Published in final edited form as:
Nurs Outlook. 2008 ; 56(3): 123–131.

A Transdisciplinary Training Program for Behavioral Oncology and Cancer Control Scientists

Anna M. McDaniel, DNS RN FAAN,
Indiana University School of Nursing, Professor and Assistant Dean for Research

Victoria L. Champion, DNS RN FAAN, and
Indiana University School of Nursing, Distinguished Professor and Associate Dean for Research

Kurt Kroenke, MD
Indiana University School of Medicine, Professor and Senior Scientist

Abstract

Transdisciplinary health research training has been identified as a major initiative to achieve the vision for research teams of the future as articulated in the NIH Roadmap for Medical Research. To address the need for scientists who can integrate diverse scientific approaches and work in transdisciplinary teams to solve complex health problems, Indiana University has designed an innovative training program that will provide the didactic and research experiences to enable trainees to establish productive careers in behavioral oncology and cancer control research. Development of a successful transdisciplinary training program requires mentorship, research, and a specialized curriculum that encompass a broad range of disciplines. The program capitalizes on a unique set of existing and emerging training opportunities resulting from the collaborative activities of the Indiana University (IU) Simon Cancer Center, the IU Schools of Nursing and Medicine, and multiple research institutes and academic centers located in Indiana and neighboring states.

Introduction

Cancer is a leading cause of mortality worldwide and a significant amount of cancer morbidity and mortality is caused by our own behaviors. It is estimated by the American Cancer Society that in 2007 almost 170,000 deaths will be caused by tobacco use. Additionally, approximately 187,000 cancer deaths will be related to poor nutrition, physical inactivity, and obesity. Screening tests, including cervical, breast, colorectal, and prostate, can detect cancer early and result in cures, although screening rates are less than optimal [1]. While vaccines to reduce the incidence of cancer, such as the recently approved HPV vaccine, continue to be developed, behavioral research is needed to identify the best ways to encourage acceptance of vaccines. All of these sobering facts emphasize the importance of better understanding the complex nature of human behavior. To reduce the burden of cancer in our society, there is a great need for scientists who can develop and test interventions for smoking cessation, screening, dietary intake, and exercise, as well as translation of efficacious treatments into practice. Along with

1111 Middle Drive NU481, Indianapolis, IN 46202, Business: (317)274-8095, Home: (317)773-6212, Fax: (317)274-2411 Email: amcdanie@iupui.edu.

Victoria L. Champion, DNS RN FAAN, Indiana University School of Nursing, Distinguished Professor and Associate Dean for Research

Kurt Kroenke, MD, Indiana University School of Medicine, Professor and Senior Scientist

other disciplines, nurses have played an important role in cancer control research along the cancer continuum.

We are at an important crossroads in the prevention, detection, and treatment of cancer. Scientific advances are blurring traditional disciplinary boundaries. For example, scientific discoveries are enabling early identification of persons with genetic profiles that place them at high risk of developing cancer, so that lifestyle modifications and chemoprevention treatments can be instituted. Drug discoveries using pharmacogenetic approaches to develop targeted anticancer therapies are emerging. Advanced imaging technologies and identification of specific cancer biomarkers allow for early detection of cancers. With improved detection and treatment, cancer becomes a chronic condition and today over 10 million cancer survivors live among us[2]. As a result, research on interventions to help cancer survivors adapt to symptoms caused from the disease or treatment, as well as to prevent future cancers, is essential. The role nurses play in behavior related to cancer development and treatment necessitates an interdisciplinary approach to research.

One of the top priorities identified by the National Institute of Health's (NIH) Roadmap for Medical Research is the training of health science researchers capable of collaborating across diverse disciplines. Because advances are increasingly occurring at the juncture of basic, clinical, and behavioral sciences, investigators who can work collaboratively in multi-disciplinary settings are necessary to ensure rapid and constant progress in research. Few areas are likely to benefit more from an influx of such scientists than behavioral oncology and cancer control, which focus largely on phenomena that emerge from the complex interplay of biological, psychological, and social factors. Insuring that future researchers in behavioral oncology and cancer control possess not only the necessary scientific diversity but also the knowledge, attitudes, values, and behaviors to collaborate with their peers from other disciplines will require a new paradigm for research training [3].

Training in Research for Behavioral Oncology and Cancer Control (TRBOCC) Program

To address the need for transdisciplinary scientists, we have established a training program capable of providing a multi-disciplinary environment in which both pre- and postdoctoral students can acquire the didactic and research experiences needed to successfully pursue a collaborative career in behavioral oncology/cancer control. At Indiana University, behavioral oncology nursing scientists lead the Cancer Control Program at our NCI designated cancer center. In order to further develop a transdisciplinary approach, we took the lead in writing for a training support grant provided by the National Cancer Institute's R25 mechanism. Alternative funding mechanisms (e.g., T-32s) that are currently available tend to focus on more specific topics within the context of a single discipline and are not designed to provide training to students from different disciplines, who must acquire vocabularies and conceptual knowledge diverse enough to enable collaborations with investigators from other fields. Therefore, the R25 mechanism which specifically addressed a transdisciplinary approach was used.

In order to achieve our training goals, the program takes advantage of a unique set of pre-existing and emerging training opportunities resulting from the cooperative activities of the Indiana University Melvin and Bren Simon Cancer Center (IUSCC), the IU School of Nursing, the IU School of Medicine, and several other organizations and centers of higher learning located in Indiana and neighboring states. Creating this new model for transdisciplinary research training has required commitment and support from a number of academic units and research enterprises.

Program Infrastructure

The R25 application was developed in the School of Nursing because senior nurses led the research expertise in behavioral oncology. The Principal Investigator of an R25 training grant must be a senior researcher in the area of research training and be positioned to incorporate other senior researchers across disciplines. Therefore, senior nursing faculty with specific areas of research expertise can use the R25 mechanism to develop an interdisciplinary program of research that is housed within their school but reaches out across disciplines.

Administratively, the TRBOCC program is housed in the IU School of Nursing, academic home of the program director. Governance of the program is achieved through the Internal Advisory Committee, which has members from the primary organizations participating in the TRBOCC Program, including transdisciplinary representatives with research expertise in aging, biostatistics, risk perception and communication, epidemiology, and clinical pharmacology. The Internal Advisory Committee is charged with (1) identifying appropriate mentors who contribute to the transdisciplinary training environment; (2) recruiting and selecting outstanding fellows whose training interests closely match those of the primary mentor; (3) approving the program curriculum; (4) reviewing and approving individual training plans; and (5) evaluating trainee progress throughout the program. An External Advisory Committee, consisting of nationally preeminent behavioral oncology scholars, consults with the Internal Advisory Committee and program leadership to review the program annually and make recommendations for improvement. A diagram of the program infrastructure is found in Figure 1.

Key Resources

Development of a successful interdisciplinary program requires mentorship, research, and didactic experiences that encompass a broad range of disciplines relevant to cancer control. The resources that support our interdisciplinary training program are numerous but are often linked together in non-traditional ways because of the unique organization of the Indiana University and Purdue University school systems in the state of Indiana. Key resources for the TRBOCC program are briefly described below.

Indiana University School of Nursing—The IUSON is the academic home to many faculty and resources that are used to support the TRBOCC Program and historically it has played the leading role in the IU Cancer Center's cancer control efforts. With its Center for Enhancing Quality of Life in Chronic Illness (CEQL) the school is one of only nine nursing schools to have an NINR-funded research center, the stated mission of which is to provide an infrastructure for collaborative research to support the development and testing of interventions to improve health behaviors and quality of life among persons with chronic conditions across the life span. IUSON is also in the 17th year of an Institutional Research Training Grant in Health Behavior Nursing, funded by NINR, which provides pre-doctoral and postdoctoral fellowships, as well as regular health behavior research seminars.

Mary Margaret Walther Program—This unique program, supported by the behavioral branch of the Walther Cancer Institute, an Indianapolis-based private foundation dedicated to eliminating the suffering caused by cancer, is housed within the IUSON. The Mary Margaret Walther Program's specific mission is to develop and test methods that facilitate cancer prevention/early detection, as well as symptom management and supportive care for cancer patients, their family caregivers, and cancer survivors. The Mary Margaret Walther Program supports the local infrastructure for cancer control research activities and competitively awards seed funding to investigators needing pilot data for grant submissions.

Behavioral Cooperative Oncology Group—In addition to the Mary Margaret Walther Program, IUSON also houses the administrative office for the Behavioral Cooperative Oncology Group (BCOG), which like the Mary Margaret Walther Program, is part of and supported by the behavioral branch of the Walther Cancer Institute. The BCOG was specifically established to foster collaborative links and provide organizational support among Midwestern research institutions, including training opportunities for pre- and post-doctoral students. Institutions with collaborative ties to BCOG include Indiana University, Michigan State University, the University of Michigan, and The Ohio State University. Each year the group sponsors scientific colloquium with leading theorists and researchers in the field of behavioral oncology.

Indiana University Melvin and Bren Simon Cancer Center—The IUSCC encompasses a broad range of basic, translational, clinical, and behavioral research focusing on cancer. These research efforts are organized into four programs that are based upon existing institutional strengths and on institutional and Cancer Center priorities for future growth. The four programs are: 1) Cancer Control, 2) Breast Cancer, 3) Experimental Therapeutics, 4) Hematopoiesis and Immunology. Three of these programs have significant basic, translational, and clinical research components, and many of the research themes bridge more than one program allowing excellent opportunities for inter-programmatic and interdisciplinary collaborations for research and training activities. The IUSCC is part of the Indiana University School of Medicine, which is strongly committed to facilitating the Center's mission.

Indiana Cancer Consortium—In 2001, the Indiana Cancer Consortium (ICC) began as a collaborative effort of the IU Cancer Center, the Indiana State Department of Health, the Great Lakes Division of the American Cancer Society, and the IU School of Medicine Department of Public Health, which assembled a panel of experts from each institution to discuss the need for cancer control planning in Indiana. The ICC's mission is to reduce the cancer burden in Indiana through the development, implementation, and evaluation of a comprehensive plan that addresses cancers across the continuum from prevention through palliation. The ICC now has 47 member organizations that include hospitals and health care delivery systems, primary care groups, health insurance plans, health care purchasers, public health agencies, trade/professional organizations, health professional organizations, community-based organizations representing survivors, consumers and racial/ethnic groups, providing a fertile environment to conduct clinical research and translate findings from the academic setting to the community at large.

Other Contributing Organizations—More than 30 other institutes, schools, departments, or research centers provide mentors, students, and opportunities for collaboration with the TRBOCC Program. At least one faculty member from each of these organizations has volunteered to serve as a mentor for the training program and has agreed to facilitate access to the resources available from each of these institutions. These resources represent a variety of disciplines in addition to nursing, including medicine (19 affiliated centers), psychology, informatics, allied health public health, kinesiology, social work, music therapy, and oral health.

Curriculum Development

Currently, training programs in behavioral oncology and cancer control focus almost exclusively on post-doctoral traineeships. An important feature of our program is the inclusion of pre-doctoral students from a variety of disciplines in addition to post-doctoral trainees. Although post-doctoral training constitutes an effective and relatively quick way to increase the number of investigators working in the field, waiting to expose young scientists to cancer control research until after they have completed their doctoral training will mean that a

significant percentage of the "best and brightest" will already have been directed down the more traditional pathways of their home disciplines. Thus, we believe that incorporating a focus on pre-doctoral training should help fill a critical and frequently overlooked training niche.

Meeting the needs of students pursuing doctoral degrees from multiple academic homes with different expectations and policies is challenging. The training program has been designed to be flexible enough to address the educational needs of individuals from different disciplines and different levels of preparation (i.e., pre- and post-doctoral), but formalized enough to ensure that participants acquire high levels of content knowledge as well as intensive research experience by the time they complete the program. The curriculum necessary to provide the academic experiences required by behavioral oncologists-in-training did not exist at any single school or department participating in the training program. Therefore, a highly collaborative process involving key individuals from multiple disciplines was necessary to develop the TRBOCC curriculum. In addition to the program director (School of Nursing), the curriculum committee consisted of the director of the IU Simon Cancer Center (School of Medicine), the associate dean for research at the School of Dentistry, an endowed professor of pediatric oncology nursing, and a professor of general internal medicine and health services research. The committee was chaired by a faculty member holding a joint appointment at the Schools of Nursing and Informatics.

The first step in developing the training program curriculum was to identify learning outcomes and competencies for trainees. The competencies include research skills and foundational knowledge specific to the field of behavioral oncology and cancer control, as well as the behavioral, affective, interpersonal, and intellectual characteristics needed by transdisciplinary scientists [4]. Learning outcomes and competencies are found in Table 1.

To insure that trainees achieve competencies in transdisciplinary research requires careful planning and intensive training experiences. The cross-disciplinary program curriculum incorporates mentored research experiences, formal coursework, and other didactic experiences such as lectures, seminars, journal club, and attendance at scientific presentations (e.g., Grand Rounds). All trainees are required to complete a set of didactic and research-based core requirements, although these are tailored to the experiences and academic backgrounds of students. The three core requirements include: A) a specialized curriculum; B) other didactic and socialization experiences; and C) mentored research experiences.

Specialized Curriculum

Pre-doctoral students are expected to take four formal courses that address fundamental knowledge related to behavioral oncology and cancer control. Post-doctoral students may opt out of those classes that overlap previous coursework by gaining their mentor's approval and presenting the request with supporting documents to the Internal Advisory Committee. The courses are integrated into the requirements for predoctoral students regardless of their PhD program. For nursing students the health behavior and intervention courses were often added as content specific foci. The two cancer courses could be integrated as part of their major or could be electives. Predoctoral students in other schools could opt to have an outside minor consisting of the four core requirement courses. For post doctoral students, course requirements are more tailored to their needs. Most post doctoral students take additional courses during their program and the R25 mechanism provides the tuition support.

The four courses that constitute the specialized behavioral oncology/cancer control curriculum include:

Health Behaviors—The focus of this course is the in-depth analysis of the theoretical and research literature related to health behavior change. Students have the opportunity to critically

evaluate theories/models applicable to health behavior and to complete an analysis of a health behavior across the cancer continuum, from screening and prevention to treatment and symptom management to survivorship and end-of-life care. Emphasis is on the theoretical underpinnings currently driving research in behavioral oncology and cancer control. Examples include the Health Belief Model, stress and coping theories, self-regulation theories, and symptom management models.

Advanced Research Designs and Behavioral Intervention—This course examines the conceptual, methodological, and logistic underpinnings of conducting intervention research in the area of behavioral oncology/cancer control. Content includes intervention dosage, sensitivity of measures, mediators and moderators, and quality assurance and feasibility of intervention delivery. Translational research, multi-site research, intent-to-treat, nested designs, and outcome designs are included.

Transdisciplinary Cancer Care: Prevention, Screening, and Diagnosis—This course focuses on the transdisciplinary nature of cancer prevention, screening, and diagnosis. Emphasis is on the interplay of biological, clinical, and psychosocial factors leading to both the problems encountered and the solutions provided by clinicians and cancer control researchers.

Transdisciplinary Cancer Care: Treatment, Survivorship, and End-of-Life Care —This course focuses on treatment, survivorship, and end-of life care for cancer patients and their families. The focus is on learner-centered discovery and application of research to the complex clinical needs and research questions in cancer care.

The two cancer care courses have been developed by an interdisciplinary group of clinical oncologists and behavioral scientists using a problem-based learning approach to promote the acquisition and application of knowledge in behavioral oncology. [5 6] PBL is implemented by sequential presentation of a case study, that is, the “problem,” with student self-study and group activities to formulate and test hypotheses. Students are actively engaged in discovery learning. The role of the faculty is that of tutor or facilitator. Interdisciplinary PBL, that has teams of students from multiple health professions working together on a case study, increases student awareness and appreciation of the expertise of other disciplines [7].

Most reports of the effectiveness of PBL as a teaching strategy focus on development of clinical expertise in single discipline. Our program is unique in using PBL to foster transdisciplinary research training. Students work in a collaborative learning environment, each sharing what has been learned with transdisciplinary colleagues. For our training program, cases are designed by a transdiscplinary team of researchers and clinicians. During PBL sessions, experts from our program training faculty present information essential to the cases. Concepts integrated in our PBL cases are summarized in Table 2.

Other Didactic and Socialization Experiences

In addition to taking the specialized curriculum as part of their broader scientific training, students also are expected to take or have taken at least two doctoral-level statistics courses, at least one doctoral-level methods course, and at least one doctoral-level theory course during their graduate career. The TRBOCC Program also provides opportunities outside of formal coursework that allow fellows to acquire the scientific knowledge, attitudes and values, and behaviors necessary to function as a transdisciplinary scientist[3]. These include attendance at monthly seminars on behavioral oncology and cancer control, involvement in various seminar or journal club activities, participation at local and national scientific meetings, and taking part

in grantsmanship training, mock review panels, and other professional development opportunities.

Mentored Research Experiences

The foundation of any research training program is participation in research under the guidance of a committed and experienced mentor.[8,9] Trainees are required to engage in mentored research as soon as they are admitted to the program and to devote most of their research activities to issues relevant to cancer control. Because the focus of our program is on the development of skills in transdisciplinary research, training activities must be performed in conjunction with at least two mentors. Primary mentors must have received significant external funding within the past five years and must have successfully trained students in the past. A mentor with primary status must sponsor a trainee's admission to the program, based on correspondence between the trainee's needs and the mentor's research. Once accepted, the mentor will immediately incorporate the applicant into an ongoing or newly developed program of research and ensure that the trainee becomes an integrated member of the mentor's research team. Over time and in accordance with each fellow's level of experience, fellows are expected to develop their own research focus. To facilitate development of this focus, a second mentor from another discipline is chosen by the trainee and primary mentor after the trainee's acceptance into the program. The second mentor works with the student on an as-needed basis, which could include providing hands-on research opportunities, guiding independent study, or serving as a consultant for an ongoing project to meet the diverse mentoring needs of students from different home disciplines, who will vary greatly in terms of their current and prior research experiences. All activities involving the second mentor will be incorporated into the student's formal research training plan. Insuring multidisciplinary collaboration at the mentoring level will not only improve the diversity of students' research experiences but will also foster collaboration between mentors from different disciplines, further contributing to the multidisciplinary environment of the setting. In the case of pre-doctoral trainees, the second mentor is expected to serve on the trainee's dissertation committee.

Program Evaluation

To evaluate the TRBOCC Program we have enlisted an external consultant who is an expert in transdisciplinary behavioral oncology research and program evaluation. Dr. Susan McMillan, the Lyall & Beatrice Thompson Professor of Oncology Quality of Life Nursing at the University of South Florida, has designed a comprehensive plan to evaluate all aspects of the program, including systematic evaluation of both processes and outcomes. Processes are those activities that lead to the TRBOCC Program's ultimate objective (i.e., producing graduates capable of developing an independent career in behavioral oncology research). Thus, process evaluation will focus on whether the processes occurred and the extent to which they were satisfactory. Outcomes are the anticipated results of the training program, which include whether the fellows met the ultimate objectives of the TRBOCC Program. The evaluation model is presented in Figure 2.

Our program has just completed the first year, therefore outcomes are not completely developed. We proposed admitting 2 predoctoral fellows and 1 postdoctoral fellow the first year. Six applicants applied and we selected and enrolled the targeted fellows, one of whom is Hispanic. We have developed a tracking data base for the entire process of selection through follow up to assist in the evaluation of program outcomes.

Conclusions

This transdisciplinary training program in behavioral oncology represents a unique opportunity to train behavioral researchers in a rich environment that stimulates research across basic,

clinical, and behavioral fields. Students have the opportunity to work with diverse mentors and take classes with fellows from different disciplines. The value of Interdisciplinary coursework and mentorship has recently been demonstrated.[10] Indeed, the NIH has stressed the importance of translational and multidisciplinary research training in its Clinical and Translational Science Award (CTSA) program. An environment positioned to stimulate collaborative and novel research programs is essential to train our future behavioral oncology researchers. At Indiana University, research expertise in behavioral oncology was concentrated in nursing faculty. Taking the lead in developing transdiciplinary research was a natural outgrowth of our collective expertise and benefitted students and other faculty across the University.

Acknowledgements

This work was supported by grant number 5R25CA117865-02 from the National Cancer Institute, Victoria Champion, PI.

References

1. American Cancer Society. Cancer Facts and Figures, 2007. American Cancer Society; 2007.
2. Hewitt, M.; Grennfield, S.; Stoval, E. From cancer patient to cancer survivor: Lost in transition. Washington DC: National Academies Press; 2006.
3. Mitrany M, Stokols D. Gauging the Transdisciplinary Qualities and Outcomes of Doctoral Training Programs. Journal of Planning Education and Research 2005;24:437–449.
4. Stokols D, Harvey R, Gress J, et al. In vivo studies of transdisciplinary scientific collaboration Lessons learned and implications for active living research. American Journal of Preventive Medicine 2005;28 (2 Suppl 2):202–13. [PubMed: 15694529]
5. Baker CM. Problem-based learning for nursing: integrating lessons from other disciplines with nursing experiences. Journal of Professional Nursing 2000;16:258–66. [PubMed: 11033935]
6. Richards PS, Inglehart MR. An interdisciplinary approach to case-based teaching: Does it create patient-centered and culturally sensitive providers? Journal of Dental Education 2006;70:284–291. [PubMed: 16522757]
7. Goelen G, De Clercq G, Huyghens L, Kerckhofs E. Measuring the effect of interprofessional problem-based learning on the attitudes of undergraduate health care students. Medical Education 2006;40:555–61. [PubMed: 16700771]
8. Berk RA, Berg J, Mortimer R, Walton-Moss B, Yeo TP. Measuring the effectiveness of faculty mentoring relationships. Acad Med 2005;80:66–71. [PubMed: 15618097]
9. Sambunjak D, Straus SE, Marusic A. Mentoring in academic medicine: a systematic review. JAMA 2006;296:1103–1115. [PubMed: 16954490]
10. Löwe B, Hartmann M, Wild B, Nikendei C, Kroenke K, Niehoff D, Henningsen P, Zipfel S, Herzog W. Effectiveness of a 1–year training program in clinical research: a controlled before-and-after study. J Gen Intern Med. 2007in press

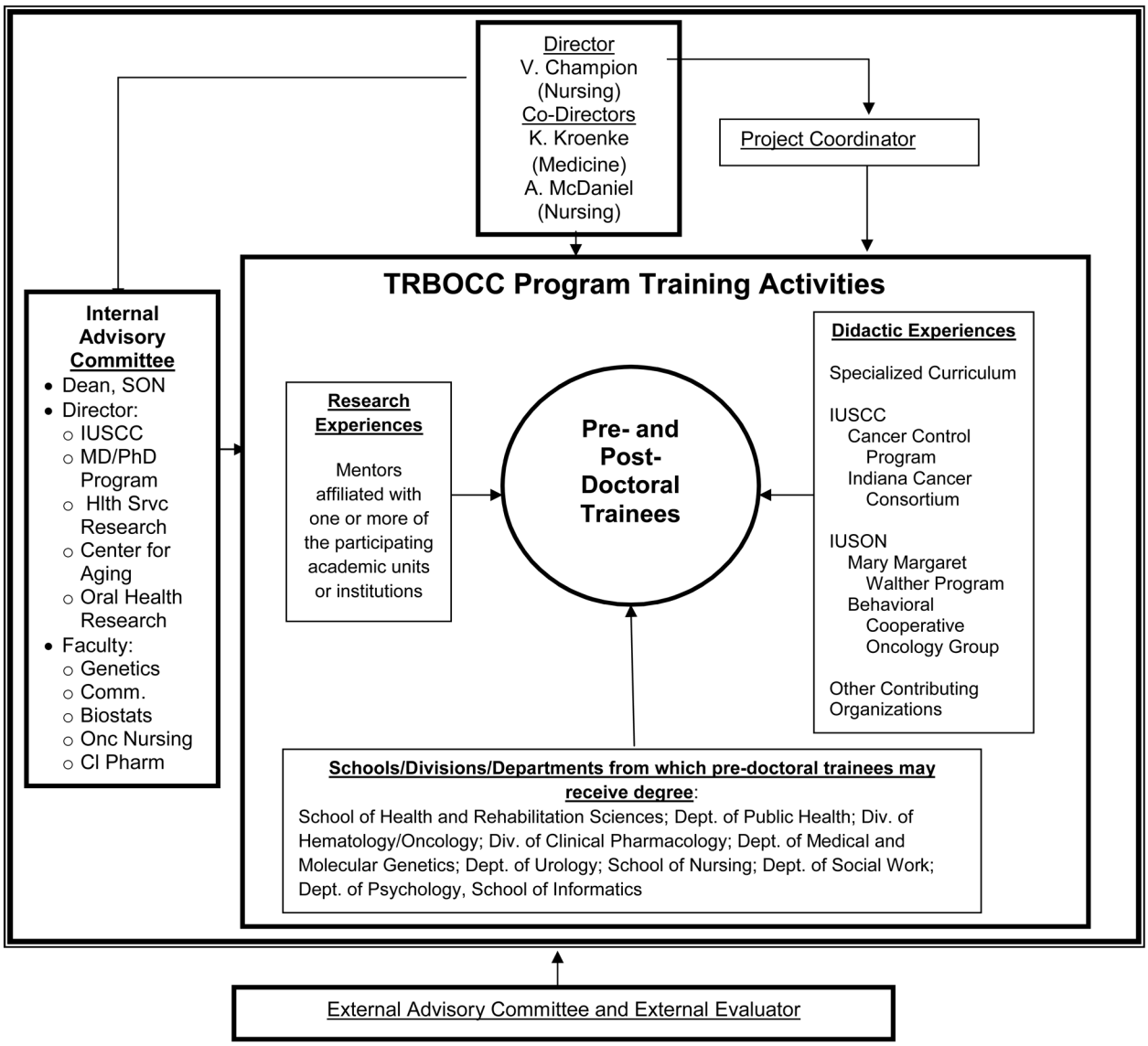

Figure 1.
Organizational Structure of TRBOCC Program

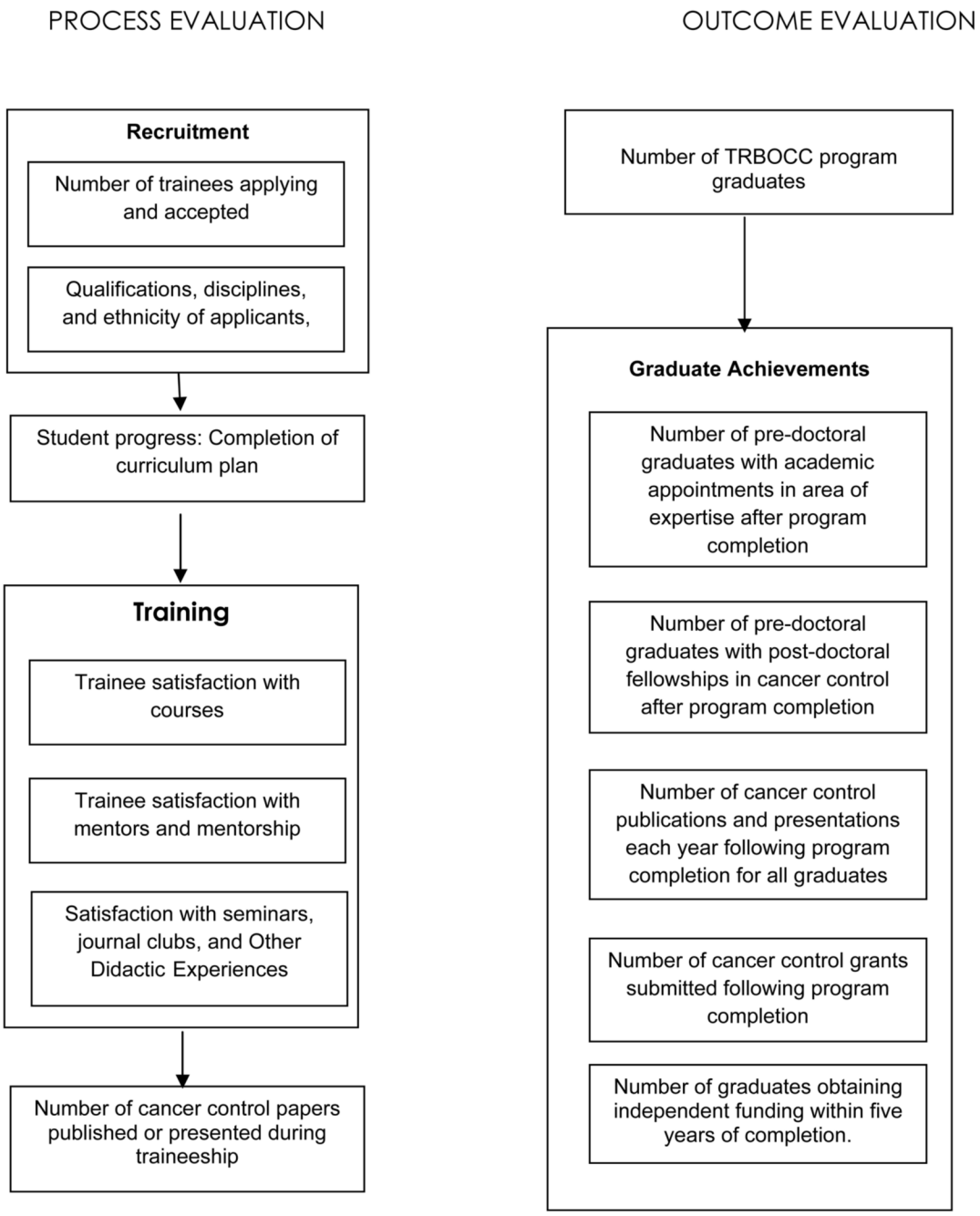

Figure 2.
Program Evaluation Model

Table 1

Learning Outcomes and Competencies for TRBOCC Program

LEARNING OUTCOME 1. Integrate advanced knowledge from biological, clinical, behavioral and population sciences to gain depth of understanding within a focused area of behavioral oncology and cancer control	
1	Develops advanced knowledge of the philosophical, conceptual, and theoretical issues relevant to a focus area in behavioral oncology and cancer control.
2	Analyzes arguments related to methodological, psychometric, and analytic issues relevant to area of research focus.
3	Applies advanced knowledge of the interplay of biological, clinical, and behavioral factors to identification of scientific problems in behavioral oncology and cancer control.
4	Evaluates the merits of ethical, clinical, and socio-political issues relevant to knowledge expansion in area of research focus.
5	Incorporates differing perspectives and epistemological orientations of colleagues from complementary disciplines into ongoing inquiry.
LEARNING OUTCOME 2. Builds a focused program of research that extends scientific knowledge in an area of research relevant to behavioral oncology and cancer control.	
1	Establishes a collegial relationship with a primary mentor and at least one other interdisciplinary mentor to gain advanced knowledge and experience.
2	Actively participates in mentors' interdisciplinary program of research.
3	Conducts a research project from the role of lead investigator.
4	Disseminates expert knowledge through a record of refereed presentations.
5	Delivers oral and written arguments that articulate the fit between professional research goals and national/international priorities in area of research focus.
6	Carries out scientific investigations that extend existing boundaries of knowledge in area of research focus.
7	Obtains funding from intramural and/or extramural agencies to conduct such scientific investigations
LEARNING OUTCOME 3. Is recognized as a beginning scholar within a larger community of behavioral oncology and cancer control scientists.	
1	Evaluates personal and professional strengths in developing as an independent scientist.
2	Develops an action plan for a research trajectory in behavioral oncology research.
3	Presents data based oral and written critiques outlining the existing boundaries of scientific knowledge in area of research focus.
4	Serves as a reviewer for abstracts, manuscripts, and/or grant proposals to advance the knowledge within the area of clinical expertise.
5	Establishes collaborative relationships with scientific colleagues at the local, regional, and national levels.
6	Engages in professional activities to advance the community of scholars within and across disciplines.

Table 2

Content Threads for TRBOCC Specialized Curriculum Courses

Transdisciplinary Cancer Care: Prevention, Screening, and Diagnosis	**Transdisciplinary Cancer Care: Treatment, Survivorship, and EOL**
Genetics	Symptom Management
Diagnosis & Staging	Clinical trials
Screening	Quality of Life
Carcinogenesis	Chronic/Late Effects
Epidemiology	Benefit Finding/Post-traumatic Growth
Cancer type/Biology	Fear of Reoccurrence
Policy	Cancer Treatment Localized therapy Systemic therapy Molecularly targeted therapy
Community	
Health Communication Interventions Risk perception Lifestyle modification	
Surveillance	Complementary/Alternative Therapy
Environmental influences on development of cancer	Molecular and cellular factors that cause metastasis
Chemoprevention	End of life care
Impact of diagnosis on family	Impact of treatment on family
Disparities – access, utilization	Disparities – cancer outcomes
Cross-cultural	Cross-cultural
Communication Patient-Provider Family	Communication Patient-Provider Family
Decision Making/Behavior change	Decision Making/Shared Decisions
Information seeking	Information seeking
Clinical Ethics	Clinical ethics
Clinical guidelines	Clinical guidelines
Prognosis	Prognosis
Translation	Translation

NOTE: Shaded boxes indicate content that crosses both courses.