A training programme to build cancer research capacity in low- and middle-income countries: findings from Guatemala

Lauren D Arnold, a Joaquin Barnoya, b Eduardo N Gharzouzi, c Peter Benson d & Graham A Colditz b

Problem Guatemala is experiencing an increasing burden of cancer but lacks capacity for cancer prevention, control and research. In this article, we illustrate one example of a country with a critical need to incentivize health research – the retention of “clinician researchers”, research that informs policy and systems changes, and institutional commitment are all key to building cancer research capacity in the country and addressing the country’s cancer needs.

Introduction

A disproportionate burden of the recent global increase seen in cancer incidence and mortality is shouldered by low- and middle-income countries (LMICs). This is due in part to population ageing in LMICs, but shifts in the prevalences of modifiable risk factors – such as smoking and obesity – have also played a role.1 The United Nations and the Pan American Health Organization (PAHO) cite cancer surveillance, research and capacity building in LMICs as critical elements in the prevention and control of cancer worldwide.2-4 The World Health Organization (WHO) has emphasized the importance of capacity building that reaches beyond the development of infrastructure and resources to include the strengthening of in-country competence for conducting high-quality research.5 Potter & Brough developed a “capacity model” that addressed the building of infrastructures, systems, skills and tools, particularly in LMICs.6 In this article, we illustrate one application of this “Potter–Brough” model that is responsive to the country needs of Guatemala – a lower-middle-income country in Latin America.

Guatemala: context for capacity building

Although cancer is the third leading cause of mortality in the country,7 Guatemala lacks a population-based surveillance system8 and only has limited services for cancer prevention and control. According to WHO – which has used Guatemala as an example of a country with a critical need to incentivize health care – the retention of “clinician researchers”, research that informs policy and systems changes, and institutional commitment are all key to building cancer research capacity in the country and addressing the country’s cancer needs.8

The Instituto de Cancerología (INCAN) in Guatemala City serves as the point of referral and service for Guatemala’s cancer patients. Access to adequate medical care in general – and oncological care in particular – is so poor in many areas of Guatemala that most cancers are not diagnosed until they are advanced. More than 70% of INCAN’s patients present with late-stage disease. The country’s oncologists are keen to develop strategies to reduce the late-stage diagnoses and improve outcomes. Although INCAN focuses on diagnosis and treatment and collects no population-based data, its medical records currently provide the best data available for estimating the national cancer burden in Guatemala.8 Recently, INCAN’s administration expressed an interest in collecting better, population-based data on which more accurate estimates of the country’s cancer burden – and more effective initiatives for cancer prevention and control – could be based. INCAN is slowly developing into a resource for the development of agendas for the future prevention and control of cancer in Guatemala.

Training programme

In a partnership between INCAN and the School of Medicine of Washington University in Saint Louis (Saint Louis, United States of America), a training programme was developed at the Instituto de Cancerología (INCAN) in Guatemala City. This institute provided a year-long training programme for clinicians that focused on research methods in population health and sociocultural anthropology. The programme included didactic experiences in Guatemala and the United States as well as applied training in which participants developed research protocols responsive to Guatemala’s cancer needs.

Abstracts in Arabic, Chinese, French, Russian and Spanish at the end of each article.
States of America), the Cancer Control Research Training Institute was developed at INCAN in September 2010. This was in response to Guatemala’s increasing cancer burden and INCAN’s recognition of the need to train clinical researchers in population health methods – so that such individuals can study and address Guatemala’s cancer needs. The long-term goal is to establish a sustainable training programme to develop capacity for research that could improve cancer-related policy health systems and disease management. Key features of the year-long programme described here included multidisciplinary training, didactic sessions, a mentored dyadic experience and applied training through the development of research protocols that are responsive to Guatemala’s needs (Fig. 1).

For the first, year-long training programme, 10 clinicians – five from the United States and five from Guatemala – were selected to participate, via a competitive application process. Participants engaged in training sessions – in English – in biostatistics, epidemiology, research methods, data collection and management, ethics and anthropology. The participants were separated into five pairs – each comprising a clinician from Guatemala and one from the United States – and each pair was matched with a mentor who was a member of the academic staff at the School of Medicine of Washington University in Saint Louis. Via e-mails and voice-over-Internet-protocol conversations, each pair and its mentor developed an early-stage research project that addressed a cancer need in Guatemala.

**Capacity-building model**

**Structures and systems**

At the “ground level” of the Potter–Brough model are the structures, systems and roles that address information flow and the authority to make decisions. A key component of the Cancer Control Research Training Institute was the “buy-in” from INCAN’s leadership and the Liga Nacional Contra el Cáncer Guatemala – INCAN’s sponsor. Also crucial was a train-the-trainer model, in which a member of INCAN’s staff who had decision-making authority participated in the training programme. As INCAN does not have an institutional review board, it was arranged for a Guatemalan university – the Universidad Francisco Marroquín – to review the research protocols that were produced in the training programme. Although this arrangement set the foundation for research in the near future, INCAN’s administrators recognized the importance of establishing their own institutional review board to sustain the research capacity that they aim to build.

**Staff and infrastructure**

The second level of the Potter–Brough model addresses the presence of facilities, resources and staff to support the work being done. Our training programme relied on on-site training in two countries and Internet-based communications. These activities required

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**Fig. 1. Building cancer research capacity, Guatemala, 2012**

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<td>Increasing cancer burden, accounting for 11% of the country’s deaths</td>
<td>Funding</td>
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<td>Research protocols</td>
<td>Short-term&lt;br&gt;Increased self-efficacy for design and conduct of research</td>
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<td>Limited cancer prevention and control activities</td>
<td>Institutional support</td>
<td>Participant–mentor meetings via VoIP</td>
<td>IRR agreement between INCAN and local university</td>
<td>Intermediate&lt;br&gt;Development of an IRB at INCAN</td>
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<td>No population-based cancer registry or surveillance</td>
<td>Expertise in population-health research and anthropology</td>
<td>Identification of research questions in cancer prevention and control</td>
<td>Annual cancer seminars</td>
<td>Generation of basic epidemiological data to inform future population health studies on cancer</td>
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<td>Lack of training in population health research methods</td>
<td>Training materials in English</td>
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INCAN, Instituto de Cancerología; IRB, institutional review board; VoIP, voice over Internet protocol.

Note: the figure shows a logic model used for a year-long training programme for clinicians. The programme was based at the newly established Cancer Control Research Training Institute – a joint endeavour of the INCAN in Guatemala City and the School of Medicine of Washington University in Saint Louis (Saint Louis, United States).
classrooms, academic staff, computer access and support and Internet connections that supported “online meetings”. We had to identify academic staff who were willing and able to add new responsibilities – trainee instruction and mentoring – to their workloads. A careful examination of existing work schedules was key to solidifying the commitment of academic staff. Administrative support for travel, scheduling and financial logistics was provided by Washington University in Saint Louis.

**Skills**

The third tier of the Potter–Brough model involves the building of individual-level knowledge, skills and confidence to engage in activities. These aspects of capacity building formed the crux of our training programme. It was a lack of available training in population-based cancer research for oncologists that motivated the programme’s creation. Didactic sessions were developed to build knowledge and skills in epidemiology, biostatistics, research ethics and regulation, data collection and management and sociocultural anthropology. Each of these sessions was led by an instructor with graduate-level training in public health or anthropology.

The trainee’s perceptions of their own research abilities were assessed by using a clinical research appraisal inventory. This tool, which was developed to assess clinician-scientists’ self-efficacy to perform clinical research, has been used to evaluate training programmes in clinical research. Between the initiation and end of our training programme, participants demonstrated substantial improvements in their self-perceived efficacy for study conceptualization, study planning and the ethical conduct of research (data not shown).

**Tools**

The fourth and final level of the Potter–Brough model describes “performance capacity” – i.e. the availability of resources needed to complete activities. The best-trained clinician researchers cannot work effectively if the resources that are available fail to meet their needs. At this level of the model, the Cancer Control Research Training Institute needed to know if the tools required for our training programme – and those required to sustain any likely future training – were available.

**Before our training programme, Washington University in Saint Louis was conducting relevant coursework and activities. For our programme, these were adapted to the Guatemalan perspective. Other components of the programme were developed from scratch. For example, sessions on database management and data collection tools were not only created specifically for the programme but also adapted during the programme – to satisfy the participants’ needs as they developed their own research projects.**

At the end of our training programme, it seemed clear that the ability to gather data to further Guatemala’s cancer prevention and control efforts would still be very limited if no more of INCAN’s clinicians could be trained in the relevant research methods. To begin to address this problem, INCAN translated some of the educational materials used in the training programme into Spanish and incorporated them into residency training; purchased relevant textbooks for clinician use; and established a journal club so that research discussions could be incorporated into future training.

**Value-added benefits**

During and after the training programme, various ancillary activities helped to build and solidify relationships that are likely to be critical to sustaining capacity for research training. In response to a dialogue initiated by the Cancer Control Research Training Institute, for example, annual cancer seminars were established in Guatemala. Each of these seminars has been built around a presentation by researchers from Washington University in Saint Louis. Although these meetings were originally planned only for INCAN’s clinicians, other clinicians from Guatemala as well as some of their counterparts from El Salvador, Honduras and Mexico, have attended recent seminars. One seminar has included a workshop on cancer pathology. At another, an anthropologist from the United States – who had worked in Guatemala – led a workshop on qualitative research and cultural competence. Clinicians from both partners involved in the training programme have met with representatives from the Liga Nacional Contra el Cáncer and the Guatemalan Ministry of Health to discuss priorities for cancer prevention, control and care in Guatemala. By highlighting the Cancer Control Research Training Institute’s activities, the Guatemalan media have helped raise awareness among the Guatemalan people about the country’s cancer burden and the need to strengthen training in cancer research to address ground-level issues such as surveillance, prevention and quality of care.

**Current status**

Since the end of our training programme, INCAN has established a research department and begun research collaborations with the United States National Cancer Institute, the Swiss Federal Technological Institute and the Nutrition Institute of Guatemala. Today, several of INCAN’s clinicians are engaged in research projects – on cervical and breast cancer and Mayan concepts of medicine and cancer – or, at least, applying for research grants. Most importantly, perhaps, INCAN’s administrators – in conjunction with the Guatemalan government, the International Agency for Research on Cancer, the Union for International Cancer Control and PAHO – are in the early stages of developing a national cancer registry. INCAN’s leadership credits the Cancer Control Research Training Institute with raising research interest and engaging the stakeholders needed to support the incorporation of research into INCAN’s activities.

**Lessons learnt**

The main lessons learnt are summarized in Box 1. Participants in our training
programme gained confidence in their ability to conduct population health research and developed research protocols that have begun to address some of Guatemala's cancer-related needs. However, some challenges were recognized that must be addressed to sustain future training. One of these was language – all trainees had to be fluent in English, partly because it was hoped they would have opportunities to present their work in English at international venues. At the time of our training programme, the Cancer Control Research Training Institute had no teachers of English, even though proficiency in English in general – and particularly in the technical English used in research – was considered essential in the training programme. A similar training programme in Spanish would benefit a broader group of the clinicians at INCAN. Trainees cited the international travel included in the training programme as critical to developing international relationships and collaborations, as well as to understanding the context in which partners worked. As such travel may not be financially sustainable in the future, the training of the next cohort may have to rely more heavily on Internet-based meetings and didactic sessions. Such online training has the advantage that it could easily be expanded to cover a large audience. Further funding will be needed to ensure that INCAN keeps up to date with resources such as software and texts. The employers of the trainees must provide the trainees with protected time for participation in training programmes and research.

Conclusion
INCAN’s Cancer Control Research Training Institute illustrates one approach to building capacity for cancer research, prevention and control in a low- or middle-income country such as Guatemala. By training local clinicians in research methods in population health, LMICs will be able to gather disease burden, identify priority areas for prevention and treatment, and guide policy – a critical component to addressing the global burden of cancer.12 The desired long-term outcomes specific to cancer in Guatemala include building systems to gather data for advocating for resources, guiding clinical practice, advocating for cancer prevention and control policies and monitoring the role of cancer in the health of the Guatemalan people.

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ملخص
برنامج تدريبي لبناء القدرة في بحوث السرطان في البلدان المنخفضة والمتوسطة الدخل الناتج عن غواتيمالا
وتوفي السرطان وعفاحته. التغييرات ذات الصلة تقدم التدريب في مجالات الدراسة الإقليمية والطبية، وتوصيل البيانات المرتبطة بتكوينها الذاتي في تعليمات الأسلوب بالتعاون مع أكاديميات الطب في الولايات المتحدة الأمريكية. تم إنشاء معهد تدريب على بحوث مكافحة السرطان Instituto de Cancerología مدى عام إلى الخبراء السريريين الذين يركزون على طرق البحث في الصحة السكانية والأنthroپولوجيا الاجتماعية والاقتصادية. تضمن البرنامج تدريبة في غواتيمالا والولايات المتحدة لتعزيز التدريب الطبي النظري الذي قام المشاركون بتجربته من خلال وضع بروتوكولات بحثية تمكين الأبحاث التعاون مع السرطان في غواتيمالا. هو مركز الإحالة INCAN هو معهد GUATEMALA وخدمات السرطان في غواتيمالا، إلا أن إدارة المعهد يتم كذلك بزيادة بحوث السرطان – مع تركيز على صحة السكان.

中国低收入国家建立癌症研究能力的培训项目：危地马拉的研究成果

问题
危地马拉正在承受越来越沉重的癌症负担，并且缺乏癌症预防、控制和研究的能力。

方法
危地马拉市癌症研究所 (INCAN) 携手美国的一家医学院建立了多学科癌症控制研究培训机构。该机构采用专攻人口健康和社会文化人类学研究方法的临床医生提供为期一年的培训计划。计划包括危地马拉和美国的教学体验以及应用培训，其中参与者制定出针对危地马拉癌症需求的研究方案。

当地状况
虽然 INCAN 是危地马拉癌症病人转诊和服务的中心，但机构管理部门以人口健康为重点，对日益增加的癌症研究也很关注。INCAN 因此成为癌症预防和控制环境下能力构建的资源。

相关变化
受训者提高了设计和处理研究的自我效能。带来附加价值的益处包括建立癌症病理学和定性分析的年度癌症研讨会和实习班。INCAN 最近将计划的一些组成部分融入住院医师培训并建立了一个研究部门。
Клинические тренинги. Медицинский тренинг может существенно сократить доступ к качественной помощи для населения Гватемалы. Например, программа обучения врачей, реализованная Институтом канцерологии недавно, включала семинары по раковому заболеванию и качественному анализу. Слушатели программы повысили свои компетенции в области профилактики рака и борьбы с ним. Однако в странах с низким и средним уровнем доходов, включая Гватемалу, ресурсы могут быть ограничены, что делает необходимым инструментарий для максимизации эффекта обучения.

Резюме

Управление онкологическим заболеванием. Гватемала испытывает значительное увеличение заболеваемости раком. Недавние перемены в сфере науки о раке, включая повышение уровня знаний о его профилактике, контроль и исследовании, позволяют создавать эффективные стра tegии для их реализации. Следующие шаги связаны с формированием научно-исследовательского потенциала в области рака в странах с низким и средним уровнем доходов. Основным преградой является недостаток финансовых и человеческих ресурсов. Осуществленные перемены включали создание научно-исследовательского отдела и внедрение программы обучения для врачей. Эти изменения способствуют созданию научно-исследовательского потенциала в области рака и борьбы с ним в Гватемале.

Рэндомизированное исследование. В партнерстве с медицинской школой из США, в Гватемале был открыт междисциплинарный Институт по исследованиям (INCAN) с отделением по борьбе с раком. Этот институт имеет значительный потенциал для проведения научных исследований. Собранные данные могут быть использованы для оценки бремени связанных с раком заболеваний, выработки стратегий для их сокращения и определения приоритетных направлений для профилактики и лечения рака.

Анализ данных. Слушатели программы повысили свои компетенции в области профилактики рака и борьбы с ним. Однако в странах с низким и средним уровнем доходов, включая Гватемалу, ресурсы могут быть ограничены, что делает необходимым инструментарий для максимизации эффекта обучения. Осуществленные перемены включали создание научно-исследовательского отдела и внедрение программы обучения для врачей. Эти изменения способствуют созданию научно-исследовательского потенциала в области рака и борьбы с ним в Гватемале.

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 ciudad de Guatemala. Este instituto ofreció un programa de formación de un año a médicos que se especializaban en los métodos de investigación en materia de salud pública y antropología sociocultural. El programa incluía las experiencias didácticas en Guatemala y Estados Unidos, así como la formación aplicada en la cual los participantes desarrollaron protocolos de investigación que respondían a las necesidades de cáncer de Guatemala.

Marco regional
Aunque INCAN es el punto de referencia y de servicios para los pacientes con cáncer de Guatemala, la administración del instituto también está interesada en aumentar la investigación del cáncer, centrándose en la salud pública. INCAN es un recurso para desarrollar la capacidad en el contexto de la prevención y el control del cáncer.

Cambios importantes
Los participantes aumentaron su propia eficacia en el diseño y la realización de la investigación. Los beneficios de valor añadido incluyeron el establecimiento de un seminario de cáncer anual y talleres sobre la patología del cáncer, así como un análisis cualitativo. Recientemente, INCAN ha incorporado algunos de los elementos del programa en su capacitación residencial y ha establecido un departamento de investigación.

Lecciones aprendidas
Un programa de capacitación para los médicos puede aumentar la capacidad de investigación del cáncer en los países de bajos y medianos ingresos. La capacitación en los métodos de investigación basados en la población permitirá a países como Guatemala recopilar datos específicos de cada país. Tras obtener los datos, pueden utilizarse para evaluar la incidencia de las enfermedades relacionadas con el cáncer, orientar las políticas para reducirla e identificar las áreas prioritarias para la prevención y el tratamiento del cáncer.

References


