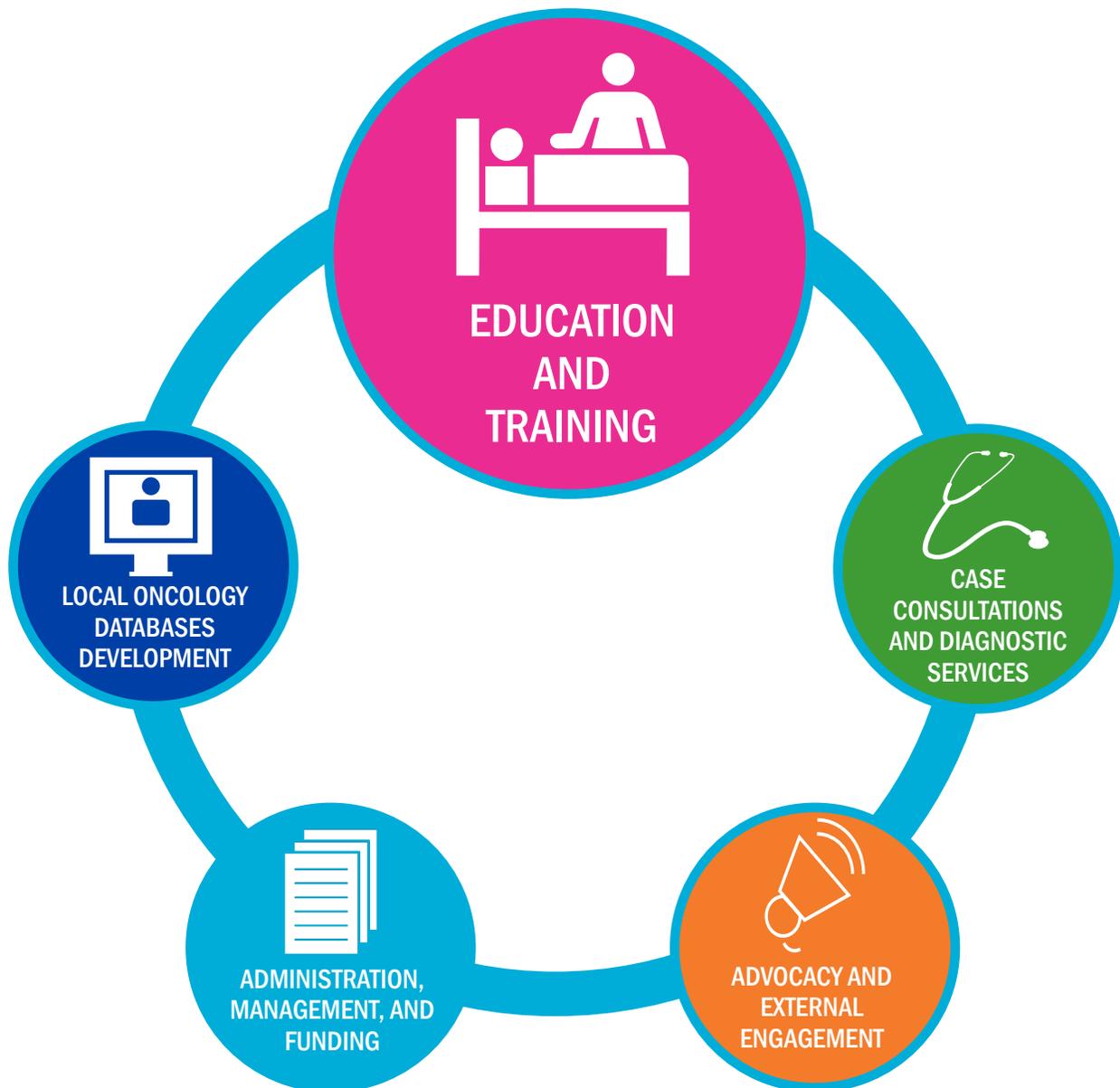


SCI

SickKids-Caribbean Initiative

Enhancing Capacity for Care in
Paediatric Cancer and Blood Disorders

Reflections on the SickKids-Caribbean Initiative: Education and Training



Reflections on the SickKids-Caribbean Initiative: Education and Training

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- Advocacy and External Engagement
- Case Consultations and Diagnostic Services
- Education and Training
- Local Oncology Databases Development

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Abstract

Continued professional development and formal training in a healthcare setting are important to the delivery of up-to-date patient care. In resource-constrained settings, this can be challenging given the discordance between the number of trained healthcare professionals and patient load. This technical paper describes the activities and lessons related to the education and training undertaken within the SickKids-Caribbean Initiative (SCI). With the aim of improving the outcomes and quality of life for children with cancer and blood disorders in the Caribbean, SCI offered four core forms of education and training: formal training of pediatric hematology/oncology fellows; the development and delivery of a specialized nursing curriculum program on pediatric hematology/oncology; multiple forms of informal training; and quality improvement initiatives. Collectively, the efforts within SCI have led to five fellowships to train pediatric hematologists/oncologists and 41 nurses with specialized pediatric hematology/oncology skills in the English-speaking Caribbean with high retention rates, as well as the integration of enhanced delivery, clinical expertise, and leadership of pediatric hematology/oncology.

Introduction

To ensure quality healthcare provision, continued and specialized professional development and training programs are core elements among healthcare professionals. Technological and clinical advancements are continuous, making it imperative that healthcare professionals seek opportunities for constant competency development to maintain evidence-informed practice.

Knowledge and techniques that are considered cutting edge and current can quickly become outdated, which is another reason why healthcare professionals should continue their professional development well after the end of their official training. Using a recent oncological example, chimeric antigen receptor (CAR)-T-19 therapy is a revolutionary treatment, with a major positive impact on outcomes for patients with relapsed acute lymphoblastic leukemia (Maude et al 2018). Since CAR-T-19 therapy was not widely available until 2017, physicians trained prior to this time have required further education and training specific to CAR-T-19 therapy, to support improved clinical outcomes.

Learning in a clinical setting is a foundational component for medicine, nursing, and general healthcare professional education. Beyond practical skills, this type of educational experience helps learners to understand the cultural and social aspects of the healthcare environment (Burgess et al 2020). Importantly, it can shape the learners' professional values and bedside manner as they prepare for independent and

inter-dependent practice. While e-learning methodologies and telemedicine cannot replace bedside teaching, they are increasingly used to reinforce and support core competencies acquired through patient care and practice-based learning experiences. For busy practitioners in private and public practice, e-learning can allow for improved access to more efficient and convenient training. By not requiring absence from work, e-learning can alleviate barriers related to travel costs and backfilling challenges. Such methods are increasingly being used to deliver content, and the prolonged duration of the COVID-19 pandemic has been a catalyst for this transition.

Depending on one's role within the health system, there are differences in the duration and content provided within training programs. Higher levels of training for physicians come in the form of residency training or sub-specialty fellowships. Completing a fellowship in an area such as pediatric hematology/oncology allows for sub-specialization and mastering one specific area of medicine. Such programs usually include a mixture of clinical, surgical, and research components, lasting two to three years. Nursing education can come in a variety of forms, including undergraduate, graduate, and post-graduate degrees, encompassing professional and postdoctoral fellowships. At the graduate and post-graduate level, nursing programs may take anywhere from one to four years to complete. Establishing specialized nursing education at the postgraduate level can improve health care delivery and positively impact patient outcomes (Abu-Qamar et al 2020). Other less academically-focused forms of education are also important to knowledge and skill development among healthcare professionals. These include attending rounds, continuing education programs, conference participation, webinars, and/or quality improvement (QI) initiatives.

The fact that QI allows for continuous improvement and learning to support a change in practice, means it can be considered a form of education. QI is typically a data driven process that aims to improve safety, effectiveness, and patient experience of health care by applying a systematic approach to designing, testing and affecting changes through real time quantification (Jones et al 2019). Within oncology, specifically, some examples of focus areas for QI initiatives include the timely and safe delivery of chemotherapy, prevention of extravasation injuries, and reduction of central line associated bloodstream infection. From a hematological perspective, this can include adequacy of pain management in sickle cell disease (SCD), as well as the assessment and management of bleeding episodes in persons with inherited bleeding disorders, such as hemophilia and von Willebrand disease.

While the WHO recommends a minimum skilled health worker (i.e., physicians and nurses/midwives) density of 4.45 per 1000 population, the extent to which this is achieved in the Caribbean varies by country (**Table 1**). Although there are approximately 60 offshore medical schools operating in the Caribbean, graduates of these offshore schools are generally steered towards working in the United States, and leave soon

after the completion of their degree requirements (Maharaj et al 2012). The Faculty of Medical Sciences at The University of the West Indies (UWI) is the largest medical institution in the English-speaking Caribbean, and has campuses in Jamaica, Trinidad, and Barbados. The Bahamas has a clinical training site for fourth and final year medical students and also has an online campus for delivery of The UWI courses. Residency training is offered in the Caribbean in many disciplines such as medicine, pediatrics, obstetrics and gynecology, and surgery and its subspecialties. An adult hematology/oncology training program is offered at the Mona Campus in Jamaica, as well as a medical oncology program at the St. Augustine campus in Trinidad (The University of the West Indies 2020), although there is no formal pediatric hematology/oncology training program based in the English-speaking Caribbean.

Table 1. Skilled health worker density across countries in the English-speaking Caribbean and Canada

Country	Year	Physician density*	Nurse/ midwifery density*	Total skilled health worker density*
Jamaica	2008	0.4	1.1	1.5
Saint Lucia	2010	0.1	2.0	2.1
Trinidad and Tobago	2007	1.2	3.6	4.8
Saint Vincent and the Grenadines	2001	0.6	4.4	5.0
The Bahamas	2008	2.7	4.0	6.7
Barbados	2005	1.8	4.8	6.6
Canada	2013	2.5	9.5	12.0

* Per 1000 population

For pediatric hematology/oncology, adequate physician and nursing support is fundamental to the coordination and management of cases. A modelling exercise in Canada found that a ratio of one oncologist per 15 newly diagnosed patients with malignancy was required to provide optimum care, and that for every 2.5 oncologists, there should be 1.0 hematologists (Halton et al 2012). Using locally collected data from the six Caribbean countries presented in Table 1, it is suggested that there are approximately 200 new pediatric oncology cases per year (Gibson et al 2018). This corresponds to a need for 13 oncologists and 5 hematologists at minimum, as there are substantial differences between healthcare context relative to Canada. Similarly, nurses with specialized pediatric oncology nursing skills are critical to providing optimum care, and the recommended nurse to pediatric oncology patient ratio is 1:5 (Day et al 2014; Pergert et al 2020).

The aim of this paper is to describe the diverse education and training activities undertaken within the framework of the SickKids-Caribbean Initiative (SCI) project to support the development of pediatric hematology/oncology expertise.

Overview of SCI and Program Components

SickKids-Caribbean Initiative Overview

Formally launched in 2013, SCI is an innovative nine-year program in six Caribbean countries, focused on activities to improve the capacity of local health care professionals to diagnose and treat children with cancer and blood disorders. As a non-profit partnership between The Hospital for Sick Children (SickKids) in Toronto, Canada, The UWI, Ministries of Health, and hospitals at seven sites in the six Caribbean countries (Barbados, The Bahamas, Jamaica, St. Lucia, St. Vincent and the Grenadines, and Trinidad and Tobago), key outcomes of the partnership have included increasing the number of physicians and nurses in the region with specialized skills around pediatric hematology and oncology care; improving health care professionals' ability to diagnose, treat, and manage pediatric hematology and oncology patients; facilitating regional, international, and inter-professional collaborations around pediatric hematology and oncology; and developing a system of real-time pediatric oncology data collection linked to pediatric oncology databases. SCI included two phases: Phase 1 (2013-2018) and Phase 2 (2019-2022). The focus of this paper is the breadth of education and training-related activities within SCI.

Education and Training

Four core forms of education and training were offered within SCI: (1) formal training of pediatric hematology/oncology fellows; (2) development and delivery of a specialized nursing education program on pediatric hematology and oncology; (3) multiple forms of informal training (i.e., continued professional development); and (4) QI initiatives (**Figure 1**).

Fellowship Specialization

Over the course of SCI, five fellows from the region were sponsored to receive formal training in pediatric hematology/oncology at SickKids in Toronto, Canada. Four have completed their training at SickKids over two to three years and returned to practice in the Caribbean (two in Jamaica, one in Barbados, and one in Trinidad and Tobago). One fellow from Jamaica is in training at the time of writing, and will complete this year. Overall, the number of fully trained pediatric hematologists/oncologists in the six partner SCI countries has increased from three to seven, or 133%. The fellowship program included knowledge of and testing on a curriculum including core topics, laboratory diagnostics, performance of procedures, research training, and patient follow up through a continuity clinic. The pathophysiology of pediatric hematological and oncological disorders was covered in detail, with an emphasis on clinical management of relevant disorders.

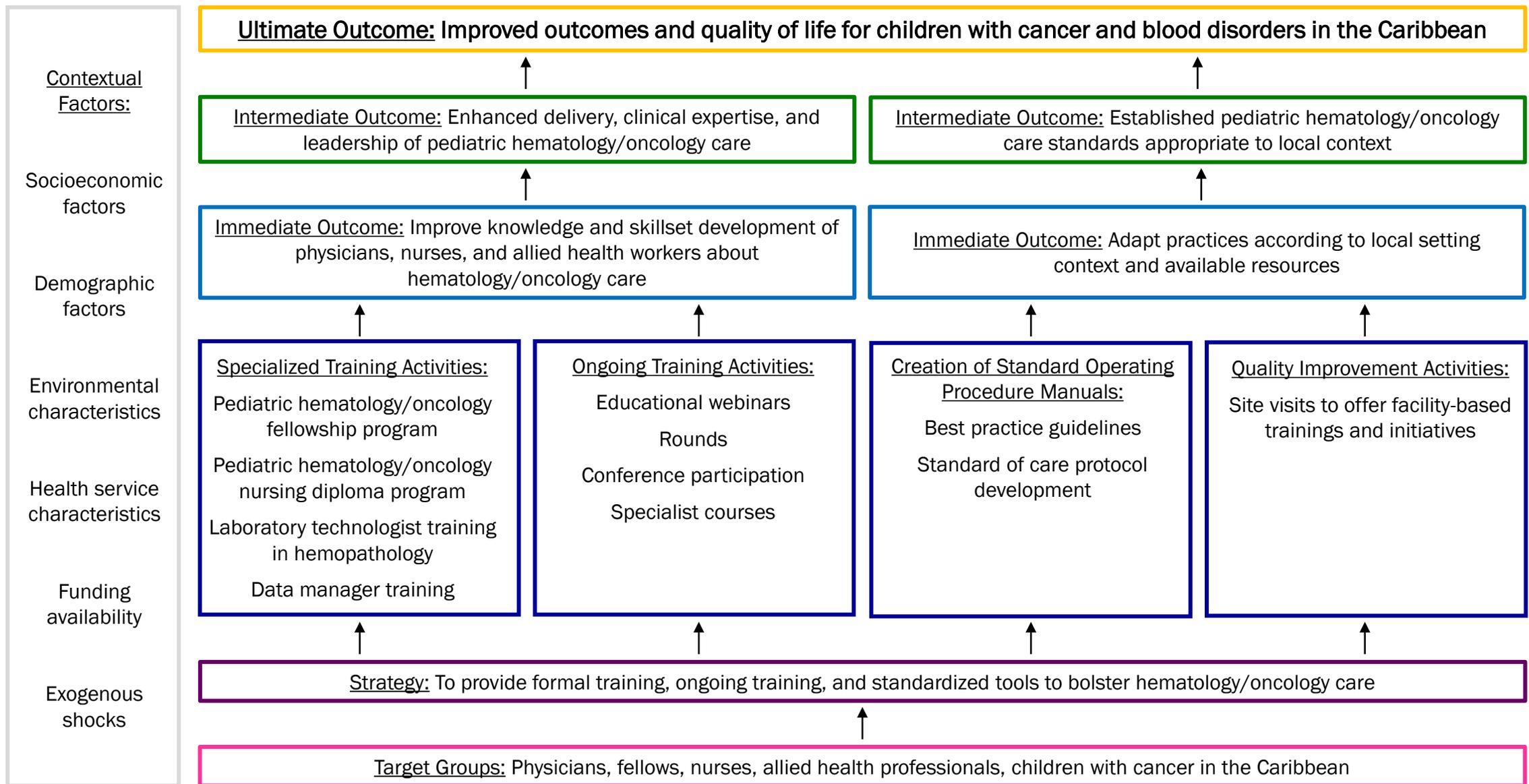


Figure 1. Framework of activities and outcomes within SCI related to education and training

Specialized Nursing Education

A formal pediatric hematology/oncology nursing education program, the Post-registration Diploma in Pediatric Hematology/Oncology Nursing (referred to hereafter as the nursing education program), was established as part of The UWI School of Nursing, St. Augustine Campus. The program was delivered as blended learning, with both in-person and online delivery. Trinidad and Tobago was selected as the in-person training site, as it had the required infrastructure needed to support the program. Five of the six partner countries were represented, and 41 specialist hematology/oncology nurses were trained. The one-year program was accredited and included foundational nursing concepts, such as family-centered care, pain management, pediatric health assessment, specialist hematology/oncology nursing practice (e.g., supportive care, common pediatric cancers and blood disorders, safe chemotherapy handling, and oncology emergencies), and nursing leadership (i.e., leading a change and QI project). Post-training, nurses were able to practice with their newly acquired skills; however, their ability to integrate their learnings into practice could depend on site-specific factors and potential competing responsibilities at their home institutions.

Other Training Opportunities Offered within SCI

Support for specialized training and/or participation in professional groups and corresponding activities was also provided through SCI. Physician leads received membership to American Society of Pediatric Hematology/Oncology (ASPHO), and could receive educational funds to attend professional development activities, including conferences (e.g., annual American Society of Hematology (ASH) and ASPHO meetings). Some were also able to partake in an intensive ASPHO review course on emerging oncological practices, which included very demanding and rigorous further medical skill development.

To strengthen the infrastructure to support better care for children with cancer and blood disorders across the six countries, additional training was provided to laboratory and data management personnel. Personnel in the hematopathology laboratory at the University Hospital of the West Indies and the National Public Health Laboratory in Jamaica received training and support related to immunophenotyping services for testing the bone marrow and blood of children with leukemia. There had been a goal of setting up a similar service within the hematopathology laboratory in Trinidad, although this has not been realized to date given resource limitations. Data management training focused on teaching data managers to facilitate consistent data collection and entry at the different sites. Details specific to the efforts around data management and the development of clinical databases are further described in the Local Oncology Databases Development technical paper (Browne-Farmer et al 2023).

Specific to SCD, SCI supported the Caribbean Network of Researchers on Sickle Cell Disease (CAREST) conference in 2016, including the guest speaker and attendance of representatives from the SCI countries in Jamaica. A SCD Newborn Screening (NBS)

Nurse Coordinator was supported in her training of nurses in all Regional Health Authorities regarding practical skills, demonstrating correct techniques for heel pricks, cord blood collection and use of Guthrie cards. The Nurse Coordinator also developed a manual for NBS which was accepted by the Ministry of Health and Wellness as standard of care and distributed to all regions. Some of the SCI partners also engaged in additional education around comprehensive care for SCD patients, role of hydroxyurea, pain management, as well as patient education packages.

Quality Improvement Initiatives

Within Phase 2 of SCI, QI activities played an important role as a change management strategy to facilitate the integration of new knowledge and skills into the practice settings, and to enhance the team approach to care delivery. QI activities were site-specific and determined by the needs identified by the local management partners. A multi-modal, multi-disciplinary approach was employed, which included allied health professionals, nurses, and physicians based at SickKids and in the Caribbean. The incorporation of education on QI principles and concepts was mindful of sustainability. To demonstrate and carry out the QI activities with the local team, in some instances a team from SickKids would travel to the respective countries. QI activities included focus on the recognition of oncology emergencies, chemotherapy administration, central line care, psychosocial care, comprehensive care for SCD patients, nutritional management of pediatric oncology patients, palliative/end-of-life care, and peer support for teams working in this area. Two context-relevant patient education packages were also developed, pertaining to hydroxyurea for SCD and warning signs in children with cancer, respectively.

Methods

To inform this technical paper, we reviewed past internal and external SCI reports, including the independently prepared midterm and final evaluations (Rudiack-Gould and McGuire 2016; Salehi 2020). The four themes were identified from this review and approved by the SCI Research, Policy and Advocacy Working Group. All co-authors were asked to complete a survey to ascertain key activities and provide feedback on each of the four themes related to the major successes, challenges, and areas for further improvement. Anonymized responses were reviewed and summarized. There were also follow up conversations with specific co-authors to gather additional details around certain elements.

Themes

Communities versus Silos

Within SCI, a strong community of practice was created around education and training. Through inter-professional education, the concept of the hematology/oncology team expanded from being country-specific to Caribbean-wide, thus fostering a community of physicians, nurses, and data managers that supported one another across the region (Spence et al 2019). Importantly, connections were made with colleagues who had previously been practicing largely in isolation prior to SCI. Although the development of a community took time, strong relationships were formed, and a collaboration characterized by good communication was supported. There came to be an openness, such that obstacles and challenges could be shared, which led to generating solutions from within the Caribbean in multiple cases. Of note, both professional and friendship bonds were formed. This was predicated on the importance of interprofessional collaboration as a key strategy for enhancing better patient outcomes (Knoop et al 2017; Tremblay et al 2010), which is particularly important in resourced-constrained contexts.

The installation and incorporation of telemedicine resources were integral to the delivery of the different forms of education early on and facilitated the development of a community among the SCI team. Telemedicine teaching sessions were structured, occurred at set times, and were well attended by participants from the various islands and specialists from SickKids. General education webinars led by physicians, nurses, and allied health professionals in sub-specialties, such as pharmacists and nutritionists, addressed interlinked areas of management needed for holistic care. Feedback was sought at the end of each session to ensure material was relevant to local needs and areas for improvement were identified. Sessions were held at a frequency to support continuous learning and strengthened confidence in the practice of pediatric hematology/oncology locally. Perceived improved outcomes with respect to patient survival further reinforced participants' confidence in the importance and utility of the telemedicine teaching sessions.

The SCI consultations regarding complex cases in the Caribbean proved to be a major source of continued education for both local and Canadian physicians, and especially for the SCI-sponsored fellows-in-training who would be returning to the region to provide similar care. This is further detailed in the technical paper on Case Consultations and Diagnostic Services (Thame et al 2023).

A formal regional nursing community of practice was developed for pediatric hematology/oncology nurses across the Caribbean. This provided graduates of the nursing education program with a forum to meet with other nurses with shared knowledge, skills, and commitment to improving clinical practice. It also supported further development of their knowledge, skills, and judgement in the clinical area

through access to relevant literature, best practices, and expertise applicable to their practice. A safe and confidential environment was fostered to debrief and discuss clinical cases and practice improvements, with a goal of alleviating professional isolation. Nurses engaged in the specialized pediatric hematology/oncology nursing education program also developed informal communities, especially within cohorts and within sites, which strengthened regional ties.

The opportunity to attend conferences and the annual SCI meetings fostered knowledge generation and expertise enhancement. International conferences and courses were made available to site leads, and traveling and attending events together facilitated relationship and team building. With respect to the ASPHO Review Course, this offered an important opportunity to engage in immersive learning with a comprehensive curriculum on fundamental pediatric hematology/oncology concepts. SCI also facilitated involvement in regional and international conferences, symposia, and professional networks. The annual SCI meetings allowed for exchange of ideas and reflection on priorities, such that the group could discuss and include all national perspectives (Manley-Kucey et al 2023).

Building Local Capacity versus Parachuting in

Supporting the education of health professionals in the region was key to building local capacity within SCI. This included providing formal and informal training tailored to the context, such that the regional context and potential resource limitations were considered. To foster local ownership and autonomy, there was an emphasis on encouraging those in training positions to gain experience by leading continuing education activities. SCI included local participants in leadership teams for various initiatives, including ones requiring local advocacy.

Throughout the SCI partnership, support for building local capacity changed over time. Prior to Phase 1, a needs assessment was done to identify the gaps in care in the region. Guidance documents on best practices were identified as an area for development, which led to the generation of standard operating procedures. The focus was mainly on supportive care for the stabilization of children with emergent presentations at diagnosis. These documents were written as a general guide for appropriate practice in the care of pediatric patients with cancer and blood disorders in the Caribbean and to optimize the stabilization of patients with cancer at first presentation when there is a high risk of mortality. SCI pediatric hematologists/oncologists and other local consultants were involved in the development and review of these documents, and the documents were tailored to each island depending on resource availability. This approach facilitated ownership of these documents by the local health care professionals involved with the assessment and care of children with cancer and blood disorders.

One component of education in Phase 1 was monthly meetings via telemedicine, where a case would be presented by a local physician with an opportunity for discussion and relevant research/evidence and experience provided by the SCI consultant. These case consultations were mostly geared towards management of oncological cases. The University of the West Indies Distance Education Centre (UWIDEC) also provided a format for local and Canadian consultants to discuss a relevant topic, either hematological or oncological. The education format changed somewhat in Phase 2, as relevant topics were still presented, but there was more targeting of content to physicians and fellows-in-training. Case consultations, in particular, were used as educational opportunities for fellows who were to return to the region. The discussion allowed insight into management of challenging hematology/oncology cases, which could be used to guide the management of future similar cases. Over the course of the program, newly trained SCI fellows took on greater responsibility in leading the education sessions and rounds, as detailed further in the technical briefs on Case Consultations and Diagnostic Services (Thame et al 2023).

Nursing education was a key component within the SCI collaboration and required a significant investment to ensure successful implementation. Initially, implementation focused on foundational components to ensure positive momentum, resources, and infrastructure. This included engagement of nursing leaders from the six partner countries, networking with key stakeholders to obtain approval of the program at The UWI; ensuring that the program was a sufficient duration and offered relevant opportunities for training (i.e., clinical practicum); and engaging and hiring dedicated local clinical faculty to deliver the content. Thereafter, much time was put into building relationships, strong communication, and collaboration with partners, which supported positive outcomes for the program. A team-based teaching approach was implemented, in which both SickKids and The University of the West Indies School of Nursing (UWISoN) educators fostered local ownership and ensured the delivery of contextually relevant content. There was strong leadership and administrative support for the nursing education program in St. Augustine, however it was sometimes challenging to secure dedicated clinical faculty time to support the program. Related to nursing education, local ownership was supported through a co-teaching model with The UWI faculty and accreditation of the post-registration program at The UWI (i.e., not a SickKids program, but a The UWI program). This was supported by the pediatric oncologists/hematologists who provided clinical supervision to students, especially in the first cohort. By the second and third cohorts, the graduates of the previous cohorts served a key role in supporting knowledge transfer while in the clinical setting. Engagement of nursing leaders was critical to ensuring a positive and supportive working environment for nursing education program graduates; supporting retention; and applying clinical knowledge, skills, and leadership abilities in practice.

Graduates of the nursing education program were well positioned as leaders in their practice environment, where they supported and led change through teaching others, including patients and medical interns. This often took the form of informal one-on-one bedside teaching. From a graduate retention survey completed in 2019, over 96% of the nursing education program graduates remained at their home facilities. Furthermore, one way in which local nursing capacity was fostered was through 'change projects' initiated by nurses at the end of the program. The change projects allowed the nurses an opportunity to identify and address a clinical issue they were passionate about, using knowledge obtained during their training. This was supported by the respective hospitals where they were primarily employed. An example of one graduate's change project was creating a safe space for chemotherapy delivery for staff and the development of a booklet for patients to better understand chemotherapy.

Of the several QI projects implemented, there was a keen focus on SCD. In Trinidad, this included port-a-catheter care, hydroxyurea, and pain management in SCD; whereas in The Bahamas, the local team focused on improving the delivery of care to reduce central line associated bloodstream infections and overall care in SCD patients. In SCD management, local ownership was very evident but had better outcomes in Jamaica. This was largely related to multiple barriers at many levels in other sites. In Jamaica, SCD NBS increased from approximately 40% in 2008 to all public institutions in 2015, and local private hospitals joined the program in 2020. Furthermore, SCI-affiliated personnel have helped to integrate the care of SCD into public health in an entirely new way. This has helped to inspire people living with SCD in other Caribbean islands to reach out in South-South collaborations to improve their own care.

Strengthening versus Supporting Health Systems

Within SCI, an emphasis was placed on developing infrastructure and resources to strengthen education and training. As well, specialized training was provided to build the health workforce. Building the capacity of health care professionals with specialized hematology/oncology expertise was a central mandate. To build the health workforce, five pediatricians completed hematology/oncology fellowships at SickKids and three cohorts of nurses were formally trained in pediatric hematology/oncology. In particular, the nursing education program was developed by leveraging the strengthening of a local institution. This was a way to develop academic programming with the potential to extend beyond the project period, either as a continued stand-alone program or integrated into new programs (e.g., Master's of Nursing in pediatrics with oncology option).

All the regions involved in SCI had access to some telemedicine facilities through UWIDEC, but sometimes the location was offsite, which could require a busy clinician or nurse to leave the hospital to participate. To remove this barrier, the SCI team installed telemedicine facilities at the various hospitals for easy and consistent access when needed (Adler et al 2015). Over the duration of the SCI project, case consultations

were increasingly arranged using virtual platforms (e.g., Zoom) to facilitate maximum participation by the involved health care professionals in Canada and the SCI partner countries. This has become even more important with the onset of the COVID-19 pandemic, and it has allowed other teams at the hospital to participate remotely.

QI activities, such as addressing pain management in SCD, were geared towards ensuring the delivery of the highest standard of healthcare. This occurred in The Bahamas and Trinidad and Tobago and was received with enthusiasm by the local team. However, the QI activities were challenging to identify and coordinate, and as a result they became more focused on supporting local hospitals to address acute issues. For SCD, SCI partnered with other regional groups, such as the Caribbean Network of Researchers on Sickle Cell Disease and Thalassemia (CAREST) and supported SCI-affiliated personnel to attend a CAREST regional conference. SCI also supported a nurse coordinator in Jamaica who was part of the existing unit.

Optimized versus Routine Practices

The recognition that resources and funds were limited to a varying extent in the different countries required practice modification, while maintaining a high-quality level of care. This included developing supportive care guidance documents for each country. Documents were created for the management of febrile neutropenia, tumor lysis syndrome, hyperleukocytosis, transfusion issues and chemotherapy induced nausea and vomiting. These were spearheaded by the respective experts at SickKids and reviewed by physicians in the different partner sites. Due to the high toxicity associated with acute myeloid leukemia treatment, specific antimicrobial guidelines were created and updated based on antibiotic availability. The SCI/ASH Children's International Consortium for Acute Leukemia Initiative (C-ICAL) childhood ALL protocol that has been accepted as the current standard of care for management of children with ALL in The Bahamas, Barbados, Jamaica and Trinidad and Tobago was specifically designed to be an optimal management approach in the context of local resources, but with the very important goal of improving cure rates and quality of life of affected children and their families. This protocol represented an adaptation and implementation of standard protocols used in high income countries.

With respect to the delivery of the nursing education program, a team-teaching approach was used to create bi-directional support and learning and improve the curriculum and delivery. The development of the nursing education curriculum was a collaborative effort. An 'evidenced-informed' approach was taken in developing the nursing curriculum, recognizing that sometimes best practices need to be adapted for the local context.

Discussion

The SCI story is fundamentally one of translating philanthropy into inspiration and hope. At the start of the journey, those in the region were disconnected but aimed to provide high quality, patient-centric care. Over time, SCI participants have come together to work as an interconnected team, optimizing resources, and collectively finding patient- and family-centered solutions. This is a noted key feature of interprofessional collaborations in hematology/oncology care (Knoop et al 2017; Wait et al 2017). This reach has come to extend beyond the six territories primarily involved in the region, with assistance being provided to other English-speaking Caribbean countries with children with cancer and blood disorders.

There have been many outstanding achievements, with the training of five new pediatric hematologists/oncologists firmly establishing this sub-specialty within the region. These new pediatric hematologist/oncologists will further act as regional experts for small Caribbean countries that cannot fully support a trained pediatric hematologist/oncologist, and especially for stabilization of critically ill children prior to transfer to a larger health care facility for assessment and management before transfer back to their home country. Excitingly, the specialized training which these physicians have received creates the potential for the development of a fellowship program within the region in the future, which would serve to further increase capacity. These trainees will be the next generation of leaders in the field of pediatric hematology/oncology locally in the years ahead, and will be the lasting legacy of SCI.

A future plan for optimization of other inter-related specialties should be considered. This could include targeted training opportunities for pharmacists, pathologists, radiation oncologists, and surgeons, as all lend critical roles to the successful outcome of the pediatric hematology/oncology patient.

During SCI, three cohorts of nurses were also trained in pediatric hematology/oncology. There was a formalized Nursing Working Group in Phase 1, but more *ad hoc* engagement with nursing leaders in Phase 2. The *ad hoc* arrangement had some disadvantages. In contrast to the previous model, some elements of the previously supportive environment for practice and education, including a targeted strategy to support an advanced scope of practice, were lost.

Continued training of local pediatric hematology/oncology nurses from the six partner countries is needed for sustainability and to promote retention in the field of pediatric hematology/oncology nursing. The adoption and modelling of this program by UWISoN is a possible solution, given the commitment from these nurses to stay in the region. However, other issues that need to be addressed include the lack of recognition of this specialized training by the regional nursing councils. Nurses found it frustrating when

they returned to their position and were not able to practice the full skillset obtained in training. An example was the inability of nurses in one setting to provide central line care (despite having the knowledge and skills), as this was a task that physician and residents routinely performed and there was uncertainty about whether the nursing regulatory body supported the advanced scope of practice.

Sustainability was a core focus of the SCI initiative. Going forward, there is concern that there may be a loss of the nurses who received specialized pediatric hematology/oncology training, if they were to accept other job opportunities locally or abroad, although there was limited attrition in the three to five years post-training. The solution to this issue will require ongoing commitment and to some degree lies beyond SCI, as the nursing councils and Ministries of Health in each country will need to empower newly trained nurses by recognizing their skills and facilitating financial incentive and career satisfaction. Trained nurses could also lobby as a group, emphasizing the impact of their skills on maintaining a good standard of care for pediatric patients with cancer and blood disorders. With support from the physicians whom they work alongside, and with whom they have developed a strong community through SCI, this would offer further leverage to the initiative.

The COVID-19 pandemic impacted planned QI activities for the SCD unit and oncology wards in Jamaica. SCI physicians and nurses were unable to travel, and local physicians and nurses were deployed to the general labor force, thus creating a shift away from pediatric hematology/oncology issues.

Some initiatives led by SCI were not as successful as they could have been. For SCD, training personnel in St. Lucia to use heel prick and high-performance liquid chromatography (HPLC) was difficult. This offered important insight into the additional approaches needed to implement program change, as well as the importance of local champions within the public health sector and academia. In Jamaica, local ownership gave a multiplier effect to the impact of involvement in Jamaican NBS program. The power/authority/influence of local “owners” greatly impacted how much training could extend beyond the SCI members to other healthcare workers, demonstrating the extent to which regional involvement and ownership can influence the successful outcome of any initiative.

The interventions of SCI with regional Ministry of Health and Wellness in The Caribbean Community (CARICOM) have brought SCD more prominently into focus in this group and with The Caribbean Public Health Agency (CARPHA). The support for SCI from these regional bodies would auger well for the continued improvement in this area for the Caribbean. SCI has also captured the attention of The Pan American Health Organization (PAHO), which has recognized the group’s efforts to improve outcomes in the region.

Even though several participants knew one another pre-SCI, regular meetings over the past nine years of the SCI partnership enhanced this association on a common platform of goals and dreams. After SCI formally ends, this will foster continued success. The tangible gains from SCI will hopefully inspire investment from the region, both at a government level and from non-governmental organizations.

Contributions

MRM prepared the first draft of the manuscript, with assistance from JBB. JBB designed the survey, and all remaining authors provided input on the key activities and themes related to education and training within SCI via the survey. All authors read, provided additional feedback, and approved the final draft.

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