

Increasing Ethnic Diversity in Cancer Control Research: Description and Impact of a Model Training Program

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Abstract—Background. There is little ethnic diversity at the doctoral level among researchers in cancer control. The Minority Training Program in Cancer Control Research is designed to encourage underrepresented master's level health science students to pursue doctoral training and careers in research. **Methods.** Program components include an annual 5-day summer institute, internships, and doctoral incentive awards. Intention to pursue doctoral training is measured before and after participation. Doctoral applications and enrollment are tracked through annual surveys. **Results.** Seventy students participated during the first three years, 1999-2001. Intention to apply increased significantly for each class (year one, $p < 0.001$; year two, $p = 0.042$; year three, $p = 0.006$). Thirty-one percent of participants have either enrolled in doctoral programs ($n = 10$) or report plans to apply in the next one to two years ($n = 9$). Over half of these students indicated that the MTPCCR had a positive influence on their plans. **Conclusions.** A targeted training program encourages under-represented students to pursue doctoral degrees and thus has the potential to increase ethnic diversity in public health research. *J Cancer Educ.* 2003;18:73-77.

For most cancers, there is excess incidence and/or mortality among the poor and communities of color.¹⁻⁵ Yet the field of cancer control research, drawing from the many public health scientific disciplines, is itself notably lacking in ethnic diversity. This directly reflects the discouraging demographics of the doctoral programs that prepare members of this field, including epidemiology, biostatistics, health education/behavioral science, health psychology, anthropology, clinical medicine, health economics, nutrition, and many more.

The proportion of minorities* in health-related research is less than in the health service professions and substantially less than in the US population.⁶⁻¹¹ For example, the

proportion of minority students enrolled in doctoral programs in schools of public health in the year 2000 was 76.7% White, 7.9% African American, 4.5% Hispanic, 10.2% Asian, and 0.7% Native American.¹² This compares with the following breakdown for the general population at that time: 69.1% white, 12.1% African American, 12.5% Hispanic, 3.7% Asian/Pacific Islander, 0.7% American Indian/Alaska Native, and 1.8% other.¹³ Note that while Asians overall are not underrepresented in the behavioral and social sciences, this is most likely not the case for Asian subgroups who are disproportionately affected by chronic diseases including certain cancers (e.g., cervical cancer incidence is higher among Vietnamese women than any other race/ethnic group³).

In sharp contrast to doctoral program enrollment, in many regions of the country health science programs at the master's level have successfully attracted ethnic minorities. Of 28 listed US schools of public health, one-fourth reported minority enrollment greater than 40% for Fall, 2000.¹² However, as the numbers indicate,¹⁴⁻¹⁷ historically these students have not been provided the impetus and support (e.g., the motivation and encouragement that would come from role models such as successful minority researchers) to pursue doctoral training and careers in research. In addition, students from underrepresented communities are likely to face other substantial barriers such as those associated with low socioeconomic status.

If public health research is to reduce disparities such as the disproportionate burden of cancer, investigators must

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*We use the word "minority" advisedly. The term as applied to subgroups of the general population is questionable. The context for this report, however, is the field of cancer control research, which is predominantly composed of Anglo Americans. In this arena, members of other race/ethnic groups or of subgroups defined by such factors as sexual orientation are seriously underrepresented. The word "minority" in the name of the training program, while problematic in most respects, has nevertheless been effective in recruiting the underrepresented students who are the intended audience.

be involved who are best equipped to address the needs of specific ethnic communities. These are insider researchers, members of the targeted culture. There is no substitute for the combination of innate knowledge of a culture and strong research skills.¹⁸ This applies to development of appropriate research questions, study design, measurement tools, interventions, and the acceptance of studies and their findings by communities. To effectively redress disparities, minority researchers should in fact be *over-represented* in cancer control research. To achieve even the aim of parity, programs should be in place that are designed to increase the diversity of this field.

There are numerous programs funded by the Federal government (particularly the National Institutes of Health¹⁹) and other institutions^{11,20,21} that are designed to increase race/ethnic diversity in medicine and health-related research. However, our inquiries have only identified one program specifically targeted to minority master's level students to encourage their pursuit of a doctorate (Bridges to the Doctorate²²), even though this subset of individuals clearly has the motivation and ability to complete graduate level training.

These observations were the impetus for the Minority Training Program in Cancer Control Research (MTPCCR), a partnership between the Northern California Cancer Center (NCCC) and four academic institutions, the University of California at Berkeley (UCB), the University of California at San Francisco (UCSF), San Francisco State University (SFSU), and San Jose State University (SJSU). The goal of the three-year (1998-2001) National Cancer Institute-funded training grant is to encourage minority master's students in health sciences to go on for their doctorate and to pursue careers in cancer control research. This report describes the MTPCCR and presents the results of the impact and outcome evaluation from the first phase of the program.

The Minority Training Program in Cancer Control Research (MTPCCR)

The heart of the MTPCCR is a 5-day summer institute, Careers in Cancer Control Research, designed to showcase the needs, opportunities, and resources available in this field. The program also includes internships each year for up to five of the students who attend the summer institute, and up to two privately funded doctoral incentive awards per year in the amount of \$2,000, given to eligible participants or alumni to offset costs associated with doctoral program applications.

Recruitment: The recruitment goal is to enroll 25-30 eligible masters students in each summer institute. Eligibility criteria for acceptance into the program include: a.) graduate school grades averaging at least B; b.) self-identification as a member of a minority group; c.) faculty recommendations; and d.) a written statement that reflects potential to pursue a doctorate, (although stated intent to do so is not a prerequisite). Our definition of minority

groups includes those who suffer a disproportionate or unknown (e.g., gays/lesbians) burden of cancer and who are underrepresented in the cancer control research field. Outreach to students includes one-to-one recruitment by student and faculty advisors from partner institutions; program staff presentations; and fliers and emails distributed to eligible students.

Summer Institute: The objectives of the five-day program are: i.) to illustrate the range of cancer control research, the need for the whole spectrum of cancer control in underserved communities, and the far-reaching potential of research regarding disparities; ii.) to provide an opportunity for students to interact with accomplished researchers from similar backgrounds; iii.) to showcase research across the spectrum of the field (e.g., surveillance, epidemiology, behavioral/intervention research, etc.); and iv.) to provide students with the skills, resources, and reassurance needed to apply for a doctoral program. The all-volunteer Institute faculty consists of over 35 role model minority researchers representing the range of cancer control research disciplines, and also including current minority doctoral students, and university and government representatives.

The design of the Institute components was based on concepts from Social Learning Theory, self-efficacy and role modeling,^{23,24} and from the Theory of Reasoned Action, persuasive communication.²⁵ Research has consistently shown that perceived self-efficacy, the belief in one's capability to organize and execute particular courses of action, contribute significantly to human motivation and attainment.²⁴ Self efficacy has been shown to be favorably influenced by role modeling, performance of the desired behavior by others with whom one can identify closely. Persuasive communications are those designed to change comprehension, beliefs, attitudes, behavioral intentions or behaviors through emotional appeals, arguments or reasoning.²⁵

The institute presentations begin with an overview focusing on disparities in cancer incidence and survival and the need for a more diverse cadre of scientists. Next, a panel of minority researchers discusses their personal experiences getting through the doctorate and into their current roles. Over the following two days, the continuum of cancer control is described, from surveillance to descriptive and etiologic epidemiology, to intervention research across numerous topics (tobacco, fitness, screening, survivorship), always with the focus on cancer disparities and underserved populations. The emphasis throughout is on the need for insider researchers and the potential for making a difference through research.

Subsequent sessions address the strengths and limitations of both qualitative and quantitative methods for research across cultures. In the remaining one-and-one-half days, university faculty and current doctoral students present practical information and resources with regard to getting in and surviving a doctoral program (e.g. Show me the money!). Throughout the program, a variety of interactive activities are used to promote discussion, sharing of personal experiences and challenges, and close relationships

among students. This last component proved particularly important since many of the students reported experiencing some form of alienation and/or discrimination in the course of their academic careers.

Internships and Doctoral Incentive Awards: Students may apply for either the summer institute alone or the institute plus an internship in the following programs: biostatistics, epidemiology, prevention sciences, registry research, or the Cancer Information Service of California. MTPCCR internships must be associated with a study that focuses on the underserved and/or where the mentor is an insider researcher. Private donor funded doctoral incentive awards ranging from \$1000 to \$2000 are designed to assist students in offsetting the costs of applying to doctoral programs and visiting campuses. Eligible applicants must show financial need, be in good to excellent academic standing, and demonstrate commitment to applying to a health science doctoral program.

METHODS

Evaluation of the program is conducted at three levels: process, impact, and outcome. The *process evaluation* provides immediate feedback on intermediate objectives such as number and diversity of program participants. Process measures include number of applications, summer institute attendance, and participant satisfaction as indicated by daily surveys, and a final survey following the institute.

Impact evaluation measures participant intentions to apply for a doctoral program before and after the summer institute, and on an ongoing basis until participants either submit a doctoral program application or determine that they most likely never will do so. We chose intention as our main impact measure because the strength of one's intent to undertake a behavior or activity has been shown to be strongly associated with actual conduct of the behavior.²⁵ In our evaluation, intention as adapted from the Theory of Reasoned Action²⁵ is measured through survey questions regarding respondent plans to apply to a doctoral program. To assess changes in student intentions that may be associated with participation in the program, we initially experimented with a retrospective approach in year one, asking participants at the end of the summer institute to think back and indicate their level of intention prior to attending the program. They were then asked to indicate what it was at the end. We did not want to put this question on the initial application out of concern that prospective applicants would regard it as a criterion for selection, which it was not. In years two and three, we found that a pre-institute questionnaire mailed to those accepted into the program was an appropriate method for obtaining a baseline measurement for use in a prospective comparison.

In year one, as part of the final evaluation, we asked students:

1. "Before the MTPCCR Summer Institute, had you ever thought of going on for a doctoral degree?" Yes/No (If

yes—again before the Summer Institute—How certain were you that you would apply to a doctoral program?" 1: very certain—10: very uncertain)

2. After the Institute we asked, "Now that you have completed the Summer Institute, are you considering going on for doctorate? If yes: How certain are you that you will apply? 1:very certain—10: very uncertain)

In year two, in the Pre-Institute Survey we asked, How likely are you to apply to a doctoral program? (1: very unlikely—5: very likely). This question was repeated in the final, post-institute survey. Similarly, in year three, before the summer institute we asked: "At this point in your career plans, how certain are you that you will apply to a doctoral program in the next one to two years?" And at the end of the institute we asked: "Now that you have completed the Summer Institute, how certain are you that you will apply to a doctoral program in the next one to two years?" (1: very certain will not apply—10: very certain will apply).

Outcome evaluation tracks plans to apply, actual applications, and enrollment in doctoral programs through regular informal contact between alumni and program staff, and through annual alumni surveys mailed to all past participants. Data are presented here from the most recent alumni survey that was sent to participants in the first three classes. A 14-item survey was mailed to the seventy alumni of the program. Questions covered professional and academic plans for the next 5 years; current enrollment in a doctoral program; and intentions to apply in the next 1-2 years. For those who have applied, we asked for their three greatest challenges in the application process, the three most helpful factors, the extent to which their plans were influenced by the MTPCCR, and what field of study they are pursuing. Participants were tracked using contact information provided upon completion of the summer institute, and through a variety of other sources including their master's degree program, professional association directories, and online search tools. All contacts with students for evaluation/research purposes were reviewed and approved by the Human Subjects Review Committee of the NCCC.

In this paper, we report on the number and diversity of participants over three years, the main process measure of change in intention among participants, and the outcome of actual doctoral program enrollments.

RESULTS

Participants in the summer institute numbered 25 students in each of years one and two, and 20 in year three. Race/ethnic representation for these three years was African American (15), Latino/a (11), Asian American/Pacific Islander (A/PI—36), American Indian/Native American (1), other/mixed ethnicity (7). A/PI sub-groups included Asian Indian (4), Burmese (1), Chinese (10), Filipino (9), Hmong (1), Japanese (4), Korean (3), and Viet-

Table 1. Change in Intention to Apply to a Doctoral Program, MTPCCR Years 1 through 3

	Scale Used	Absolute Change in Certainty	P-value
Year 1	1-10	3.6	<0.001
Year 2	1-5	0.4	0.042
Year 3	1-10	1.4	0.006

names (4). Included in “other” were students who self-identified as gay/lesbian (2), 1 Palestinian, and those reporting mixed ethnicity (4).

Qualitatively, the extent to which participants found the program motivational is illustrated in the following representative participant responses to the final evaluation question, What would you like to say to next year’s participants?

Year One:

“A career in cancer research does not mean that you’ll be hidden away in some lab never to be seen again. Rather there are boundless possibilities and directions to pursue.”

“This is an experience you’ll never forget! I bet you didn’t expect to learn this much. Have fun and good luck with your research.”

“Open your eyes, open your hearts—the possibilities start here!”

“You’re in for a life changing experience.”

Year Two:

“This program is a LOT more than you’ll ever expect.”

“This training is an invaluable opportunity to peek into the kaleidoscope of CCR [Cancer Control Research] and the lives of real-life researchers who look like us and care about our communities!”

“You are really in for something. By the end of the 5th day you will realize how many things have changed in your life. This is really going to be a turning point in your life.”

“This program demonstrates that your experiences are relevant and your personal wisdom can help others.”

Year Three:

“This program is excellent, empowering, and rejuvenating. . . . It will change your life!”

“The participants and staff will touch your life and spirit and leave an impression that will stay with you forever.”

“This program is an invaluable gift, opportunity and experience. Absorb and take advantage of every bit of information and person that you come in contact with. . . .”

To quantitatively assess impact, a paired t-test was used to compare intentions before and after the summer institute. Results are shown in Table 1. In the year one retrospective assessment, 96% of participants reported that before the summer institute they had intended to apply to a doctoral program. Following the summer institute all participants (100%) said that they would apply. The mean

absolute change in intention was 3.6 with a standard error of 0.49 (p-value < 0.001). In responding to the year-two prospective questions, prior to the institute 85% said they intended to apply, increasing to 100% afterward. The prospective paired comparison showed an absolute mean difference of 0.4 with a standard error of 0.2 (p = 0.042). In year three the mean absolute change in intention was 1.4 with a standard error of 0.43 (p = 0.006).

Results from the 2002 annual alumni survey, completed by 62 of the 70 alumni (88.6% response rate), show that 30.6% of participants have either gone on to enroll in doctoral programs (n = 10) or report plans to apply in the next one to two years (on a scale of 1-10, with 10 being very certain will apply, nine respondents answered 8 or higher). When those enrolled or planning to enroll were asked, Did your participation in the MTPCCR influence your decision positively, negatively, or it made no difference? (1: negative influence–10: positive influence), 27 (60%) chose 9 or 10. In our first three years, 50 summer institute participants applied for internships. Fifteen internships were funded through the MTPCCR. Thus far, two doctoral incentive awards have been presented to students from these three classes. One recipient, who will pursue a doctorate in Epidemiology with an NCI-funded traineeship in cancer control, reported that the MTPCCR altered her original plan that was to obtain a medical degree.

DISCUSSION

The Minority Training Program in Cancer Control Research met or exceeded its goals for the first three years of the program. The program has been re-funded by the NCI for five years, including support for a Southern California replication program based at the University of California, Los Angeles.

While our data indicate that many participants were at least somewhat predisposed toward doctoral training prior to the program, for the majority this experience appeared to have a strong positive influence on their plans. These findings were corroborated by extensive qualitative responses. These results are very positive, but there are some limitations to the current evaluation. From the qualitative comments of participants, it is evident that there are many benefits from the summer institute that we neither anticipated nor measured quantitatively. To more fully understand and document the value of this program, we are currently developing measures to identify and assess several psycho-social and behavioral dimensions that influence readiness to apply for a doctoral program.

The primary limitation of our outcome evaluation is that, in the absence of a randomized controlled trial, which is not feasible within the scope of a training program or otherwise, we cannot be certain that the successful outcome is directly attributable to the program. Nevertheless, it is evident that master’s level health science students represent an untapped but readily accessible cadre of prospective doctoral students (and future role models) with high potential to increase the

race/ethnic diversity in cancer control and throughout public health research. Future research should include a survey of a representative sample of minority master's students in health sciences to assess interest in doctoral training in this population as well as barriers and needs that might be overcome through appropriate intervention.

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