% of graduates applied their knowledge to a very large extent, while 53.90% applied it to a large extent. Only 6.90% applied it to some extent, and 1.30% applied it to a little extent. No graduate reported not applying technical skills at all.

For leadership and management skills, 43.20% applied these skills to a very large extent, and 47.30% applied them to a large extent. A small proportion (9.50%) applied them to some extent, with no graduates reporting little or no application of these skills.

In communication skills, 48.70% of graduates applied them to a very large extent, and 43.40% applied them to a large extent. Only 6.60% applied communication skills to some extent, and 1.30% applied them to a little extent. Again, no graduates reported not applying communication skills at all.

For ICT skills, 32.90% applied them to a very large extent, and 44.70% applied them to a large extent. A smaller portion (19.70%) applied ICT skills to some extent, while 1.30% applied them to a little extent, and another 1.30% did not apply ICT skills at all.

Finally, in problem-solving skills, 51.30% applied them to a very large extent, and 42.10% applied them to a large extent. Only 3.90% applied them to some extent, and 2.60% applied them to a little extent. No graduates reported not applying problem-solving skills at all.

The results generally show that the knowledge and skills acquired during the Programme were reported to be extensively applied in their current positions. This reflects the match between the programme content and the industry needs.

Table 6: Application of knowledge and skills gained in the current position

Skills Category	Scale Very large extent	Large extent	To some extent	Little extent	Not at all
Technical skills (n=76)	29 (38.20)	41 (53.90)	5 (6.90)	1 (1.30)	0 (00)
Leadership and Management skills (n=74)	32 (43.20)	35 (47.30)	7 (9.50)	0 (00)	0 (00)
Communication skills (n=76)	37 (48.70)	33 (43.40)	5 (6.60)	1 (1.30)	0 (00)
ICT skills (n=76)	25 (32.90)	34 (44.70)	15 (19.70)	1 (1.30)	1 (1.30)
Problem solving skills (n=76)	39 (51.30)	32 (42.10)	3 (3.90)	2 (2.60)	0 (00)

The relevance of the MHSCM Programme was evaluated by examining the connection between graduates' current positions and the MHSCM. As shown in Table 6 Reference source not found., the findings reveal a strong positive relationship. A majority of graduates (75%) indicated that their current job is very closely aligned with the MHSCM Programme, while 11.8% felt their roles were closely related. When asked about the preparation the MHSCM Program provided for their current positions, 48.7% of graduates believed they were prepared to a great extent, and 40.8% felt they were very well prepared.

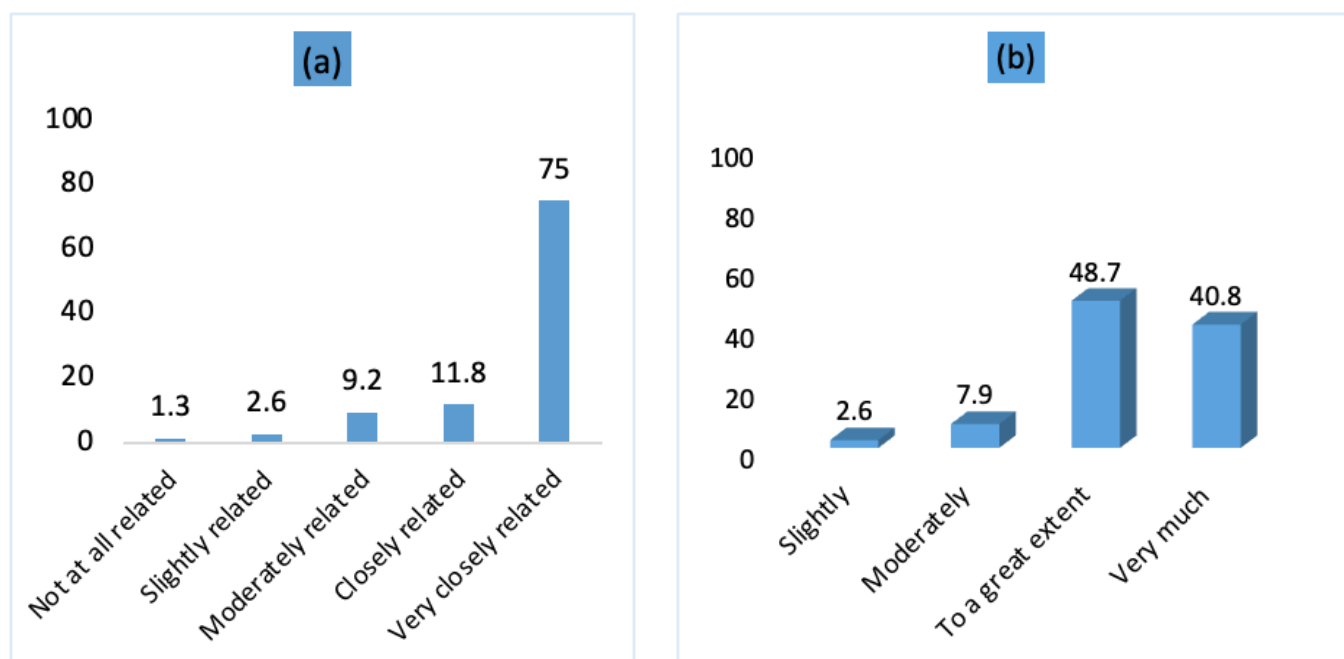


Figure 5: Relevance of HSCM Programme to Graduate Roles (n=76) ((a) alignment with current responsibilities (b) Programme prepared graduates for the current role)

Further, the contribution of the MHSCM Program to career progression was also reported. Error! Reference source not found. indicates that the MHSCM Programme contributed significantly to graduates' career development, particularly in key domains. The highest percentage of graduates (83.13%) indicated that the MHSCM Program enhanced their technical expertise, followed by leadership skills (74.7%), professional network (73.49%), and research capabilities (72.29%). Additionally, 55.42% felt that the MHSCM Program provided valuable international exposure. Most of graduate come from health discipline, this show the contribution of the programme in all program design structure since almost all of them were rated above 70%.

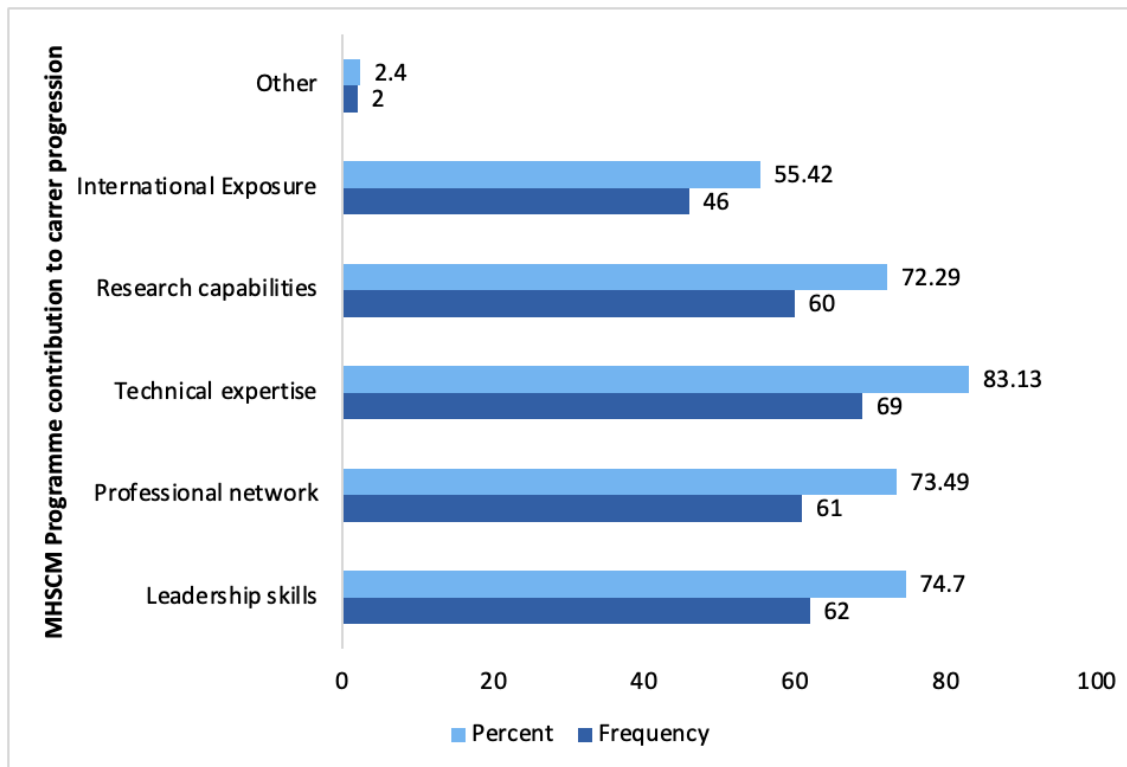


Figure 6: MHSCM Programme's contribution to graduate career development (n=76)

Overall strength of the RCE MHSCM Program

Besides reporting the contribution of the HSCM Program to career progression, the graduates also generally reported several key strengths of the HSCM Program and these are reported in Table 7. A significant number appreciating its quality in terms of design, structure, content, learning materials, the overall implementation, coordination, and management, which was highlighted by 43.75% of respondents. A majority of respondents (42.50%) also valued the flexibility offered by the blended delivery mode, which allowed them to attend the HSCM Program while continuing their work, thanks to the integration of ICT. The quality of teaching, especially with hands-on experience and instructors who possess regional and international expertise, was another highlighted strength, noted by 30.00% of graduates. Additionally, 21.25% of graduates emphasized the student-centered and peer-to-peer learning environment, which facilitated collaboration and active engagement. The HSCM Program's supportive approach to student facilitation also contributed to creating an effective learning atmosphere, as noted by 18.75% of respondents.

Furthermore, 12.50% of graduates acknowledged the quality of research, which led to numerous publications, alongside the HSCM Program's inclusivity and regional representation, recognized by 11.25% of graduates. Several graduates (10.00%) noted the real-world relevance of the courses, which were closely linked to current industry trends and work experience, offering valuable insights into addressing regional challenges.

The study findings revealed that the strengths of the programme lie in its design, delivery, and content. They underscored the flexibility offered by the blended learning mode. The Programme's strength was also highlighted by the graduates' employers. They expressed their satisfaction with the graduates' competencies and preparedness for the job challenges, especially those related to managing health supply chains.

Table 7: Overall strengths of the HSCM Program (n=80)

Key strengths	n(%)
Quality HSCM Program design, structure, content, learning materials, implementation, coordination and management	35 (43.75)
Flexibility for attendance due to its delivery mode (Blended) with use of ICT – attended and working	34 (42.50)
Quality of teaching with hands-on experience and teaching staff members with regional and international exposure and expertise	24 (30.00)
Student-centered and peer-to-peer learning	17 (21.25)
Student facilitation enables the learning environment	15 (18.75)
Quality of research enabling publication	10 (12.50)
Inclusiveness with regional representativeness	9 (11.25)
Real-world experience (courses linked with work experience) with trending topics	8 (10.00)
The HSCM Program addresses real regional problems	7 (8.75)

Challenges MHSCM Programme graduates face in their current responsibilities

Graduates reported varying levels of challenge in applying the knowledge and skills acquired during their Masters of HSCM Program to their current work [Table 8](#). The majority, 55.40%, indicated that applying academic knowledge to their jobs was not challenging at all, while 29.70% found it slightly challenging. A smaller portion (10.80%) found it moderately challenging, and just 4.10% viewed it as very challenging, with no respondents reporting it as extremely challenging.

When it comes to performing their jobs in the face of skill gaps not covered during their studies, 52.70% reported that this was not challenging at all, and 35.14% found it slightly challenging. Only 10.81% felt that it was moderately challenging, and a very small number (1.35%) described it as very challenging, with no one reporting it as extremely challenging.

Regarding the alignment of qualifications with job requirements, 67.57% of respondents felt that meeting job requirements based on the knowledge gained from the Masters of HSCM Program was not challenging at all. Only 22.97% found it slightly challenging, while 6.75% viewed it as moderately challenging. A small percentage (1.35%) felt it was very challenging or extremely challenging.

Finally, when aligning the skills gained from the Master's HSCM Program with industry expectations, 58.11% felt that this was not challenging at all. 28.38% found it slightly challenging, while 10.81% found it moderately challenging. The majority of the Graduates of the MHSCM programme expressed that their current work is not challenging at all or slightly challenging. This shows that the knowledge and skills learnt equipped them with necessary knowledge and skills needed to perform their duties. The reported level of challenges in applying the acquired knowledge and skills may be attributed to work environment. Recalling that healthcare funding is at different levels in EAC countries.

Table 8: Acquired knowledge and skills’ application challenges in current work (n=74)

Variables	Level of challenge				
	Not Challenging at All	Slightly Challenging	Moderately Challenging	Very Challenging	Extremely Challenging
Application of knowledge gained to current work	41 (55.40)	22 (29.70)	8 (10.80)	3 (4.10)	0 (0.0)
Performing job due to gaps in skills	39 (52.70)	26 (35.14)	8 (10.81)	1 (1.35)	0 (0.0)
Meeting the job requirements	50 (67.57)	17 (22.97)	5 (6.75)	1 (1.35)	1 (1.35)
Alignment of the skills gained with industry’s practical demands and expectations	43 (58.11)	21 (28.38)	8 (10.81)	1 (1.35)	1 (1.35)

Gaps in the MHSCM Programme and recommendations for improvement

The following section explores the identified gaps within the RCE training HSCM Program, areas where the graduates think that the RCE HSCM Program fell short in preparing them for the market demand, suggested topics that either need to be emphasized more or need to be included in the HSCM Program, and other general weakness in the HSCM Program that needs to be improved. Since these gaps can create significant barriers to graduates’ employment and impacting not only the graduates’ confidence and employability but also the overall competency, this section therefore, provides recommendations indicating how the reported gaps can be addressed to enhance graduate preparedness and align training outcomes with market demands.

Perceived gaps in the MHSCM Programme

Figure 7 shows perceived gaps in the MHSCM programme curriculum. The majority of respondents 71.1% indicated that there are no perceived gaps in the MHSCM Programme. Participants reported different areas where the HSCM Program falls short in adequately preparing them for current job positions, Figure 8 shows the top priority areas reported include integration of technology in Health Supply Chain Management, cold chain management, Health Supply Chain management optimization, and strategic procurement and management.

Out of the total number of respondents who reported gaps, 58.7% indicated the lack of hands-on learning or practical experience should be more integrated into the curriculum. While 56% believed that the curriculum was sufficiently comprehensive in terms of course offerings, 44% believed that there were topics or courses missing or underemphasized in the MHSCM programme.

Regarding the need for additional training or refreshers to stay aligned with current work requirements, majority 85.33% of graduates acknowledged the need for further training.

Overall, the graduates of MHSCM reported no perceived gaps in the Program structure, delivery, field placement and hands on experiential learning. This may be due to robust curriculum development, which is market driven, experienced faculty and conducive learning and teaching environment. However, a small number of graduates reported perceived gaps in the MHSCM programme.

More than a half of the respondents expressed needs to enhance hands on training. This may be attributed to the limited industrial rotations including study visits and mentorship during fields attachment. These gaps will be addressed in the revised curriculum of the MHSCM. Slightly under half of the respondents, reported missing or underemphasized topics. These findings point to the need for improved use of AI and information technology, health supply chain optimization, use of modeling software in forecasting and quantification, international procurement, cold-chain system and effective vaccines management. A significant number of respondents reported an additional need for training or refreshers to stay aligned with their current work. These perceptions are informed by a rapidly health supply chain management environment, especially after COVID-19 disruptions and emerging technologies. Starting summer programs and continuous capacity building by employers will resolve this gap.

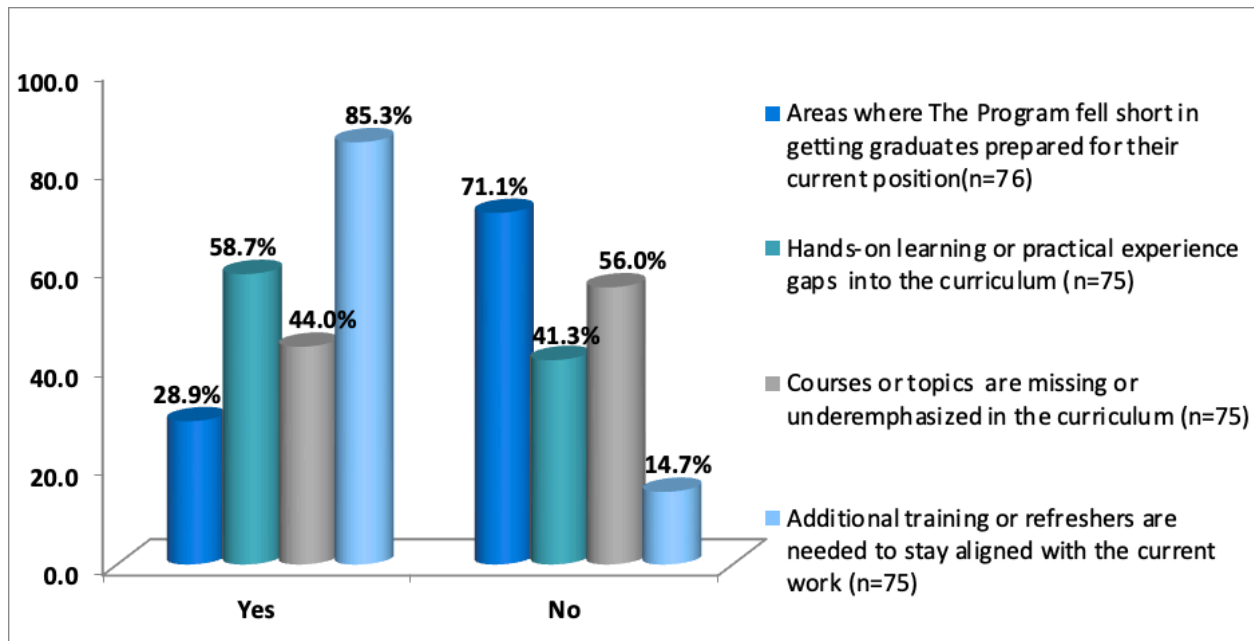


Figure 7: Perceived gaps in MHSCM Programme

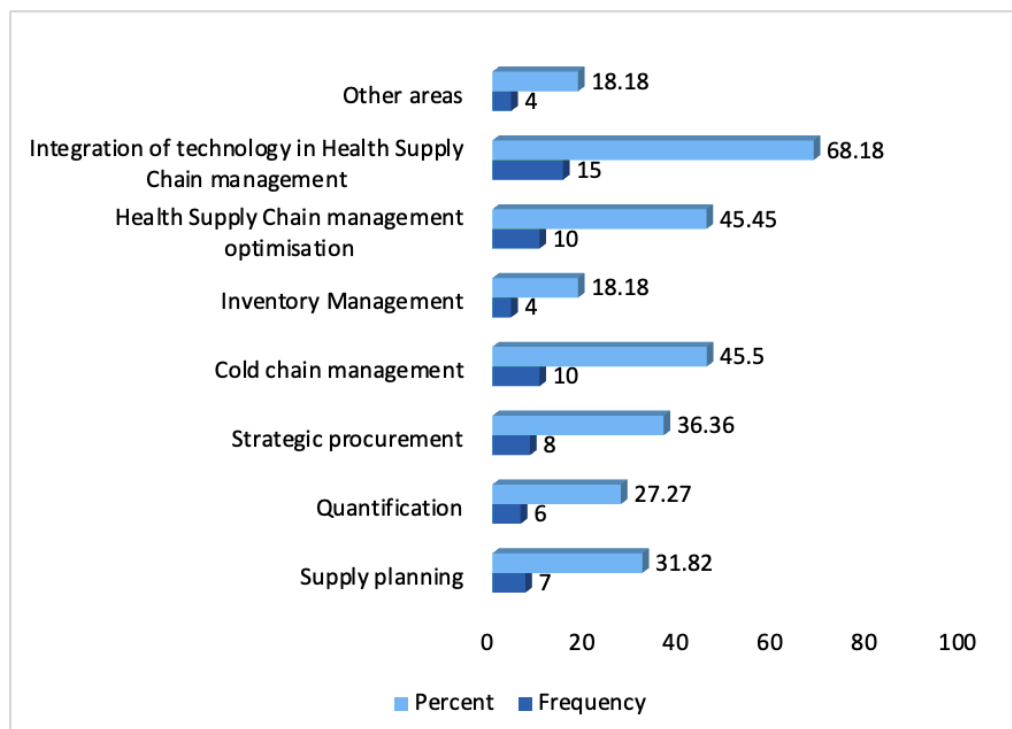


Figure 8: Areas where the RCE training HSCM Program fell short

Similar to the quantitative findings, qualitative results also reported the integration of technologies in health supply chain management as an area that need improvement:

“As we know, everyone is moving toward AI and machine learning. Therefore, we need to stay updated about that. Additionally, I mentioned the importance of equipment management. I always review my transcripts and notice that this is where I had the lowest scores. However, as I mentioned earlier, it’s also where I was learning. I believe we need to place more emphasis and allocate more time to these particular units.”(Participant, FGD 1)

Other graduates expressed need to expand the leadership and management course to include other soft skills:

“Since most students often transition into leadership roles after graduation, we should expand the focus on soft skills and leadership to include team management, stakeholder engagement, and change management. This will strengthen their readiness to lead effectively.”(Participant , FGD 1)

Areas of improvement of the RCE HSCM Program delivery

Some graduates reported areas of improvement in the HSCM Program that challenged them during their academic experience. Those include, modules sequencing, some content duplication, duration of face to face classes, possibility of elective modules, field placement and study visits, improvement of communication between students and supervisors.

Like the quantitative findings, discussions in the Focus Groups revealed that field visits and placements are crucial areas that require improvement.

“The courses were well-prepared and effective. My friend mentioned the field attachment, and I would also like to revisit that topic. It definitely deserves more emphasis. Alongside other courses, practical experiences should be incorporated, particularly through field visits. For instance, when studying storage and distribution, the center could arrange visits to the central warehouse in the area, such as the central medical store in Rwanda. While some may be familiar with it, the course program often includes individuals who may not be involved in storage and distribution. I want to emphasize that each course should include either a field visit or practical experience. We often learn theoretically, but we tend to forget what we learned until we see it in practice.”(Participant, FGD 1)

Another graduate added:

I believe the program provided a strong theoretical foundation. The structured internships at the hospital level could have allowed students to apply what they were learning in real-world settings, but such placements were not widely available. Consequently, we focused on our employment settings, which created some challenges. Although we did have live supply chain simulations, it sometimes became difficult to translate what we had studied into actual supply chain scenarios. It could be valuable to incorporate experiences that are particularly beneficial for students working in critical areas, preparing them for larger roles so they can make decisions even under pressure. (Participant, FGD 1)

Other graduates proposed even to have field placements out of their countries. One graduate stated:

I was thinking, why not have some of these field visits or attachments in other countries? I know it would be quite costly initially, but perhaps we could consider that there might be a country doing things significantly better than others. Even such an attachment, for instance, if we were to go to a central medical store or any other organization, might offer more learning than what we would get in class. If we could explore options like that- I spoke with some colleagues who are involved in other global supply chain courses, and they are securing placements in various countries and organizations, even if those weren’t health supply chain roles. They managed to secure placements in multinationals like J&J and other global companies, and the experience someone would gain from that would be truly enlightening. (Participant, FGD 1)

Supervision of filed attachment also was reported as an area that need improvement:

“You can make some little improvement in how you supervise the field attachment. You know a student remain a student. I think, at least in every country, there are some lecturers. So maybe you can assign for instance your lecturers who are in Tanzania, who come and supervise those field attachment lecturers who are in South Sudan, who go and supervise those field in other countries.” (Participant, FGD 2)

In addition to quantitative findings, graduates expressed other topics they would like to see included in the MHSCM Programme. They stated:

“I believe certain aspects of the course were underemphasized. When the first speaker discussed Advanced Data Analytics and supply chain technology, he underscored the necessity for comprehensive training in modern tools like AI forecasting, data analytics, and cold chain technologies. These elements are increasingly crucial for optimizing the intricate health supply chain, so we should delve deeper into this.”(Participant, FGD 1)

“We could engage in health supply chain data analytics, and performance monitoring. I know several colleagues who aren't familiar with using various performance metrics, so they could benefit from learning how to work with data analytics tools. They could apply dashboards, making those skills quite significant, especially regarding efficiency and accountability.”(Participant, FGD 1)

“I think you can add a component on how supply chain specialist can leave in this era of artificial intelligence out of that there is much knowledge which you are putting now will soon or later not be needed anymore due to the coming of this artificial intelligence so we need also to adjust our, our, our, our program in line with the use of artificial intelligence.” (Participant, FGD 2)

Employers' perceptions about the performance of MHSCM programme graduates

The employers reported their perceptions about the performance of the graduates of the MHSCM Programme. Overall theme was divided into four categories (1) technical skills; (2) leadership and management; (3) confidence; and (4) Satisfaction with the Graduates' performance. These are described in details in the following section.

Technical skills

Overall, employers reported that the graduates of the HSCM Programme have technical skills which have enhanced their overall performance at their workplace. Some participants expressed:

“On a technical level, you see that people are talking about technical terms like processes like trends that are going on in the supply chain, things like that. So it gives you a good impression about the employee to know that they know what they're talking about, they're following trends in the supply chain” (Participant, KII 1).

I realize that for them, the way they present, for example, the reports and their contributions in different technical meetings, or when we assign them technical tasks, [...]they conduct personal research and document their findings to propose solutions to management.(participant, KII 3)

Some participants also compared HSCM Programme graduates with those programmes from top ranking universities, suggesting there is no difference. One participant noted:

“I would assert that our staff, compared to those who studied in these [.....advanced countries], are no different; this is what I appreciate. Otherwise, we know that some people study in other institutions, but when we assess the quality of their services, we realize there is not much difference from who they were before. Therefore, I would argue that our staff who graduated from the Centre of Excellence are really equivalent compared to those who studied abroad in highly recognized institutions. This is what I would say.” (participant, KII 3).

However, some respondents indicated that some improvement may be needed as the HSCM field is evolving. One respondent stated:

I'll give them eight over ten (8 / 10). Because space is really moving fast in terms of the new innovations that are coming up and also the new things that are evolving. So, in terms of the daily routine, yes, they are really good. But again, there's also room to catch up on the fast-evolving technologies and innovations that are within the space. (Participant, KII 4)

Leadership and management

Leadership and management was also reported as another area where the graduates have acquired knowledge and skills as some of them are into leadership/senior positions.

"In terms of leadership, looks like the course actually enhanced both their leadership and practical skills. In aspects of taking initiative, being proactive, coordination, stakeholders engagement in terms of communication skills, problem solving, [...]. All these engagements require someone who can coordinate people to make decisions and also thrive in an environment where there's teamwork. I've seen an improvement and growth in those aspects." (Participant, KII 4)

However, one respondent indicated that some improvement can be made, especially tailing the leadership course to leadership in the supply chain.

"Perhaps leadership skills should be included and emphasized in the program. People should consider the implications of leadership in the supply chain." (Participant, KII 2)

Confidence

All respondents indicated that the HSCM Programme has equipped the graduates with a high level of confidence, and this is linked to the technical skills that the graduates acquired.

"First of all, there's a good level of confidence. You know, when someone is discussing something that they know about, they will tend to have some confidence. So I tend to see confidence and also they're confident in what they're doing" (Participant, KII 1)

"The graduates, if I remember correctly, are confident in their master's degree. The Master's program has instilled a sense of confidence for their routine work. They know that they are qualified for the positions. The skills and knowledge gained have fostered this confidence. People are truly on their feet, working with assurance, knowing that their work is qualified, and that knowledge has helped them improve our skills." (Participant, KII 2)

"So in that particular skill, I had alluded to assertiveness someone who is assertive is someone who is confident, believes in the ability to do something, and also can coordinate other people. So, they are assertive in terms of any assignment that they've been given." (Participant, KII 4)

Satisfaction with the Graduates' performance

Overall, participants expressed a high level of satisfaction with the graduates' performance, highlighting their strong technical competencies, problem-solving skills, and ability to adapt to workplace demands. Overall, participants expressed a high level of satisfaction towards the graduates' performance.

[.....], all of them are within my department. So these are the four staff I know very well. My general perspective is that these four alumni of the Regional Center of Excellence, are performing very well. They, as you said, ethically and technically really professional, the center, contributed a lot to the improvement of their skills, so I'm quite satisfied with the result they are giving at the work. (Participant, KII 3).

“Overall, I see a good level amongst the candidates who have undertaken this Programme; I would say if I’m rating the satisfaction over five, I would say maybe 4 out of 5. Or yeah, maybe 4 or 3.5. I can see they have a good level.” (Participant, KII 1).

“Yeah, I would say that I’m satisfied at a rate or score of more than 80%. I mention 80% because, by nature and considering my background in quality assurance, I always like to reserve a certain percentage for continuous improvement. But to be really honest, we are very, very satisfied. This is a qualitative little appreciation, and if I have to quantify, I would say it’s more than 80%– maybe even 90%.” (Participant, KII 3).

3.3. Short course training

This section presents the results, indicating how well these courses equipped trainees with the necessary skills and knowledge for their current positions. It identifies strengths and weaknesses in the training curriculum and evaluates the overall contribution and impact of the courses on the trainees' professional success.

Socio-demographic characteristics of the respondents

Table 9 shows that 320 trainees from professional courses participated in the study. The trainees who are scholarship recipients are from Rwanda (28.75%), followed by Kenya (19.06%), United Republic of Tanzania (18.75%), Uganda (16.56%), South Sudan (8.44%) and Burundi (6.56%). A small proportion (1.88%) of graduates are private candidates from non-EAC countries from Gambia. The courses were attended by (68.13%) males and (31.88%) females. The results indicate that most trainees were aged 35 years and below (38.13%) followed by those aged between 36 and 40 (25.62%) and those above 45 years (22.50%). The majority of the trainees had bachelor’s degrees (46.56%), followed by those with a diploma (27.19%). Besides, a small number of the courses were attended by those with Master’s (19.69%) and PhD (0.94%) degrees. Finally, health facilities (23.44%), Immunisation Programme/EPI (22.81%), National Medical Stores/supply chain entities (16.56%), and the Ministry of Health at the central level (10.94%).

Before attending the courses, a significant number of trainees (34.06%) had six to ten years of working experience, followed by 22.50% and 16.88% who had three to five years and 11 to 15 years, respectively. This finding indicates that many trainees possessed substantial experience before attending the reported courses. This may be attributed to the nomination process, in which Partner States select candidates for participation. To ensure more balanced representation, additional criteria, such as limited experience and gender balance, could be included when requesting EAC Partner States to nominate participants. This would allow the inclusion of trainees with less work experience who may, in principle, gain greater benefits from short term professional training by enhancing their knowledge and skills.

Table 9: Socio-demographic characteristics of the respondents

Variables	n(%)
Country of origin (n=320)	
Republic of Burundi	21 (6.56)
Republic of Kenya	61 (19.06)
Republic of Rwanda	92 (28.75)
Republic of South Sudan	27 (8.44)
Republic of Uganda	53 (16.56)
United Republic of Tanzania	60 (18.75)
Non EAC (Gambia)	6(1.88)

Gender		Prior work experience	
Male	218 (68.13)	Less than 3 years	39 (12.19)
Female	102 (31.88)	3 – 5 years	72 (22.50)
Marital status		6 –10 Years	109 (34.06)
Married	265 (82.81)	11 – 15 years	54 (16.88)
Widow(er)	2 (0.63)	Above 15 years	46 (14.38)
Separated	5 (1.60)	Institution/organization	
Single	48 (15.00)	Health facilities (hospitals)	75 (23.44)
Age (Years)		EPI	73 (22.81)
Up to 35	122 (38.13)	National Medical Stores/supply chain entities	53 (16.56)
36 – 40	82 (25.62)	Ministry of Health Central level	35 (10.94)
41- 45	44 (13.75)	Regulatory Authorities/Agencies	29 (9.06)
>45	72 (22.50)	Academia	6 (1.88)
Highest degree		Research Institutions	1(0.31)
Diploma	87 (27.19)	Manufacturing industries	2(0.63)
Bachelor's degree	149 (46.56)	Private Sector	9(2.81)
Master's degree	63 (19.69)	Non-Governmental Organization (NGO)	4(1.25)
PhD degree	3 (0.94)	Multilateral Organization (e.g., WHO, UN)	2(0.63)
Other (please specify)	18 (5.63)	Other (Please specify)	31(9.69)

Short courses attended and reasons for attending the courses

This tracer study revealed key trends in course attendance and reported primary reasons that motivated trainees to attend. The Immunization Supply Chain Management course was the most popular, attended by 62.81% of trainees, followed by Cold-Chain Equipment Management at 50.31%, and Solar Direct-Driven Cold Chain Equipment Management was attended by 14.38% of the trainees, [Figure 9](#) These results indicate a gradual strong interest and offer in immunization supply chain management and cold chain equipment management which reflect a growing need for skilled professionals in this area in the region and beyond. This offering is mainly due to a high level of demand for these courses, which in turn reflect critical needs in the region and beyond.

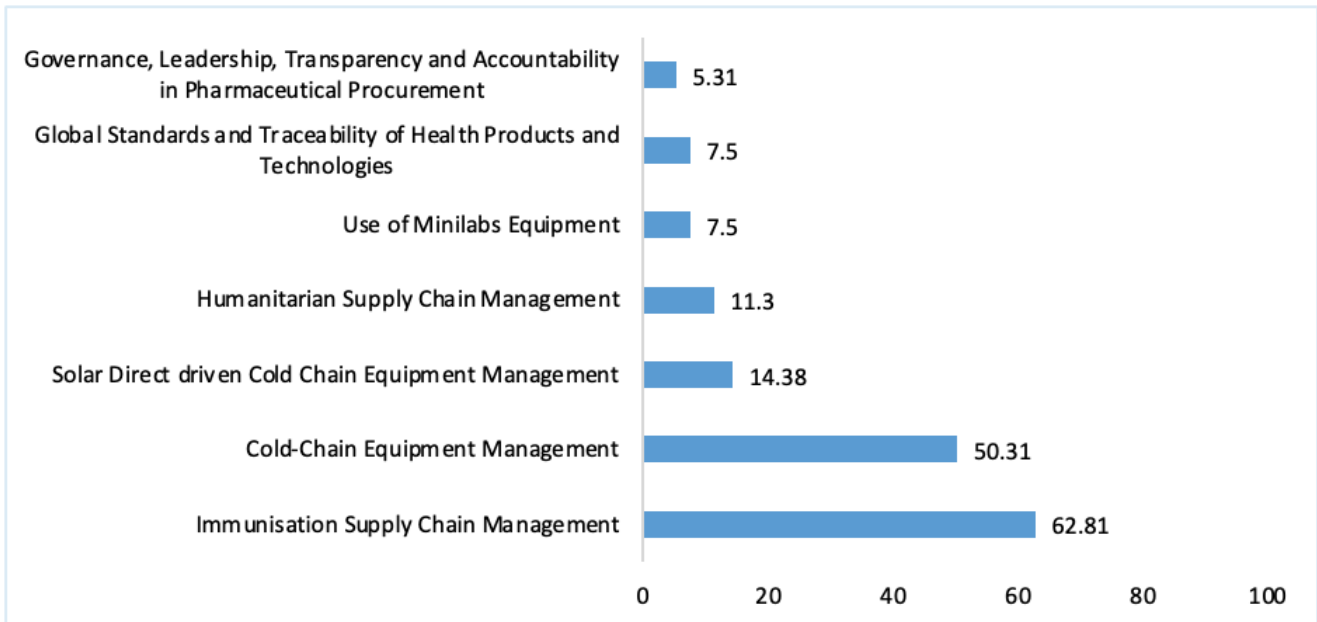


Figure 9: List of short courses attended and reasons for attending the courses

These courses were predominantly attended in 2023 (53.44%), with significant participation also noted in 2022 (28.13%) and 2019 (15.94%), [Figure 10](#). The gradual increase in the number of trainees in 2023 aligns with the expansion of the training menu offered by the Centre and the growing demand for specialized training in the region, like cold chain equipment management. This trend highlights the Centre’s role in addressing critical capacity-building needs in the region and emphasizes the importance of continuously assessing and increasing course offerings to meet the evolving demands in the region and beyond.

The primary drivers for course attendance were identified as skills enhancement (75.31%) and professional/career development (68.13%), highlighting the trainees' focus on improving their capabilities and career prospects. Networking opportunities also played a role, with 21.25% of trainees citing this as a motivating factor.

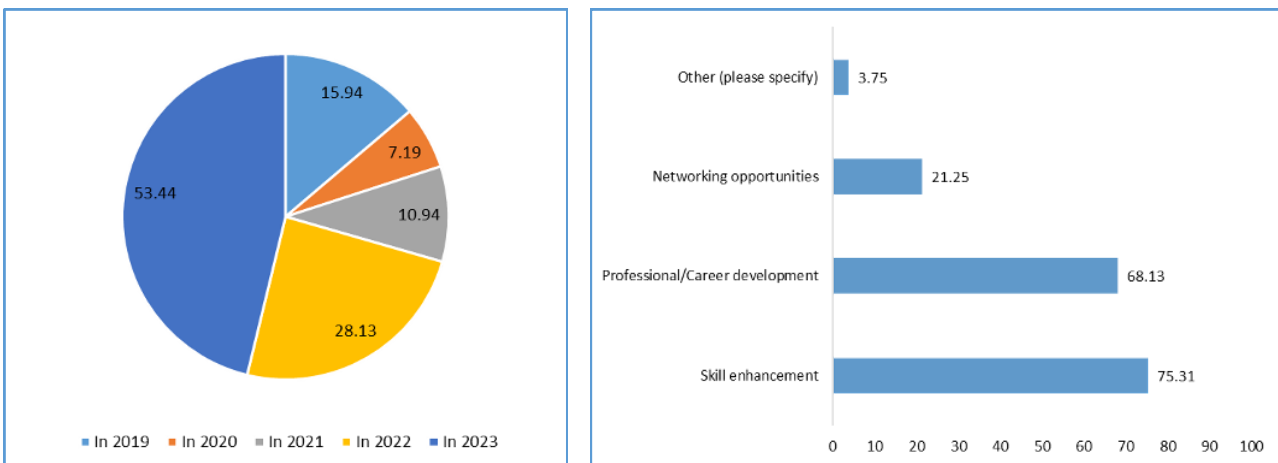


Figure 10: Year of attendance and Reasons for attending short course training

Overall trainees’ satisfaction with professional courses

The courses attended were reported as comprehensive and up-to-date by nearly all respondents (98.01%). [Figure 11](#) shows that a significant number of graduates were very satisfied (52.16%) and satisfied (41.20%) with the professional courses. The reported positive perception of the courses’ comprehensiveness and the high level of satisfaction among trainees indicate that the courses offered are effectively aligned with professional and demand-driven. This is largely due to the regular updating of the course materials. Besides, some courses, such as cold chain equipment management, were developed and offered in 2023. Therefore, it may not be surprising that the course is still up to date, and this may have positively influenced the satisfaction level.

The courses offered were comprehensive and up-to-date

Trainees satisfaction

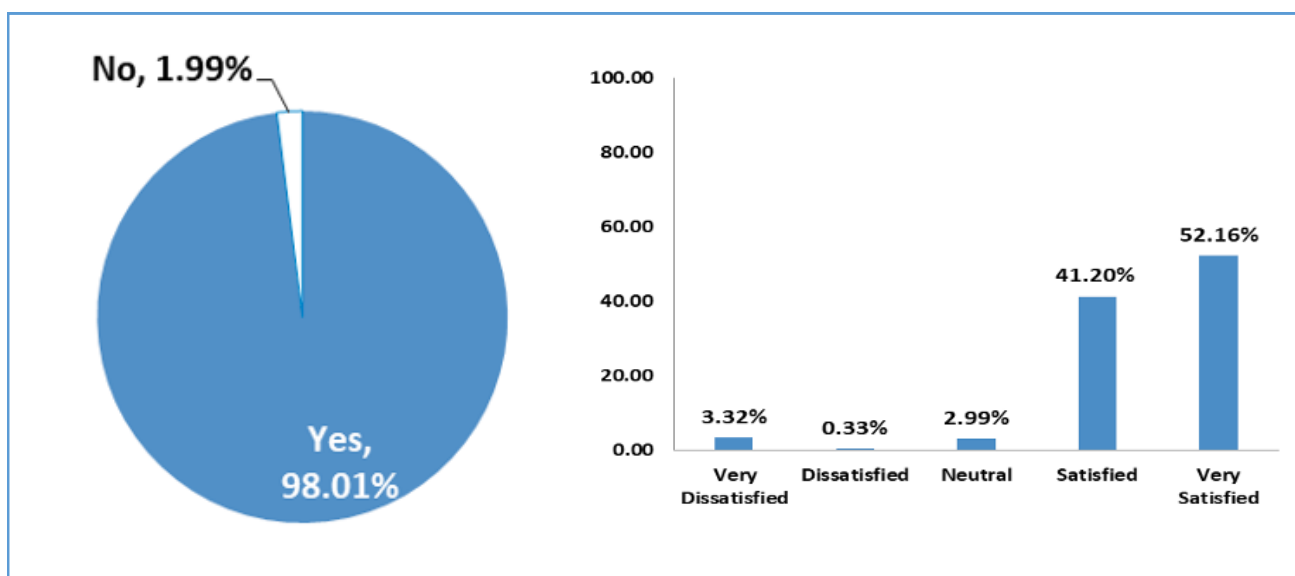


Figure 11: Comprehensiveness of the short course training and overall satisfaction of the trainees

Overall quality of the short course training

The participants were requested to assess the overall quality of the course. The course content (materials/resources) was perceived as excellent (47.33%) or very good (43.33%). The training delivery methods were rated as either excellent (44.00%) or very good (46.00%). The performance of the trainers was excellent (47.14%) and very good (42.42%) to the participants. Similarly, the training logistics arrangement was excellent (41.67%) and very good (42.33%). Table 10 provides more details.

Table 10: Quality of the short course training

Variable	Excellent	Very good	Good	Not Good	Poor
Course content (materials/resources) (n=300)	142 (47.33)	130 (43.33)	27 (9.00)	1 (0.33)	0 (0.00)
Training delivery methods (n=300)	132 (44.00)	138 (46.00)	29 (9.67)	1 (0.33)	0 (0.00)
Course duration (n=292)	61 (20.89)	106 (36.30)	106 (36.30)	17 (5.82)	2 (0.68)
Trainers performance (n=297)	140 (47.14)	126 (42.42)	30 (10.10)	1 (0.34)	0 (0.00)
Training logistics arrangement (n=300)	125 (41.67)	127 (42.33)	44 (14.67)	4 (1.33)	0 (0.00)

Figure 12 Reference source not found. shows that almost all trainees (99.30%) indicated they would recommend RCE professional courses to their colleagues due to the high quality of the training received.

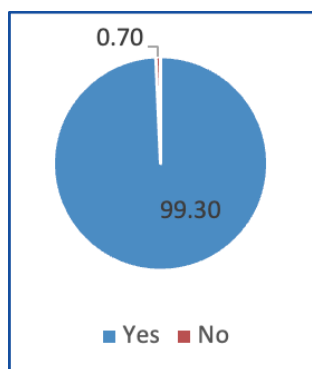


Figure 12: Recommending the short course training to others

These quantitative results were largely supported by qualitative findings where trainees expressed the relevance, elaborateness, and clarity of the course materials, noting that they significantly facilitated their understanding of key concepts. Further, trainees indicated that the interactive session formats and learning from regional colleagues allowed for a deeper engagement with the subject matter, ensuring that participants could navigate complex topics with greater confidence. Some quotes from the trainees:

"The materials provided were so elaborate with proper explanation of all the terms and the sessions were interactive with answers to questions given on spot."

"I saw that you take your time to prepare for the training, either theory or hands-on practice, this gives the trainees the opportunity to understand the courses deeply."

"For me, RCE short courses are an excellent resource for professional development, combining flexibility, relevant content, and networking opportunities."

Further, the relevance of the training materials was enhanced by the use of qualified and experienced trainers. One trainee elaborated:

"The courses were well organized and the trainers' were very good and knowledgeable"

Furthermore, the combination of international and local trainers was reported as an added value for fostering regional sustainability and strengthening the regional workforce. Mainly because the local trainers understand the context-specific resources and challenges. One trainee noted:

"I commend the continuous engagement of local trainers to back up the international trainers"

"It was a good experience learning different practices from our regional colleagues. This was very informative and interactive, avenue for networking"

Finally, trainees expressed that the training environment was conducive, promoting effective learning and engagement. Some of the trainees stated:

"The theoretical training environment was so conducive."

"The trainings are well organized, in good locations for learning, quality content, and always on time."
These quantitative and qualitative findings indicate that trainees consistently reported a high overall quality of the short course trainings offered by the RCE. The reported high quality of training is largely attributed to the relevance of the courses, the quality of the training materials and trainers, and the strong alignment of the training curriculum with industry demands.

By maintaining this momentum of providing high-quality standard courses, there is a guarantee that the RCE can continue to play a crucial role in building a skilled health supply chain workforce.

While most of the trainees rated overall quality of short course training as excellent or very good, nonetheless, course duration received a comparatively low rate (good, 36.3% or not good, 5.82%) to other criteria. Consistent with this quantitative finding, course duration was also highlighted in the qualitative results as an area that needs improvement mainly for cold chain equipment management and immunization supply chain courses. Some trainees specifically expressed:

“Increase the training period from 2 to 3 weeks. Use 2 weeks on theory and 1 week for practical work” (Participant of CCEM course)

“Extend the course duration up to at least 10 days” (Participant of the iSC course)

This low rating of the course duration, indicates that some courses may not provide sufficient time for comprehensive learning among some trainees particularly for trainees who require more time to grasp complex concepts. Similarly, existing literature (Swiss Agency for Development and Cooperation SDC, 2024) revealed the same where trainees proposed longer course durations. This may be due to the extensive content covered in some courses, especially cold chain equipment, and nature of the course which is more hands-on. This calls for a review of course structure and mode of delivery, adopting blended learning to give ample time for self-learning by participants.

Challenges faced by the RCE trainees during the courses

Figure 13 shows that the majority of trainees (69.10%) experienced no challenges during the courses attended. However, a notable portion (30.90%) reported various challenges. Among those who reported challenges, duration of the course was the most prevalent issue, affecting 56.99% of trainees. Logistical issues and communication problems were also cited concerns, reported by 16.13% and 15.05% of trainees, respectively.

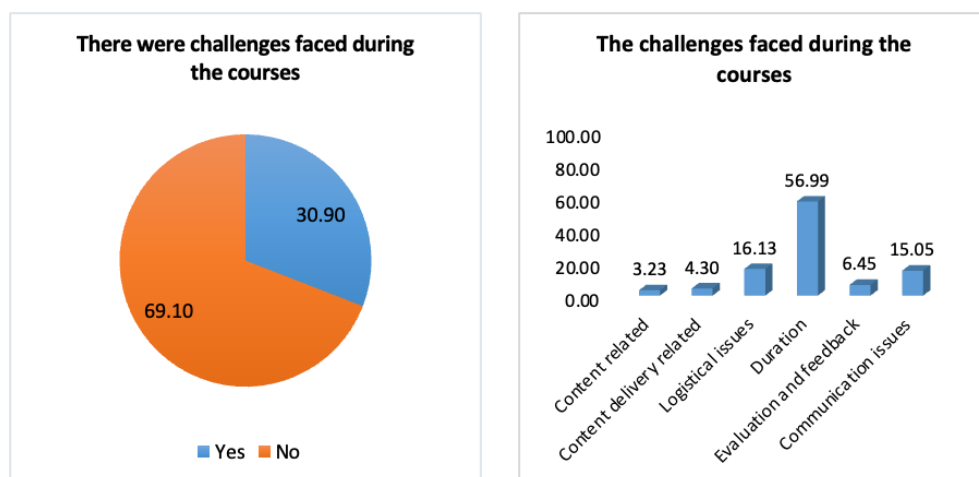


Figure 13: Challenges faced during the courses

Overall, the training delivery was effective given that the majority of the trainees did not face any challenges during the courses. This may be attributed to well-structured course design, high-quality training materials, and experienced facilitators who always ensure smooth learning.

Among those who faced challenges, time constraints/duration, logistic, and communication issues were the most prevalent, while the course content and delivery were the least cited challenges by the trainees. These challenges may be due to competing work commitments, travel difficulties, flow of information and late nominations by EAC Partner States, and some other logistic challenges in pre-course coordination. These challenges may be largely attributed to the trainees coming from diverse EAC Partner States who have to be communicated to through various EAC channels. Also, these findings imply that while the short course training is largely successful, there is room for improvement in logistical planning and communication strategies between RCE and trainees’ respective institutions through the EAC communication channels. The RCE needs to work together with the EAC Secretariat and beneficiary Ministries to streamline the communication processes.

Change, application and use of knowledge and skills after attending the short term professional courses

After attending the courses, the trainees were requested to indicate the use of the acquired knowledge and skills. Generally, the trainees indicated that knowledge and skills significantly and exceptionally changed at 73.22% and 17.29% respectively. Furthermore, the trainees reported that they always (46.60%) and frequently (38.44%) apply the knowledge and skills gained from the training at work, Figure 14.

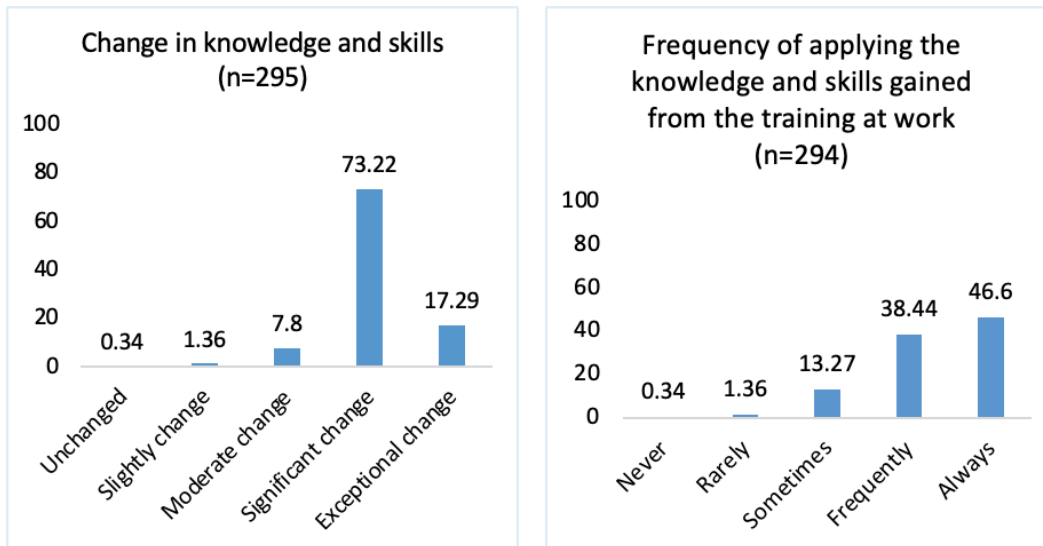


Figure 14: Change and application of knowledge and skills after attending the short term professional courses

Further, this study assessed the adoption of techniques and methodologies learnt from the courses attended. As shown by Figure 15, the majority (89.12%) indicated that they started adopting techniques and methodologies learnt from the courses into their daily work.

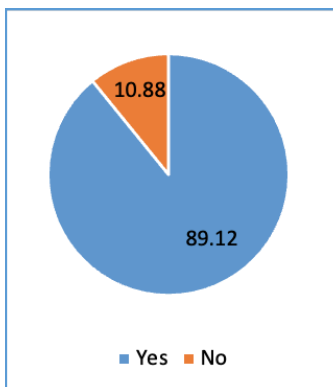


Figure 15: Use of knowledge and skills after attending the short term professional courses

The quantitative findings are supported by qualitative insights, as trainees reported applying the knowledge acquired in their daily work. Trainees specifically described how they have applied the knowledge and skills gained from various courses to improve vaccine storage, forecasting, and inventory management, as well as to repair and maintain cold chain equipment. Consequently, reduced vaccine wastage increased vaccine availability, and strengthened health system performance at both facility and community levels. Some trainees expressed:

"After completing the cold chain management course, I have applied the knowledge gained to diagnose non-functioning refrigerators, collaborate with district biomedical personnel to repair them, and identify any issues with the equipment."

"I have adopted techniques and methodologies learned from the immunization supply chain course, including vaccine forecasting and quantification while ensuring proper stock management and vaccine inventory. This has significantly helped reduce vaccine wastage."

"After completing the Immunization and Health Supply Chain Management short course, I have adopted several techniques to enhance our immunization programs both at the health facility and during EPI community outreaches. Specifically, I have implemented a revised vaccine storage and handling protocol, ensuring strict adherence to cold chain requirements, which has improved vaccine potency and reduced wastage. Additionally, I have mentored staff and strengthened the use of the vaccine control book, enabling our facility to accurately track vaccine stock levels, anticipate shortages, and plan for timely replenishments. These improvements have contributed to increased vaccine availability and better coverage during community outreach programs."

"After attending the Cold Chain Equipment Management course, I was able to resolve issues related to solar direct-drive refrigerators, as there were at least 20 non-functional units in the country. Additionally, using the cold chain calibration skills I gained, I successfully conducted the first calibration exercise on deep freezers used during the country's response to the Marburg epidemic. The course also significantly enhanced my knowledge of quality assurance management, helping me achieve program goals. As a result, in the previous Effective Vaccine Management Assessment (EVMA), the county attained a 90% overall score, with excellence in the maintenance area, which I coordinate."

Both quantitative and qualitative findings indicated that the majority of the trainees reported exceptional or significant changes in knowledge and skills after attending the professional courses. The reported changes in knowledge and skills may be attributed to the alignment of the training curriculum with industry demands applicable to their workplace.

The most interesting finding is that most trainees always or frequently use the knowledge and skills acquired from the courses and the majority of them adopted techniques and methodologies learnt from the courses. This implies that the high adoption rate demonstrates the relevance and marketability of the knowledge and skills acquired through the Centre's professional courses.

Impact of the professional courses on competencies, job performance, and career development

The majority, 21.43% and 69.39% of the participants indicated that the training had an exceptional and significant impact on knowledge and skills utilization in the field, respectively. Further, the participants reported that the training exceptionally and significantly enhanced job competencies at 20.34% and 71.19%, respectively. Further, Table 11. indicates It was reported that the training had an exceptional (20.98%) and significant (68.18%) impact on the professional advancement of the participants. Likewise, the training has exceptionally (23.16%) and significantly (58.60%) impacted the trainees' organizations/institutions.

Table 11: The overall impact of short term professional courses on competencies, job performance, and career development

Variables	Exceptional impact	Significant Impact	Moderate Impact	Minimal Impact	No Impact
Overall impact of the training on knowledge and skills utilization in the field (n=294)	63 (21.43)	204 (69.39)	23 (7.82)	3 (1.02)	1 (0.34)
Overall impact of the to enhancing job competencies (n=295)	60 (20.34)	210 (71.19)	19 (6.44)	2 (0.68)	4 (1.36)
The overall impact of the training on professional advancement in the field (n=286)	60 (20.98)	195 (68.18)	28 (9.79)	1 (0.35)	2 (0.70)
The overall impact of the training on the trainee's organization/institution (n=285)	66 (23.16)	167 (58.60)	40 (14.04)	10 (3.51)	2 (0.70)

Nearly all participants reported that the courses they attended enhanced their confidence in their work. As shown in Figure 16, 30.17% of the trainees stated that the courses to a very large extent increased their confidence, while 56.27% noted that the courses contributed to a large extent, and 12.54% said the courses helped to some extent.

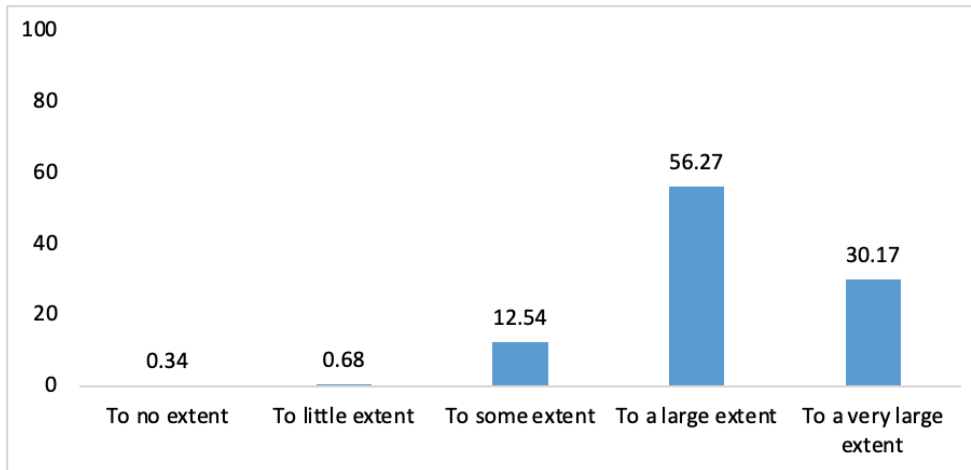


Figure 16: The extent to which short courses add confidence in the current job (n=295)

The short course training had a significant impact on the job promotion as shown in Figure 17. 21.33% of trainees reported that they were promoted to higher positions in their workplace after attending the courses. Those who were promoted indicated that the training they attended contributed to a very large extent (26.23%) and a large extent (57.38%) respectively to their promotion.

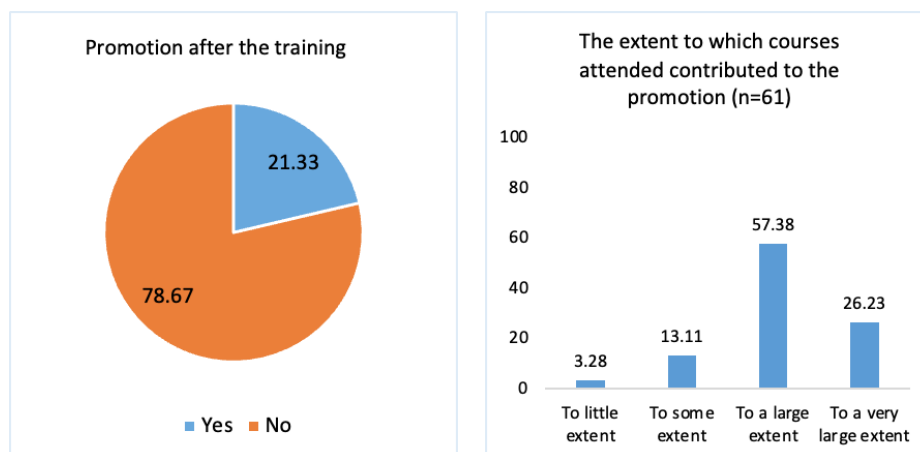


Figure 17: Contribution of the training to promotion

The majority of the respondents (83.51%) reported that the professional course training instigated the changes in their respective organizations. More than half (55.94%) of the participants used the training certificates to gain continuous professional development (CPD) credits. Importantly, the professional short course training improved confidence to a very large extent (30.17%) or a large extent (56.27%) among participants. Finally, the short term professional training allowed a significant number (36.49%) of participants to initiate collaborative projects or collaborations with their training peers after completing the training. Figure 18 provides more details.

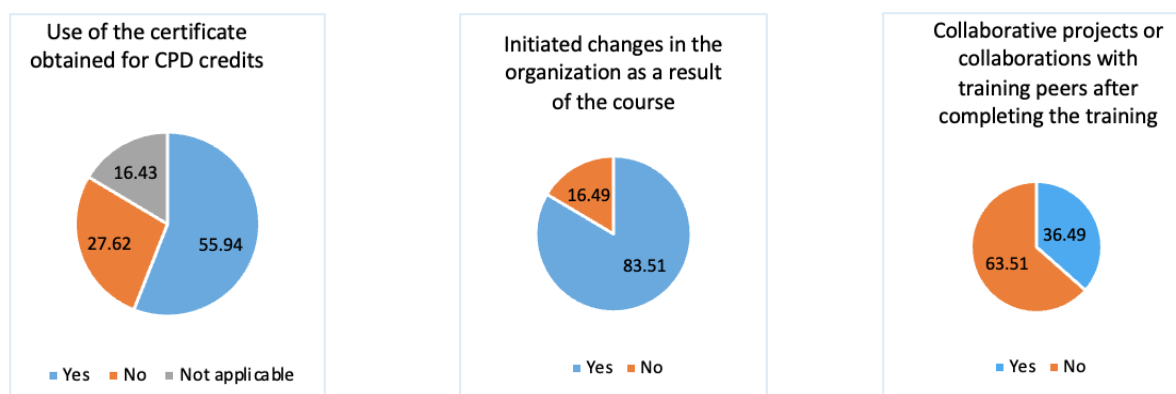


Figure 18: Change initiation and collaboration with peers

Similarly, qualitative findings support quantitative results. Trainees of professional courses have initiated significant improvements within their institutions. They reported that they have established routine maintenance plans, have influenced policy decisions, and mobilized resources to enhance cold chain equipment performance. As such, they reported to have strengthened vaccine transportation, reduced equipment failures, and ensured better immunization service delivery. Some trainees expressed:

"Before the training, my institution did not have the Cold Chain Motorcycle for vaccine transportation. However, after attending the course, I highlighted its importance, and as a result, in 2024, the government of [.....] provided one."

"I developed a cold chain equipment maintenance plan for all health facilities within my organization, which is now being routinely implemented. This has reduced frequent equipment breakdowns and improved overall performance."

"I successfully mobilized regional immunization partners to support the maintenance of all defective cold chain equipment across districts. A dedicated budget was allocated, allowing the Biomedical Engineer and me to collaborate in repairing non-functional refrigerators."

A very large number of trainees reported that short courses attended exceptionally or significantly contributed to increase of knowledge and skills, enhancing job competencies and professional advancement in the field. Most of the trainees (83.51%) reported to have initiated changes in the organization as a result of the courses. This concurs with the existing literature (Swiss Agency for Development and Cooperation SDC, 2024) reported some positive impact of trainings on the trainees' job including being able to expand their area of responsibilities at work, improved skills to perform the job better, and on their institutions/ schools' management. This reflects the positive impact of the Centre's short term professional training, and confirms its alignment with industry demands.

Challenges in implementing knowledge and skills learned during training

As the Figure 19 shows, the majority of trainees, 73.81%, reported no challenges in implementing knowledge and skills learned during training. This may be due to the nature of the course content, which sharpens their existing knowledge in their field of work while highlighting the latest innovations. In addition, the trainees are mid-level cadres who can readily influence decision-making and apply the acquired knowledge in their place of work. Another justification may be due to the conducive working environment that includes appropriate resources, like pertinent equipment.

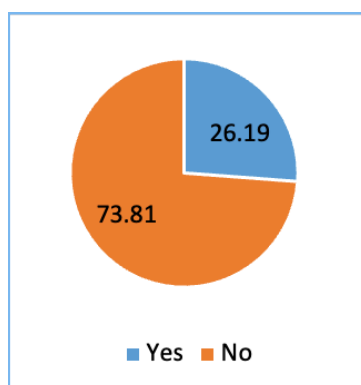


Figure 19: Whether trainees faced challenges in implementing the knowledge and skills learned during training

For the small number who reported challenges, some of these were reported as limited access to spare parts and equipment (18.18%) in the trainees' institutions, followed by inadequate funding and budget constraints (15.58%). This was supported by the qualitative findings as some of the participants stated:

"In application of cold chain knowledge, the challenges in our environments are access to spare parts and skilled technicians, which are limited."

"Limited budget support hinders the timely reaching of all the scheduled equipment."

"Inadequate resources to support training of the local EPI managers and frontline health care workers"

Aspects to be improved per professional courses

While the majority of the trainees highlighted the quality of the course content to be excellent or very good, a small proportion of trainees indicated some improvement to be made. The suggested improvement was classified into five categories as follows: (1) modifications in course content; (2) making courses easily accessible; (3) refresher courses; (4) CPD Points and contribution to professional qualification; and (5) duration of courses. The following section describes these categories in detail.

Modifications in course content

This category was further divided into two as follow:

- **Theoretical changes on RCE professional courses**

Respondents suggested modifications to the existing RCE courses to include new topics and expansion of the scope to accommodate new and trending courses in the area of vaccines, immunization and health supply chain management. Suggestions including new topics (data analysis, use and management, vaccinology, vaccines supply and management and equipment management and technology) were mostly mentioned by respondents. Some trainees stated:

"I greatly valued the RCE short course training and truly appreciated the insights it provided. If you plan to include the regulatory aspects of cold chain management in future sessions, I would be honored to attend, as I am eager to deepen my knowledge on this important topic."

"Organize other training courses, for example training on vaccine supply and management."

"For the cold chain equipment management, incorporate hands on training on cold room temperature mapping and refrigerated trucks units with emphasis on controls,

"Organize training on temperature-sensitive logistics."

"For the cold chain equipment management, include vaccines transportation system from the manufacturer to the PoE"

"For the cold chain equipment management, add also the regulatory aspect on cold chain management equipment, key considerations to ensure quality, safety, and efficacy of cold chain equipment, how to conduct inspection for cold chain equipment and human medicines that requires cold chain to ensure quality, safety, and efficacy."

"For immunization supply chain, course content can be improved to include the new updates on new vaccines like COVID-19 vaccines and Mpox vaccines which are not mentioned in the training curriculum."

"Include Effective Vaccine Management (EVM), how to conduct surveillance on vaccine-preventable diseases, and challenges affecting vaccines uptake and recommendations to overcome vaccination uptake." (iSC Participant)

"Update some of the content especially showing the current landscape of traceability in different African countries (the content has 2021 data). Incorporate barcode scanners and other gadgets in the training to emphasize some of the concepts and ensure the training is in a country that will have a site visit where traceability is already implemented for further learning by the trainees."(GSTVS Participant)

- **Hands-on/Practical changes suggested**

Apart from changes on the theoretical part of RCE professional courses, respondents expressed the desire to see more hands-on or practical sessions catered for in the upcoming short courses. One respondent said:

"Include more practical sessions such as installations, connections, trouble, and spare part changing." (CCEM course participant)

"Having more time on hands-on skills. For example, organize the benchmarking/ field visit to the best performing country for study purposes and have people from the factory with respect to the number of brands or models for more clarification on their brand."

"Increase the field visit days to allow assessment of vaccine management at the last mile" (iSC course Participant)

The need to review and update the existing content of the RCE professional courses was requested by respondents. This expresses participants' and employers' desire for updated courses that satisfy their needs. The suggested changes imply that the RCE undertake a review of existing course content to include new and trending topics in the area of vaccine, immunization, and health supply chain management. On the other hand, the sustainability of the RCE professional courses will rely on demand-driven professional courses.

Making RCE Professional courses easily accessible

Respondents suggested that RCE professional courses should be made available online to allow wider access for participants, including potential candidates from the private sector. To reinforce this, respondents suggested that RCE professional courses be added to some of the education platforms of wide access, such as HealthEdu, etc. The extension/cascading of RCE professional courses to more candidates and organizing regular refresher courses to keep the Centre's alumni up-to-date were often suggested. Specific quotes below reflect the need to digitize RCE professional courses and make them remotely accessible.

"Consider blended online and face-to-face delivery modes so that participants can gain knowledge during the online and most of the face-to-face sessions can be dedicated to skills development and experience sharing."

"If possible, provide free online training on different aspects of vaccine management."

"Provide access to online learning platforms and ongoing support, blended learning, and monitor feedback"
Another respondent said:

"It's important to make the course more available and accessible".

Develop short online courses that interested participants can complete over time and use to refresh their knowledge, as some things are very dynamic.

On the same, a respondent said:

RCE course must be added to the HealthEdu website so that it can help us learn more and use it to gain credits at other private institutions.

"Create an online database where the course material can be easily accessed by the participants, even after these training."

Refresher/Continuous offering of courses and linkage with alumni

Respondents expressed interest in RCE professional courses to be offered either by repeating the same course(s) or by conducting refresher courses.

"RCE short courses are very comprehensive and one gets knowledge and skills, we request the Centre to continue with this short course", one respondent indicated.

A second respondent said: *"Refresher should be organized after courses"*

"Plan for continual short course, evaluate impact from the short course regularly, engagement of stakeholders so they can recognize the person who has taken the short course in daily institutions' plans for improvement," said the third respondent.

In this rapidly changing landscape of vaccines, immunisation and health supply chain management, including pandemics and epidemics, it is important for RCE as a suitable training institution to keep its alumni updated on the emerging trends and organise refresher training (seminars, webinars, etc...) to keep its community up-to-date. This would help to keep strong ties between RCE and its alumni across the EAC region and beyond.

Duration of RCE Professional courses

The duration of RCE short courses was noted as another area for improvement, with respondents suggesting an increase in the length of professional courses specifically for cold chain equipment management. Some trainees indicated:

More time should be allocated for the training of cold chain equipment management and maintenance. It can be done in two phases: two weeks for phase one, which is basic, and another two weeks for phase two, which is advanced.

“Course duration should at least be three weeks.”(CCEM participant)

“For immunization supply chain, I would suggest extending the training time duration from 1 week to 2 weeks for more practice (exercises) and understanding of general vaccine management. This should especially focus on the shake test method to ensure a common understanding among all participants.”

The digitization of RCE professional courses would help solve the problem of the short duration allocated to certain topics and courses offered by RCE. Making some content and course units available online for self-learning would give participants the opportunity to learn anytime and repeat the material as often as they wish.

IV. RECOMMENDATIONS AND CONCLUSION

4.1. Recommendations

Following the key findings of the tracer study, the following recommendations are made.

Enhance practical training across programmes

To address the identified need for more hands-on learning for both the MHSCM programme and short course training, the EAC RCE-VIHSCM should strengthen practical learning through case-based learning that reflects real-world HSCM scenarios, simulations, and supervised field attachments. The latter can be facilitated by establishing partnerships with national or central medical stores and immunization programme to provide structured practicum and internship opportunities.

Update curriculum with emerging HSCM topics

To keep the Master's programme relevant in today's fast-changing landscape, the MHSCM curriculum must undergo regular reviews and updates. This should encompass the latest digital health technologies and logistics management software that aid in forecasting, quantification, and inventory management. Furthermore, it is essential to explore additional supply chain optimization strategies, including advanced analytics and techniques suitable for emergency and humanitarian situations. It is also essential to engage employers in curriculum reviews, practicum design, and training quality assurance to ensure alignment between training and job market demands.

Strengthen monitoring and employer engagement

To align training outcomes with industry demands, regional workforce needs, and workplace expectations, it is crucial to establish regular feedback mechanisms with both graduates and their employers through stakeholder forums, surveys, and alumni follow-ups. This approach will help pinpoint evolving competencies, new industry demands, and performance gaps. Consequently, update Master's programme and short course training accordingly.

Expand access and duration of short course training

To meet the growing demand for deeper engagement and improve access to short courses, some courses may be extended in duration. The Centre can achieve this by developing blended courses, where the first half focuses on theory and the second half is dedicated to face-to-face, practical, and/or hands-on sessions.

4.2. Conclusion

The objective of this tracer study was to gain a better understanding of the relevance of its HSCM programme and short course training. This tracer study provides compelling evidence of the significant and multifaceted relevance of the EAC RCE-VIHSCM's Master's programme and short course training. Both graduates and trainees reported high levels of satisfaction with the programmes, citing the relevance to their professional responsibilities, substantial application of skills in the workplace, and notable contributions to career progression and leadership roles. These outcomes affirm the RCE's strong foundation in delivering high-quality, context-appropriate training aligned with industry demands and regional workforce needs.

The study also underscored important areas needing enhancement. Addressing these shortcomings will enable the EAC RCE-VIHSCM to bolster its position as a regional centre of excellence, providing pre- and in-service training across the East African Community.

To maintain and grow its impact while keeping training offerings up to date, it is essential to enhance structured interactions with graduates and employers. This approach will be vital for ensuring skills remain relevant, fostering training driven by demand, and strengthening the connection between education and performance outcomes.

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