

Reaching the Underserved Through Community-Based Participatory Research and Service Learning: Description and Evaluation of a Unique Medical Student Training Program

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Objectives: To provide an overview of the Community Health Fellowship Program (CHFP), describe the types of projects completed by the community health fellows from 2005 to 2009 and to assess the program's effectiveness from the perspective of fellows and community partners. **Methods:** We developed the CHFP for training medical students in community-based participatory research (CBPR), and understanding the components of successful community partnerships for addressing health disparities in underserved communities. The program has didactic and applied community research components. **Results:** From 2005 to 2009, fellows completed 25 research projects with 19 different community partners. Fellows reported favorable attitudes about the program, their mentors, and their community projects; their research knowledge increased significantly in most areas, especially their ability to develop a succinct research question, familiarity with CBPR, and delivering a formal research presentation (Wilcoxon signed-rank test, $P < .05$). Community partners reported favorable attitudes toward the fellows and the program; using a 5-point Likert scale (1 = not favorable, 5 = very favorable), they reported highly favorable attitudes about fellows' level of responsibility (4.85), level of cooperation (4.85), familiarity with the needs of the medically underserved (4.69), and knowledge of how to apply local solutions to health problems (4.54). **Conclusions:** The CHFP has high favorability and support among fellows and community partners; the program can serve as a prototype for training future physicians in understanding and

addressing the needs of the underserved, through community partnerships, and community-based participatory research.

KEY WORDS: community-based participatory research, community medicine, health disparities, medical student training, service learning

There is an urgent need in medical schools for combining research training with programs for addressing the health needs of communities and reducing health disparities. Clinical investigators are increasingly advocating community-based participatory research (CBPR) approaches to meet this need.¹ Medical educators have long known that improvements to the health care environment must begin at the medical education level.² Thus, the American Association of Medical Colleges (AAMC) establishes learning objectives in medical student education programs, to parallel educational content with evolving societal needs, practice patterns, and scientific developments.³ Regarding community

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health, students are expected to understand the full range of determinants (eg, social, psychological, economic, and cultural); the population health perspective; risk factors and strategies to improve early detection of disease; and commitment to increasing access to care.³ However, since these learning objectives are not uniformly part of the required curriculum at many medical schools in the United States and Canada, graduating medical students report inadequate training in public health (34.0%), the role of community health and self-service agencies (32.6%) and community medicine (21.0%).⁴

To address these training deficits, we developed a 9-week Community Health Fellowship Program (CHFP) for medical students. Students learn the principles of population medicine, community-based disease prevention and underserved care, and how to develop culturally appropriate approaches to health problems, all while completing a CBPR project. The objectives of the program are to (1) teach students how to conduct CBPR, (2) provide meaningful educational experiences in community-based settings, and (3) improve health services in vulnerable communities. Consistent with the principles of CBPR, students investigate a research topic of importance to the community, develop relationships of trust with community partners, and combine knowledge with action for addressing health disparities.⁵ In this article, we provide an overview of the CHFP and information about the program's effectiveness from the students' and community members' perspectives.

● Methods

The Community Health Fellowship Program (CHFP) enrolls 2 to 7 medical students (fellows) annually, in a 9-week applied CBPR training program. Fellows are selected through competitive application and the number of fellows accepted annually is determined by available funding. The program was developed through the Pre-doctoral Training in Primary Care Program (Title VII) of the Health Resources and Services Administration (HRSA; 2001–2008). Specific details about the program curriculum are reported elsewhere.⁶

The CHFP combines service learning, didactic sessions, and an applied CBPR research experience. Didactic sessions provide fellows with instruction in the essentials of clinical and community-based research, with a specific emphasis on CBPR. Since reporting the program's initial findings in 2005,⁶ dissemination skills have been added to the curriculum and fellows are assigned individual program faculty mentors (2007 to present). Fellows, community partners and mentors collaborate to develop CBPR projects. The CHFP and

TABLE 1 ● Evaluation of Program, Project, and Mentor by Students

Component	Posttest Items (n = 20)	Mean
Program	Gained research knowledge	5.00
Project	Personally rewarding	5.00
Program	Increased awareness of community needs	4.68
Project	Relevant to medical career	4.65
Mentor	Mentor professionalism	4.60
Project	Acquainted to medically serving the underserved	4.55
Mentor	Mentor guidance	4.55
Program	Well organized	4.47
Mentor	Mentor availability	4.45
Project	Had a direct effect on the health of the community	4.40
Project	Demonstrated local solutions to health problems	4.37
Mentor	Mentor time commitment	4.35
Program	Affected specialty choice	3.79
Project	Provided clinical exposure	3.53

all projects are approved as part of an expedited study by the UT Southwestern institutional review board (IRB).

Fellow evaluations

Fellows complete 2 program evaluations using 5-point Likert scales (see Tables 1 and Table 2 for survey measures) (1) a posttest assessing satisfaction with their community project, mentor, and the overall program (1 = not favorable; 5 = very favorable); and, (2) a pre/posttest assessing the program's effectiveness improving research knowledge (1 = not knowledgeable; 5 = very knowledgeable); the assessment is designed to assess fellow's understanding of research principles, not as a comprehensive test of their knowledge. Mean changes in self-reported research knowledge were calculated and the Wilcoxon signed-rank test was used to assess statistical significance. Complete surveys are reported for 4 years (2005, 2007, 2008, and 2009). Results prior to 2005 were reported previously.⁶

Community partner evaluations

The program's emphasis is on building permanent relationships with community partners; more than 30 partners have participated in workshops and in completing projects since the project's inception in 2002. Projects have been selected based on competitive proposal submissions (2005–2007), workshops (2008) where faculty mentors and community partners codevelop projects, and through a "Welcome Breakfast" discussion seminar (2009) attended by community partner applicants, fellows, and faculty mentors. The final study design is developed together by the fellow, community

TABLE 2 ● Evaluation of Curriculum by Students—Pre- and Posttest Results

Component	Pre/Post-Program Items (n = 20)	Mean Change ^a (SD)
Curriculum	I am familiar with the procedures of the institutional review board (IRB).	1.95 (1.15)
Curriculum	I feel comfortable creating databases and coding analysis.	1.60 (1.27)
Curriculum	I am competent in developing succinct research questions.	1.50 (1.05)
Curriculum	I am familiar with most of the statistical terms commonly used in medical research.	1.48 (1.07)
Curriculum	I am thoroughly familiar with the steps of the research process.	1.45 (1.00)
Curriculum	I feel qualified to design a thorough research project.	1.40 (1.10)
Curriculum	I am knowledgeable about the need for IRB oversight of research protocols.	1.40 (1.27)
Curriculum	I am able to develop appropriate data collection instruments.	1.35 (1.10)
Curriculum	I am familiar with the components of community-based participatory research.	1.30 (1.17)
Curriculum	I feel qualified to develop and deliver a formal research presentation.	1.10 (0.85)
Curriculum	I can explain the difference between qualitative and quantitative research.	0.95 (0.69)
Curriculum	I am confident in my ability to perform a comprehensive literature search.	0.80 (0.95)
Curriculum	Learning research methods will be useful in my medical career.	0.55 (1.19)
Curriculum	I am knowledgeable about the purpose for HIPAA training and compliance.	0.50 (0.76)

^aAll items significant, $P < .05$ except "research methods will be useful for medical career," Wilcoxon signed-rank test.

partner and mentor. During the past 3 years (2007-2009), community partners completed posttest evaluations of the program and the fellow using 5-point Likert scales (1 = not favorable; 5 = very favorable).

● Results

Projects completed and dissemination

From 2005 to 2009, fellows completed 25 projects with 19 different community partners (see Table 3 for examples of typical projects). Projects composed of both quantitative and qualitative data collection methods and when multiple projects were completed with the same partner, they were usually related to one another. For example, in 2008 qualitative data was collected to understand how Hispanic patients conceptualize being

overweight at a local community clinic. On the basis of the survey examining perception, knowledge and behaviors related to obesity among Hispanic patients, more education regarding healthy lifestyle choices was recommended. In 2009, a follow-up study using quantitative measures was conducted to develop an appropriate intervention based on these needs. Health literacy, prevalence of depression, level of physical activity, nutritional habits, patient interest in health education topics related to overweight and obesity and the most effective format for a brief educational intervention were measured. All projects provide the community partner with a tangible product for improving patient care or social services, or for increasing grant funding through completing program evaluations. Several projects have been disseminated at regional, national, and international conferences and one manuscript published.⁷

Fellows attitudes

The community health fellows rated the program, their project, and their mentor favorably (Table 1). Fellows were most favorable about the research knowledge gained (5.00), found their projects personally rewarding (5.00), and rated the specialty choice (3.79) and clinical exposure (3.53) items least favorably.

The CHFP didactic curriculum provides training in basic clinical research skills, with an emphasis on CBPR principles and applications. Fellows' self report indicates that their knowledge levels increased significantly on all but one of the items assessed on the pre/post research knowledge questionnaire (Table 2). The mean change scores indicate that knowledge improved most on institutional review board procedures (1.95 points). The underlying emphasis of the CHFP curriculum is ensuring that fellows can develop a succinct research question, employ CBPR principles to answer the question, and develop a professional presentation for disseminating the results of their study. Fellows self-reported knowledge increased significantly ($P \leq .05$) in these 3 areas—developing a succinct research question (1.50 points), familiarity with CBPR (1.30 points), and delivering a formal research presentation (1.10 points).

Community partner attitudes

Community partners have consistently indicated their interest in, need for, and support of the CHFP and the fellows (Table 4). Although community partners indicated highly favorable attitudes about their fellows' level of responsibility (4.85) and level of cooperation (4.85), they also indicated the fellows' seemed to be familiar with the needs of the medically underserved (4.69) and understood how to apply local solutions

TABLE 3 ● Examples of Student Projects, Community Impact, and Dissemination of Findings

Year	Community Partner	Substudy Title	Community Impact	Academic Dissemination
2006	Parkland Health and Hospital System	Clinical Effectiveness of Shared Medical Appointments (SMA)	Expanded number of hospital SMAs	Poster Presentation: -American Public Health Association
2007	Dallas County Health and Human Services	Attitudes, perceived barriers, and preferences in regard to immunizations in the Dallas Hispanic community	Developed management protocols and strategic planning documents	Poster Presentation: -American College of Preventive Medicine
2007	ChildCareGroup (CCG)	Developing Caregiver Asthma Education at ChildCareGroup	Used findings to revise asthma management protocols	Poster Presentation: -American College of Preventive Medicine
2007	Parkland Health and Hospital System (PHHS)	Etiology of uncompleted exercise stress tests that were scheduled following an emergency department visit for chest pain	Incorporated into hospital strategic planning	Poster Presentations: -American College of Preventive Medicine -UT Southwestern Medical Student Research Forum Manuscript published ⁷
2008	Paso del Norte Foundation	Depression among Women in Montana Vista: Needs, Knowledge, and Barriers to Care	Established first meaningful program for mental health screening in colonia.	Poster Presentations: -Texas Public Health Association -UT Southwestern National Public Health Week Manuscript under revision
2008	GRACE Outreach Community Clinic	Understanding how Hispanic patients conceptualize overweight: a qualitative study *See 2009 study for project expansion	Developed theoretical model for understanding Latino perceptions of obesity	Poster Presentations: -Health Disparities From Local to Global Conference -UT Southwestern National Public Health Week
2009	Wesley-Rankin Community Center	Assessing the health needs of Latino seniors attending a community center.	Used to develop geriatric health education curriculum for medical students and residents to implement in community center	Poster Presentation: -American Public Health Association Oral Presentation: -World Conference of Family Doctors
2009	GRACE Outreach Community Clinic	Establishing educational intervention programs to address the needs of adult Hispanic overweight patients at GRACE Outreach Community Clinic	Used to develop health educational program See 2008 study for project inception	Poster Presentations: -UT Southwestern Medical Student Research Forum -Texas Public Health Association -World Conference of Family Doctors -North American Primary Care Research Group Manuscript under revision

to health problems (4.54). The partners also indicated favorable attitudes toward the program. They thought the program was helpful to their organization (4.69), well organized (4.62), helped identify health outcomes (4.62), and had a direct affect on community health (4.31). Partners' least favorable attitude concerned the length of time provided for completing the project (3.46).

● Discussion

The Community Health Fellowship Program (CHFP) teaches medical students research principles, and pro-

vides applied experience in building relationships with community partners through CBPR. Consistent with learning objectives of the Association of American Medical Colleges (AAMC), the program provides training in understanding health determinants, knowledge about the population health perspective, risk factors and strategies to improving early detection of disease, and a commitment to increasing access to care for underserved populations.³ Fellows' evaluations of the program indicate significant gains in research knowledge, enhanced understanding of CBPR and the medical needs of the underserved, awareness of community needs, and means for developing local solution to a health problem ($P < .05$). Community partners

TABLE 4 • Evaluation of Overall Program and Student Performance by Community Partner

Component	Postprogram Item (n = 13)	Mean
Student	The student took responsibility as a medical student seriously.	4.85
Student	The student displayed a courteous and cooperative manner.	4.85
Student	The student exhibited an acquaintance with medically serving the underserved.	4.69
Student	The student was present at the clinics/community site as scheduled.	4.69
Student	Overall, the student was very good.	4.69
Program	The program was useful/helpful to your organization.	4.69
Program	Overall, the program was beneficial.	4.69
Program	The program was well organized.	4.62
Program	The program provided assistance with identifying health outcomes.	4.62
Student	The student exhibited an understanding of applying local solutions to health problems.	4.54
Student	The student fulfilled all the project obligations.	4.46
Program	The program developed collaborative solutions to health problems.	4.46
Program	The program had a direct effect on community health.	4.31
Student	The student demonstrated an awareness of the relationship of family physicians to their community.	4.27
Program	The program provided assistance in obtaining grant funding.	3.55
Program	The length of time provided was enough to achieve project success.	3.46

indicated favorable attitudes toward the fellows and the program on a broad range of topics ranging from fellows' responsibility to their ability to contribute to local solutions, and the program's contribution to improving community health.

The community partners' low ranking of the program timeframe, reflects the primary challenge of working to achieve collaborative solutions to community health problems—the problems cannot be resolved in 9 weeks. Although our experience has repeatedly demonstrated a need for longitudinal CBPR training in the medical school environment, a significant obstacle to expanding the CHFP (and similar programs) is that community-based education is not a requirement in most medical schools. Although the number of schools offering CBPR programs is increasing, there is still a lack of community research focus among medical schools in the United States and Canada.¹ Barriers to enhancing or increasing these experiences include the lack of respect for community knowledge, limited understanding of the CBPR concept and perception that it lacks rigor, lack of researchers and role models in the field, and fewer grants, rewards, incentives, and tenure opportunities available for faculty.¹ Community-based participatory research is also sometimes viewed as biased and parochial by some researchers, who feel that the community should not have a say in the results.⁸ Possible solutions to overcoming these barriers include creating incentives for faculty participation in CBPR and possibly an even stronger emphasis by the AAMC on the need for students to understand population-based medicine and the need for working with communities to address pressing health problems.⁸

Despite the barriers to community-based research and training experiences in medical schools, the need for expanding these approaches is becoming a national priority. If medicine is to be successful in addressing society's pressing disease prevention needs, new research and training approaches will be needed.⁹ Participatory research is a recommendable alternative to traditional biomedical research approaches because it ensures that intervention strategies are culturally appropriate,¹⁰ builds trust between researchers and communities,¹¹ facilitates enduring partnerships,¹²⁻¹³ contributes new research questions,^{10,14} is effective for studying community-based lifestyle factors,¹⁵⁻¹⁶ and contributes to greater understanding and resolution of urban health problems related to persistent health disparities.¹⁷

The CHFP experience allows medical students to participate in CBPR projects with many different types of health and social service organizations. They complete "hands-on" projects in community and public health clinics, other community settings engaged in health care delivery, and participate in educational experiences that benefit the community as much as they benefit the fellows themselves. The data presented in this article indicate a high level of acceptance and knowledge gained by the fellows and high favorability among the community partners. This program can serve as a prototype for others interested in developing similar experiences, and contribute to training a new generation of physicians who are sensitive to—and trained in—more adequately addressing the needs of at-risk patients, populations, and communities.

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REFERENCES

- Ahmed SM, Beck B, Maurana CA, Newton G. Overcoming barriers to effective community-based participatory research in US medical schools. *Educ Health (Abingdon)*. 2004;17(2):141-151.
- Pew Health Professions Commission. Critical Challenges: Revitalizing the Health Professions for the Twenty-First Century. 1995. <http://www.futurehealth.ucsf.edu/summaries/challenges.html>. Accessed November 7, 2008.
- Association of American Medical Colleges (AAMC). Report I: Learning Objectives for Medical Student Education—Guidelines for Medical Schools. 1998. http://health.usf.edu/medicine/educationalaffairs/pace_files/MSOP%20learning%20objectives.pdf. Accessed November 6, 2008.
- Association of American Medical Colleges (AAMC). All Schools Graduate Questionnaire. 2008. <http://www.aamc.org/data/gq/>. Accessed November 6, 2008.
- Community-Campus Partnerships for Health (CCPH). Community-Based Participatory Research. 2008. <http://depts.washington.edu/ccph/commbas.html>. Accessed November 6, 2008.
- DeHaven MJ, Chen L. Teaching medical students research while reaching the underserved. *Fam Med*. 2005;37(5):315-317.
- Zwischenberger BA, Moore BJ, Luber SD, Dallo FJ. Etiology of uncompleted exercise stress testing after ED chest pain evaluation. *Am J Emerg Med*. 2011;29:427-431.
- Macaulay A, Commanda LE, Freeman WL, et al. Responsible Research with Communities: Participatory Research in Primary Care. A Policy Statement from the North American Primary Care Research Group. 1998. www.napcrg.org. Accessed August 26, 2009.
- DeHaven MJ, Gimpel NE. Reaching out to those in need: the case for community health science. *J Am Board Fam Med*. 2007;20(6):527-532.
- O'Fallon LR, Dearry A. Community-based participatory research as a tool to advance environmental health sciences. *Environmental health perspectives*. 2002;110(Suppl 2):155-159.
- Corbie-Smith G, Ammerman AS, Katz ML, et al. Trust, benefit, satisfaction, and burden: a randomized controlled trial to reduce cancer risk through African-American churches. *J Gen Intern Med*. 2003;18(7):531-541.
- Lantz PM, Viruell-Fuentes E, Israel BA, Softley D, Guzman R. Can communities and academia work together on public health research? Evaluation results from a community-based participatory research partnership in Detroit. *J Urban Health*. 2001;78(3):495-507.
- Parker EA, Israel BA, Williams M, et al. Community action against asthma: examining the partnership process of a community-based participatory research project. *J Gen Intern Med*. 2003;18(7):558-567.
- Leung MW, Yen IH, Minkler M. Community based participatory research: a promising approach for increasing epidemiology's relevance in the 21st century. *Int J Epidemiol*. 2004;33(3):499-506.
- Ammerman A, Corbie-Smith G, St George DM, Washington C, Weathers B, Jackson-Christian B. Research expectations among African American church leaders in the PRAISE! project: a randomized trial guided by community-based participatory research. *Am J Public Health*. 2003;93(10):1720-1727.
- Sloane DC, Diamant AL, Lewis LB, et al. Improving the nutritional resource environment for healthy living through community-based participatory research. *J Gen Intern Med*. 2003;18(7):568-575.
- Fox CE, Morford TG, Fine A, Gibbons MC. The Johns Hopkins Urban Health Institute: a collaborative response to urban health issues. *Acad Med*. 2004;79(12):1169-1174.