

Student Hotspotting: Teaching the Interprofessional Care of Complex Patients

Pablo Bedoya, MD, Katherine Neuhausen, MD, MPH, Alan Dow, MD, MSHA, E. Marshall Brooks, PhD, Dawn Mautner, MD, MS, and Rebecca S. Etz, PhD

Abstract

Problem

Individuals with complex health and social needs drive much of the total cost of care. Addressing these individuals' needs and decreasing costs requires interprofessional teams, called "hotspotters," who engage with communities with high utilization. Training health professions students to succeed in the hotspotting approach may benefit trainees, academic health centers (AHCs), and communities.

Approach

The Camden Coalition of Healthcare Providers and the Association of American Medical Colleges launched the Interprofessional Student Hotspotting

Learning Collaborative in 2014. The goal was to train health professions students working in interprofessional teams at U.S. AHCs to meet the needs of complex patients, providing home visits and intensive case management for up to five patients over six months. The authors report themes from 20 reflections from the five-student Virginia Commonwealth University (VCU) team.

Outcomes

Across 10 sites, 57 students participated during June–December 2014. The review of the VCU experience demonstrated that the hotspotting program was successful in teaching students how social determinants affect health and the

benefits of interprofessional teamwork for addressing the unmet health and social needs of complex patients. Key elements that students identified for improvement were more program structure; protected time for program activities; and formalized processes for recruiting, retaining, and transitioning patients.

Next Steps

Future iterations of the program should strengthen the curriculum on caring for complex patients, provide protected time or academic credit, and formally integrate teams with primary care. A larger study evaluating the program's impact on patients, health systems, and communities should be undertaken.

Problem

Policy makers have advocated that students in the health professions should learn to collaborate in interprofessional teams to prepare them to overcome the challenges facing local communities.^{1–3} Educators and researchers have described a variety of interprofessional education experiences in classroom settings, in simulation centers, and in clinical settings in hospitals and the community. However, if the goal is to train practitioners who can collaborate across professions to respond to community needs, then community-based interprofessional experiences may be a promising approach for interprofessional learning that ultimately benefits communities.⁴

Academic health centers (AHCs) are well positioned to provide interprofessional education experiences. As part of their missions, AHCs integrate delivering care with training the future health care workforce. In addition, with the transition from volume-based to value-based payments by Medicare and other payers, AHCs are under new pressure to deliver higher-value, lower-cost care by better addressing the health needs of their communities.

As the total cost of care is driven primarily by a small percentage of the population,⁵ these individuals are a prime target for both decreasing costs and addressing the unmet health needs in a community. Many of these individuals receive fragmented care that poorly addresses their chronic physical conditions, mental illness, substance use disorders, and social needs.⁶ Addressing their complex health needs and social determinants of health requires interprofessional teams of health care practitioners who identify these individuals, build supportive relationships, and provide intensive case management. These teams are called "hotspotters" because they focus on engaging with communities with patterns

of high utilization of services.^{7–9} However, AHCs have not widely implemented the hotspotting approach, and few AHCs have integrated hotspotting learning experiences for students in the health professions. Developing a workforce that can target the needs of the highest-cost patients may benefit the education of learners, as well as the social and financial missions of AHCs.

To explore the benefit of a hotspotting experience for student learning, the Camden Coalition of Healthcare Providers (the Coalition)¹⁰ partnered with the Association of American Medical Colleges (AAMC) in 2014 to launch the Interprofessional Student Hotspotting Learning Collaborative (the Collaborative; www.aamc.org/initiatives/hotspotter). This six-month program provided an opportunity for students in interprofessional teams at AHCs across the United States to participate in intensive case management of complex patients. The Collaborative had as its goals to (1) teach students to understand the root causes of their patients' health care issues; (2) increase students' awareness of the role of social determinants of health and their ability as future clinicians to have an impact

Please see the end of this article for information about the authors.

Correspondence should be addressed to Pablo Bedoya, Department of Internal Medicine, Division of General Internal Medicine, Virginia Commonwealth University School of Medicine, PO Box 980102, Richmond, VA 23298; e-mail: Pablo.Bedoya@VCUHealth.org.

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on those determinants; (3) increase students' comfort with interprofessional interaction and teamwork; and (4) build students' confidence caring for complex patients.

To our knowledge, this was the first nationwide effort to train health professions students to work in interprofessional teams to meet the needs of complex patients in the community. Here, we describe Virginia Commonwealth University's (VCU's) experience with the Collaborative as an exemplar and share our lessons learned to guide others seeking to implement interprofessional education initiatives in hotspotting.

Approach

The first cohort of 10 teams participated in the Collaborative from June to December 2014. The 57 participating health professions students were from an array of disciplines, including medicine, nursing, public health, pharmacy, and social work (Table 1). The teams were selected through a nationwide competitive application process, which required teams to submit a list of the students and faculty advisor committed to the project, an essay describing each student's and the faculty advisor's interest in the project and a proposed approach to completing the tasks of the project, and a letter of support from the medical school's dean of students.

Each team developed its own approach to identify up to five complex patients at a clinic or hospital, engage these patients through home visits, and provide case management over the program's six-month period.

National program support

Through the Collaborative, the Coalition provided support that included monthly webinars addressing topics such as team roles, identifying and engaging patients, creating care plans, conducting home visits, working with families, motivational interviewing, facilitating strong communication between patients and providers, and coaching to self-efficacy. Each student team presented at least one of their patients to expert Coalition clinicians in a Web-based case conference and received advice on addressing challenges, such as helping the patient become self-sufficient in arranging transportation to medical appointments. In addition, the Coalition organized a Google Forum in which participating students could ask one another questions, share strategies, and reflect on their experiences. At the end of the Collaborative, teams attended sessions at a national hotspotter conference where they also presented patient cases.

Local intervention: VCU exemplar

The VCU team was composed of two fourth-year medical students, a third-year social work student in a master's degree

program, a fourth-year nursing student, and a third-year pharmacy student (Table 2). The students worked with a data analyst to identify patients who had a VCU primary care provider (PCP) and at least two inpatient admissions to the VCU Medical Center over the past 12 months. Students received daily alerts with a list of patients who met these criteria and were currently admitted to the VCU Medical Center.

The students used electronic health record information to screen patients on the list and identify those who would be appropriate for their intervention. They adapted a screening tool provided by the Coalition and used it to exclude admissions for oncology, pregnancy, psychiatric conditions only, and acute diseases only. As available data allowed, they prioritized patients for the intervention using the following criteria: (1) two or more chronic conditions; (2) taking five or more medications; (3) difficulty accessing services (e.g., language barriers); (4) lack of social support; (5) mental illness; (6) history of substance use disorder or actively using substances; (7) homeless; and (8) uninsured. (There was not one strict definition of a "super-utilizer" that was agreed on by all teams and the Coalition.)

When the students identified a potential patient, they asked a VCU clinical faculty advisor (P.B. or K.N.) to contact the patient's PCP to request permission to invite the patient to participate in the

Table 1

Disciplines of the 10 Student Teams Participating in the Interprofessional Student Hotspotting Learning Collaborative, 2014 Cohort

Academic health center	No. of students by discipline						
	Medical	NP	Nursing	MPH	Pharmacy	Social work	Other
Jefferson Medical Center	1	1		1	1		1 Couple and family therapy
Johns Hopkins School of Medicine	3		3				
Louisiana State University New Orleans School of Medicine with Tulane School of Medicine	2		1		1		1 MHA/MBA
Penn State College of Medicine	2		2	1			1 PA
The Ohio State University College of Medicine	1	1		1	1	1	1 Medical dietetics
University of Rochester School of Medicine and Dentistry	2	2			1	1	
University of Washington School of Medicine	2	1		1	1	1	
University of North Carolina School of Medicine at Chapel Hill with Duke University School of Medicine	2				1	2	1 MBA
Vanderbilt University School of Medicine	2				2	1	1 Midwife
Virginia Commonwealth University School of Medicine	2		1		1	1	

Abbreviations: NP indicates nurse practitioner; MPH, master of public health; MHA, master of health administration; MBA, master of business administration; PA, physician assistant.

Table 2

**Virginia Commonwealth University
Hotspotting Experience: Student and
Patient Characteristics and Interactions,
Interprofessional Student Hotspotting
Learning Collaborative, 2014**

Characteristic or interaction type	Students (n = 5)	Patients (n = 5)
Gender		
Female	5	3
Male	0	2
Race/ethnicity		
Asian	4	0
Caucasian	1	0
African American	0	5
Disciplines		
Medicine	2	—
Nursing	1	—
Pharmacy	1	—
Social work	1	—
Insurance type		
Medicare/Medicaid	—	4
Medicaid	—	1
Primary medical diagnoses		
Diabetes	—	4
Hypertension	—	4
Chronic kidney disease	—	3
Chronic obstructive pulmonary disease	—	1
Lung cancer	—	1
Sickle cell disease	—	1
Stroke	—	1
Student-patient interactions		
Inpatient visits	5	
Home visits	7	
Outpatient visits	4	

intervention. If approved, the students approached the patient in his or her hospital room to explain the intervention and provided an informational brochure with their names and photos. If the patient agreed to participate and signed an authorization to release confidential health care information, the students scheduled the first home visit.

At the first home visit, the students conducted a comprehensive case management evaluation, using a tool adapted from one provided by the Coalition, to gather information on insurance; health needs; mental health and substance use disorders (screening

items); nutrition; family, personal, and peer support; housing and environment; education and employment; benefits and entitlements; legal issues; identification; transportation; medications; medical supplies; and pain management needs. Students asked the patient to identify the major problem limiting his or her activities and any support services or case management he or she was already receiving. Team members worked with the patient and family to develop a care plan with clinical, behavioral health, and social goals and concrete action steps to achieve each goal. The protocol for emergencies was for students to call 911 and then contact a faculty advisor.

The VCU student team identified and worked with five complex patients (Table 2). Throughout the six-month intervention, they performed home visits, accompanied patients to appointments with their PCPs or specialists, and visited patients if they were readmitted to the hospital. The students were supported by five faculty members: four clinicians from the Schools of Medicine, Nursing, Pharmacy, and Social Work and a medical anthropologist (a nonclinician academic). The faculty members met monthly with the students to prepare them for home visits, provide guidance on challenging patients, and offer advice on how to address barriers experienced by patients. The VCU team adapted content from the webinars to help create care plans, conduct home visits, work with families, and execute motivational interviewing. Patients were tracked via the telephone.

Evaluation design

A research team comprising three of the VCU clinical faculty advisors (P.B., K.N., A.D.), a medical anthropologist (R.E.), and a Coalition researcher (D.M.) conducted a survey of student reflections (from Google Forum entries and from online diary entries submitted to the authors) to identify program strengths and areas for improvement. We evaluated over 244 reflections from team members across the 10 sites. For this report, we focused on the 20 reflections by VCU students. This study was approved by the VCU Institutional Review Board.

Outcomes

VCU students' reflections indicated that the student hotspotting program provided them with a valuable learning

experience and also identified areas for improvement. Students described several themes consistent with the goals of the program, including developing a deeper appreciation of the lives of complex patients and how interprofessional teams can address unmet health and social needs.

The Coalition-prepared webinars expanded students' awareness and understanding of how social determinants affect health. Students indicated that the webinars taught them the impact of social factors on patients' ability to self-manage health problems, facilitated conversations with patients about social issues that students "didn't really know how to verbalize" before participating in the program, and motivated them to "find ways that I can understand the patient" in order to "make the best of" the 80% of health not determined by clinical interventions. Such lessons translated into one student's developing an appreciation for "taking the time to sit down and educate a patient ... to see their medical illness in a big picture" using "nonmedical terms."

The home visits conducted as part of an interprofessional team taught students the value of incorporating diverse skill sets to provide more patient-centered care. According to one student, teams who capitalize on "varying ranges of knowledge [and] share a goal and vision [are a] precious commodity" that allow for more care. For example, during one home visit, the pharmacy student recommended that a patient with vision problems be prescribed medicines prepackaged by date and time of administration. The social work student coordinated with the patient's doctor and insurance company to implement this intervention. Within a week, the patient received the prepackaged medicines, and the patient's medication adherence improved. The interprofessional team quickly delivered an interprofessional solution with a benefit seen by both the team and the patient.

Students also noted various challenges, including difficulty navigating administrative and legal barriers within the health care system. They also reported difficulty recruiting and retaining patients—some enrolled patients chose to disengage with the program. Students were concerned about "graduating" patients at the end of the intervention and identified a need to better integrate their work with primary care to continue

successful interventions after the program's conclusion. In addition, students reported that the time commitment required to work intensely with complex patients presented a challenge. For example, one patient needed better diabetes self-management, which required eyeglasses. Obtaining the eyeglasses required arranging transportation to the optometrist, which required determining which transportation the patient's insurance would cover. Finally, there were challenges related to dealing with grief. During the program period, one of the five patients followed by the VCU team died from a long-standing illness. A faculty advisor met with the team to help them cope with grief and debrief the experience. Despite the significant health needs of this population, dealing with grief was not a formal process in place at the start of the project.

Students also identified potential improvements to the program. They indicated that there was need for formalized processes for recruiting, retaining, and transitioning patients. They requested a syllabus linked to the webinars to give the program more structure as well as protected time or academic credit for participating. One student remarked that "we are no longer in summer school [...] but in the full swing of our school years as full-time students," which interfered with the ability to regularly communicate or "go to more doctor's visits with our patients." One of the five students was not able to actively participate in the program because that student lived in a different city and could not commute to patient appointments. Perhaps future iterations of this program might limit student involvement to those residing within a specific geographical radius.

Next Steps

The VCU student team's experiences as part of the first cohort of the Collaborative demonstrate the benefits and challenges of implementing interprofessional education initiatives with complex patients. They also provide insights into the deficiencies of the program's initial curriculum and ideas for enhancing the program structure.

First, this work is time consuming. Future cohorts of students and their faculty advisors would benefit from receiving

academic credit and protected time, respectively. Second, because of the high prevalence of behavioral health conditions among complex patients, adding students and faculty from psychology and counseling might benefit patients and enrich the learning experience for students. Third, interprofessional education teams should be formally integrated with primary care, both to facilitate the team's work and to support patient transitions following the program, particularly for complex patients.

A larger study evaluating the impact of this program on parties beyond students should be undertaken. While the initial VCU experience demonstrates indirect benefits to patients, the impact of this educational intervention on utilization and longer-term health outcomes for patients, health systems, and communities should be studied. Insurers and AHCs under new payment models may benefit financially if this type of program successfully reduces utilization of high-cost services. If so, the money saved could support continuing and expanding interprofessional education focused on complex patients.

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P. Bedoya is assistant professor, Department of Internal Medicine, Virginia Commonwealth University, Richmond, Virginia.

K. Neuhausen is clinical assistant professor, Department of Family Medicine and Population Health, Virginia Commonwealth University, Richmond, Virginia.

A. Dow is Ruth and Seymour Perlin Professor of Internal Medicine and Health Administration and assistant vice president of health sciences for interprofessional education and collaborative care, Virginia Commonwealth University, Richmond, Virginia; ORCID: <http://orcid.org/0000-0002-9004-7528>.

E.M. Brooks is instructor, Department of Family Medicine and Population Health, Virginia Commonwealth University School of Medicine, Richmond, Virginia.

D. Mautner was assistant professor, Department of Family and Community Medicine, Sidney Kimmel Medical College at Thomas Jefferson University, Philadelphia, Pennsylvania, at the time of the study.

R.S. Etz is associate professor, Department of Family Medicine and Population Health, Virginia Commonwealth University School of Medicine, Richmond, Virginia.

References

- 1 Frenk J, Chen L, Bhutta ZA, et al. Health professionals for a new century: Transforming education to strengthen health systems in an interdependent world. *Lancet*. 2010;376:1923–1958.
- 2 Institute of Medicine. *Health Professions Education: A Bridge to Quality*. Washington, DC: National Academies Press; 2003.
- 3 Health Professions Network Nursing and Midwifery Office, Department of Human Resources for Health, World Health Organization. *Framework for Action on Interprofessional Education and Collaborative Practice*. Geneva, Switzerland: WHO Press; 2010. http://www.who.int/hrh/resources/framework_action/en. Accessed April 21, 2017.
- 4 Institute of Medicine. *Measuring the Impact of Interprofessional Education on Collaborative Practice and Patient Outcomes*. Washington, DC: National Academies Press; 2015.
- 5 Cohen SB, Yu W. The Concentration and Persistence in the Level of Health Expenditures Over Time: Estimates for the U.S. Population, 2008–2009. *Statistical Brief #354*. Rockville, MD: Agency for Healthcare Research and Quality; January 2012. https://meps.ahrq.gov/data_files/publications/st354/stat354.shtml. Accessed April 21, 2017.
- 6 Hunt KA, Weber EJ, Showstack JA, Colby DC, Callahan ML. Characteristics of frequent users of emergency departments. *Ann Emerg Med*. 2006;48:1–8.
- 7 Riley GE. Long-term trends in the concentration of Medicare spending. *Health Aff (Millwood)*. 2007;26:808–816.
- 8 Dow AW, Bohannon A, Garland S, Mazmanian PE, Retchin SM. The effects of expanding primary care access for the uninsured: Implications for the health care workforce under health reform. *Acad Med*. 2013;88:1855–1861.
- 9 Mautner DB, Pang H, Brenner JC, et al. Generating hypotheses about care needs of high utilizers: Lessons from patient interviews. *Popul Health Manag*. 2013;16(suppl 1):S26–S33.
- 10 Green SR, Singh V, O'Byrne W. Hope for New Jersey's city hospitals: The Camden Initiative. *Perspect Health Inf Manag*. 2010;7:1d.