

# Developing Sustainable Cancer Education Programs: Training Public Health Students to Deliver Cancer 101 in Puerto Rico

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**Abstract** The use of *promotores* to educate Hispanic communities about different health topics has been proven successful, albeit with limitations in program sustainability. The goal of this study was to develop a sustainable train-the-trainer model to train graduate public health (PH) students to disseminate cancer education among communities in Puerto Rico (PR). Graduate students ( $n = 32$ ) from Ponce Health Sciences University's (PHSU) PH program participated in a 2-day *Cáncer 101* training, where they learned how to deliver nine cancer modules to the community. Cancer knowledge was assessed before and after the training via 54 items measuring discussed concepts. Participants also assessed the training's effectiveness by completing a training evaluation informed by social cognitive theory (SCT) con-

structs of self-efficacy, outcome expectations, facilitation, and observational learning. Participants were mainly female (78.1 %),  $26.7 \pm 3.9$  years old, and enrolled in a Masters-level program (81.3 %). Participants reported an average 11.38-point increase in cancer knowledge after attending the training [ $t(31) = 14.88$ ,  $p < .001$ ]. Participants also evaluated the training favorably upon completion, reporting satisfactory comments in the open-ended responses and high scores on measured SCT constructs. The *Cáncer 101* training program effectively prepared students to deliver cancer education to local communities. Training graduate PH students to educate communities about health issues is an innovative, and potentially sustainable, way to reach underserved populations.

**Keywords** Cancer education · Promotores · Latino/Hispanic · Training · Health disparities

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## Introduction

Chronic diseases are the leading cause of death in the USA, disproportionately affecting minority populations [1]. This is particularly relevant for Hispanic communities, which represent the largest minority group in the USA [2] and have high chronic disease burden [3]. In fact, cancer is the leading cause of death among Hispanics in the USA, surpassing cardiovascular disease [3]. In 2013, an estimated 37,800 cancer deaths occurred among this group [4].

Hispanic communities have successfully used community health workers in health promotion and educational initiatives around the USA [5]. These community health workers, known as *promotores de salud* or *promotores* in Spanish, are typically community members who receive training to

provide culturally and linguistically appropriate outreach and education to engage community members in lifestyle changes that can lead to healthier behaviors [5, 6]. In many cases, “train-the-trainer” curricula are used to educate *promotores* on specific health topics, providing them with skills, materials, and strategies to ensure programmatic success [7, 8]. *Promotores* also encourage community empowerment [6] and have contributed to increased participation in chronic disease primary prevention efforts [9, 10], with several programs showing improved cancer prevention attitudes and increased knowledge and screening rates [11, 12]. However, issues related to sustainability and training of *promotores* cannot be overlooked. The sustainability of grant-funded initiatives and other community programs that use *promotores* is often limited by lack of funding [13]. Recent studies highlight that a continual funding source to support salaries, materials, and transportation needs is critical to sustaining these programs [7, 13, 14]. In many cases, programs without sustainable funding mechanisms subside soon after funding ceases. Time and resource limitations also contribute to the challenges of implementing a rigorous and consistent training program, with program planners noting that initial training efforts are not sufficient to extend program success when funding diminishes [13]. This can be particularly problematic in areas with high chronic disease burden, as is the case in Puerto Rico (PR), a US territory in the Caribbean where cancer is the leading cause of death [15]. Thus, it is important to identify alternative mechanisms to provide sustainable avenues for culturally tailored health education.

Public health programs are in a unique position to contribute to health education efforts. Graduate students enrolled in these programs have the capacity to educate local communities while using culturally competent strategies [16], making these programs excellent vehicles for sustainability. As such, the Ponce School of Medicine (PSM) - Moffitt Cancer Center (MCC) Partnership – a National Cancer Institute Partnership to Advance Health Equity (PACHE) between Ponce Health Sciences University (PHSU) and MCC [17]—adapted a cancer education curriculum for audiences in PR. The curriculum was simultaneously tailored to the needs of public health graduate students receiving cancer education training for the first time [18]. Given the PSM-MCC Partnership’s access to public health students enrolled in PHSU’s Public Health Program, the goal of this pilot study was to develop an annual cancer training program using public health students as its primary resource to educate local communities. Developing a sustainable training program for public health students to deliver cancer education in culturally appropriate ways may assist the PSM-MCC Partnership and other local cancer groups to reduce cancer health disparities in PR by providing a constant cadre of trained graduate students

available to deliver cancer health information to local communities.

## Methods

This pilot study utilized a “train-the-trainer” model to teach graduate-level public health students at PHSU to deliver cancer education to communities in PR. The Social Cognitive Theory (SCT) was used to design the training program, for it addresses the dynamic nature between communication and behavior change and distinguishes how culture shapes basic human capabilities in different cultural settings [19]. Specific SCT constructs used to inform the training program included self-efficacy (beliefs about personal ability to perform behaviors that bring desired outcomes); outcome expectations (beliefs about the likelihood and perceived value of the consequences of behavioral choices); facilitation (provision of tools/resources to make behaviors easy to perform); and observational learning (learning to perform new behaviors via exposure) [20]. These constructs were utilized in the design of the training program to ensure the curriculum was both educational and informative.

**Curriculum** The cancer curriculum used for this training program is called “*Cáncer 101: Información educativa sobre el cáncer para la comunidad de Puerto Rico*” (*Cáncer 101*) [18]. This Spanish-language curriculum was previously adapted for audiences in PR and is described elsewhere [18]. Prior versions of *Cáncer 101* have been used in multiple communities and have successfully increased cancer knowledge, attitudes, and cancer control activities [21, 22]. *Cáncer 101* contains all necessary materials for cancer educational sessions in PR. It consists of nine modules covering the following topics: basic cancer information, risk factors, screening, diagnosis, treatment, cancer and chronic illnesses, survivor and caregiver support services, cancer and genetics, and biobanking. Each module contains a written chapter with learning objectives, a PowerPoint presentation, initial and final evaluations with an answer sheet, a glossary, references, and supplemental resources. In addition to the modules, the curriculum has a list with local and national organizational resources, information on how to obtain educational brochures and/or handouts, and a training manual. The training manual summarizes how to prepare for the training, how to administer and analyze module evaluations, sample activities, and a training evaluation.

**Recruitment** The *Cáncer 101* training program was open to any interested MPH and DrPH public health students enrolled at PHSU during the 2014–2015 academic year ( $n = 124$ ). Participants were older than 21 and Spanish speakers. The training was advertised in classes and via e-mail as a 2-day

training on cancer education. Training enrollment was advertised a month prior to the training and closed a week prior to training delivery. Students interested in participating informed PHSU study faculty, who explained that participation was voluntary and would not impact their academic performance. Interested students were scheduled to take the pre-test for all modules prior to the 2-day training. At the appointment, they also provided basic demographic information (age, gender, year of study, previous cancer training attendance). After taking the pre-test, all participants received all curriculum materials and were asked to read materials and bring any questions to the 2-day training session for group discussion. This study was deemed exempt by both PSHU and MCC Institutional Review Boards.

**Training** The 2-day training session was held on March 26 and March 27, 2015, on site at PHSU (5 h each day). It was delivered in Spanish. Study staff, both Community Health Educators with previous experience in training and utilizing the *Cáncer 101* curriculum, facilitated the training sessions. A third member of the study staff assessed training delivery fidelity using a checklist. During the training, participants learned how to deliver each module in the community, adult facilitation techniques, and how to administer and analyze module pre- and post-tests. After each module was presented and discussed, participants answered the corresponding post-test. Participants completed an anonymous training evaluation at the end of the 2-day training.

**Measures** Cancer knowledge was assessed using a total of 54 items to measure concepts discussed within each module, both before and after the training. Participants read each statement and indicated if they agreed (“Yes”), disagreed (“No”), or if they were unsure (“I don’t know”). Items were recoded (1 = correct, 0 = incorrect or not sure), and scores were added to compute cancer knowledge scores for each module. An overall cancer knowledge score was also calculated by adding all module totals, with higher scores indicating higher knowledge.

The training evaluation assessed students’ perceptions of the effectiveness of the 2-day training program. Evaluation items were mapped to the SCT constructs used to design the training program (self-efficacy, outcome expectations, facilitation, and observational learning). A four-point Likert scale was used to measure statements for each construct, with responses ranging from 1 = strongly disagree to 4 = strongly agree. Self-efficacy was measured by the following statements: “The training has prepared me to plan *Cáncer 101* events/programs in my community”; “The training has prepared me to implement *Cáncer 101* events/programs in my community”; “I feel comfortable sharing cancer information with the community after this training”; “I feel comfortable answering questions from community members after this training”; “I can effectively administer

each module’s pre-/post-assessments”; and “I can effectively analyze each module’s pre-/post-data”. Outcome expectations were measured by the following statements: “The training was valuable for me”; “The training was valuable for my work/academic preparation”; and “The training was valuable for my community.” Facilitation was measured by the following statements: “The information presented was understandable” and “The training provided me with the necessary tools to deliver *Cáncer 101* in the community.” Observational learning was measured by the following statement: “The training provided me with the necessary skills to deliver *Cáncer 101* in the community.” Final scores were calculated for each construct by adding the corresponding items. The training evaluation also included four open-ended items to capture participants’ opinions about the training and how they intended to use the curriculum in the future.

**Data Analysis** Statistical analyses were conducted using SPSS 19.0. Basic demographic frequencies were calculated, and paired *t* tests were conducted to measure increased knowledge. Means and standard deviations were calculated on evaluation items that assessed self-efficacy, outcome expectations, facilitation, and observational learning. Lastly, a content analysis was conducted on open-ended responses. Two research staff members individually coded open-ended responses and discussed codes to achieve consensus. After consensus was achieved, a bilingual staff member translated responses into English. Responses were then quantified and compared with measured SCT constructs to provide additional insight to the training’s effectiveness.

## Results

A total of 32 graduate-level public health students attended the 2-day training to learn how to deliver cancer education using the *Cáncer 101* curriculum. Participants were mainly female (78.1 %), mean age was 26.7 years, and most were enrolled in a Masters-level public health program (81.3 %). Of those at the Masters-level, 12 were first-year students and 14 were second-year students. Most participants (81.3 %) had never attended a cancer presentation, workshop, or training in the past. Among the main reasons for attending were developing knowledge and skills to educate others (87.5 %); understanding Puerto Ricans’ cancer issues and concerns (78.1 %); and learning basic information about cancer (78.1 %) (Table 1).

### Cancer Knowledge Scores

Participants reported statistically significant increases in cancer knowledge after receiving the 2-day *Cáncer 101* training (Table 2). Paired sample *t* test indicated an 11.38-point increase in overall cancer knowledge ( $t(31) = 14.88, p < .001$ ),

**Table 1** *Cáncer 101* training participant demographics

Demographics	Number (%)
Age, mean (SD)	26.7 (3.9)
Gender	
Female	25 (78.1 %)
Male	7 (21.9 %)
Graduate level enrolled	
Master of Public Health (MPH)	26 (81.3 %)
Doctorate of Public Health (DrPH)	6 (18.8 %)
Previous cancer presentation, workshop, or training attendance	
Yes	6 (18.8 %)
No	26 (81.3 %)
Reasons to participate in training	
Develop knowledge and skills to educate others	28 (87.5 %)
Learn basic information about cancer	25 (78.1 %)
Understand Puerto Ricans' cancer issues and concerns	25 (78.1 %)
Develop knowledge and skills to participate in cancer control activities	23 (71.9 %)
Learn about community-based cancer projects	20 (62.5 %)
Learn about cancer resources for patients and caregivers	19 (59.4 %)
Learn about cancer resources for healthcare providers/professionals	19 (59.4 %)
Opportunity to ask questions and discuss cancer issues and concerns with others	15 (46.9 %)
Network with others	10 (31.3 %)

with all but one module (*module 3: Cancer screenings and early detection*) showing statistically significant increases in knowledge (Table 2).

**Training Evaluation via SCT Constructs**

Trainees evaluated the training favorably upon completion, reporting high scores on the SCT constructs used to design the training (Table 3). Participants perceived that the training provided them with the necessary tools and resources to deliver educational sessions, with high scores on items assessing facilitation and observational learning. These findings were reinforced by the participants' open-ended responses, where 68 % stated that the way the training was delivered and the resources available within the curriculum were the most helpful aspects of the training. Students were particularly satisfied with the strategies and adult learning techniques shared by the facilitators:

*“The most useful aspects of the training were the ‘tips’ the facilitator shared to effectively deliver educational sessions in my community.”* —Training participant  
*“[Useful aspects included] strategies to emphasize specific information and/or slides, as well as specific examples of situations that have occurred to the facilitators [when delivering] these materials in the community. Also, the training materials—the training manual with PowerPoint notes and the resources within the modules.”* —Training participant

Participants also perceived that the training was valuable and prepared them to effectively deliver cancer education in

**Table 2** Paired sample *t* test increased knowledge scores for training participants (*n* = 32)

Module	Total items	Mean score (SD)		Score increase	<i>t</i> test
		Pre	Post		
1. Cancer in Puerto Rico	10	6.66 (1.43)	9.53 (.8)	2.75*	11.19
2. Possible cancer risk factors	5	4.00 (.98)	4.91 (.3)	.91*	4.84
3. Cancer screenings and early detection	5	4.00 (.44)	4.13 (.49)	.13	1.28
4. Cancer staging and diagnostic	6	3.78 (1.04)	5.47 (.62)	1.69*	8.31
5. Beginning cancer treatment	5	3.41 (.67)	4.69 (.53)	1.28*	10.61
6. Cancer and chronic diseases	4	3.53 (.67)	3.97 (.18)	.44**	3.46
7. Cancer survivor and caregiver support	5	4.00 (.36)	4.84 (.37)	.84*	9.27
8. The role of genes in cancer	9	6.75 (1.24)	8.16 (.68)	1.41*	6.16
9. How can I help find a cure for cancer?	5	2.13 (.75)	3.94 (.88)	1.81*	9.16
All modules	54	38.25 (4.00)	49.63 (2.65)	11.38*	14.88

\**p* < .001; \*\**p* = .003

**Table 3** *Cáncer 101* trainee average Social Cognitive Theory (SCT) ( $n = 32$ )

SCT construct	Min score	Max score	Mean (SD)
Self-efficacy	6	24	22.16 (3.15)
Outcome expectations	3	12	11.38 (1.31)
Facilitation	2	8	7.59 (.88)
Observational learning	1	4	3.81 (.47)

their communities, with high outcome expectations and self-efficacy scores (Table 3). These findings were consistent with participants' open-ended responses, with 77 % stating that they felt adequately prepared to educate community members about cancer and successfully address basic cancer concerns in the community:

*"I will use the curriculum materials to empower and impact my community through educational sessions that will help promote, protect and prevent [cancer], with the goal of benefiting my community."* —Training participant

*"I can effectively tailor educational sessions to my community, because the facilitators gave us ideas on how to emphasize certain topics within the curriculum."* —Training participant

## Discussion

Sustainability is an important aspect in the development of cancer education training programs. Although *promotores* have been successfully used to educate Hispanic communities about a myriad of health issues, lack of sustainability is a common occurrence when funding mechanisms subside [7, 13]. This study incorporated an evidence-based, culturally adapted cancer education program (*Cáncer 101*) into an existing infrastructure, which may enhance the program's sustainability by training public health graduate students at PHSU annually to educate local communities in PR about cancer while reducing financial or training limitations. Students may be able to deliver cancer education to community members as part of an elective, practicum, or capstone experience or to fulfill research and/or community service hours. Furthermore, students graduating from the PHSU public health program will be able to use the *Cáncer 101* materials to work alongside local organizations through the PSM-MCC Partnership. Training students to deliver educational sessions may ultimately assist in increasing awareness of cancer prevention, early detection, treatment programs, and research, an important goal for the PSM-MCC Partnership and other local

cancer prevention agencies (such as the American Cancer Society and Puerto Rico Health Department).

Comprehensive training is another important aspect of an effective training program, which must be tailored to meet the needs of health educators delivering information [7]. Programs using students in other healthcare professions show the importance of designing training programs to meet the unique needs of these populations [23]. The *Cáncer 101* curriculum was previously culturally adapted using a three-phase process to ensure content was both appropriate for communities in PR and useful for future trainees [18]. To do so, public health students piloted content and delivery and identified skills and resources they believed were necessary in a training program to effectively deliver cancer information to community members. Their feedback was embedded into the *Cáncer 101* training program, which was developed using SCT constructs to ensure successful cancer information delivery. Providing students with content prior to the training allowed for better engagement and discussion with facilitators, increasing participant self-efficacy. Facilitators also taught students a variety of ways to deliver information in each module, contributing to better facilitation techniques and increasing opportunities for observational learning. This theory-driven design led to successful outcomes, with positive training evaluations and increased knowledge scores in all nine modules.

Several limitations must be acknowledged. First, study participation was limited to students enrolled in the PHSU public health program. These students' training needs may be different from other healthcare professionals or community leaders interested in using *Cáncer 101* to deliver cancer education to communities in PR. However, we believe that the curriculum has the core components necessary for others to use it successfully, which has been done with previous versions of *Cáncer 101* [21, 22]. Second, participant enrollment was representative of the demographics of PHSU's public health program, which is predominately female. This may present a barrier in delivering gender-sensitive material, such as prostate cancer screenings. Lastly, although students reported statistically significant increases in knowledge in almost all modules (Table 2), the increase in knowledge regarding different types of cancer screenings (module 3) was not statistically significant. This may have been due to the students having increased awareness about screening and early detection for certain cancers, as the PSM-MCC Partnership's Outreach Core conducts multiple cancer education events at the PHSU campus throughout the year, while the PR Health Department conducts breast and cervical cancer screening education through the Centers for Disease Control and Prevention's Breast and Cervical Cancer Early Detection Program. Furthermore, although *Cáncer 101* was adapted from another Spanish version of the curriculum (developed for lay audiences) through the use of a local panel of experts and other public health students [18], it is important that the module assessments be further

tested with community members before full implementation of the curriculum in local communities, as it may be necessary to include additional items assessing cancer site-specific screening guidelines.

The use of *promotores* to reach Hispanic communities and educate them about a myriad of chronic disease topics is promising. By leveraging the infrastructure of a public health graduate program, it may be possible to develop sustainable health education efforts that provide underserved communities with a consistent pool of trained health educators. These trained students can assist local non-profits, health clinics, community agencies, and other organizations with the delivery of free health education, similar to what has been done with medical students in other programs [23]. Future directions include collaborating with local community agencies and the PSM-MCC Partnership's Outreach Core in Ponce, PR, to deliver cancer education workshops conducted by trainees in actual community settings. This is an important component in the pilot testing and full implementation of the curriculum to communities in PR. It will also allow for the assessment of effective communication of curriculum materials by trained students and outcomes associated with the delivery of the curriculum (i.e., increased cancer knowledge, self-efficacy), while also linking community members to screening services.

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