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CASE STUDY

Equipping the Workforce for Complex Care: How Jefferson University Trains Medical Students in Hotspotting

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Complex care poses a major challenge to health professions education. Thomas Jefferson University integrated a new complex care curriculum that boosts team skills for learners, increases efficacy for teachers, and meets the needs of super-utilizers. This experiential curriculum suggests that training an interprofessional workforce to think more broadly about the lives of patients with complex health and social needs can foster creative problem-solvers able to deliver patient-centered solutions to improve health beyond hospital walls.

KEY TAKEAWAYS

1. The current health care workforce is ill-equipped to address the needs of patients with complex medical, behavioral, functional, and social needs because of outdated training models, a meager evidence base, fragmented health care systems, and limited reimbursement strategies.

2. A complex care educational model that focuses on applying creative strategies to address social determinants of health, behavioral health, and functional limitations can be systematically integrated across health professions training programs and may ultimately improve student comfort in working with, and empathy toward, this population.

3. Health professions students are interested in participating in more clinically relevant "value-added" collaborative practice experiences, and patients with complex medical and social needs may benefit from the individualized services that these student teams can provide.

4. Systematic integration of a complex care curriculum at an academic health center requires substantial planning and consistent engagement of key stakeholders from both academic and clinical pillars as well as patient and community partners and payers.

5. A central organizing leadership team, such as a center for interprofessional practice and education, can serve as a galvanizing force to bring a program like this to fruition.

6. Developing high-functioning teams that can respond to functional, behavioral, social, and physical needs is critical to the success of complex care and requires a paradigm shift in our traditional training approach — one that includes acute care, chronic care, and a new complex care model.

The Challenge

Across the nation, individuals with complex medical and social needs, which are often the result of social determinants of health (SDOH), use emergency rooms and hospitals frequently. These "super-utilizers," who represent 5% of patients, account for 50% of national health care expenditures.[1] Despite high utilization, these patients are falling through the cracks of a fragmented health care system. Indeed, these patients are receiving ineffective care in part because the U.S. health system has historically separated behavioral, physical, and occupational health and in part because our workforce is not equipped to address the SDOH that are driving outcomes. As a result, there is a crisis in caring for patients with complex medical and social needs.

Academic health centers (AHCs) have been slow to develop a workforce to address these needs.[2,3] Current AHCs prepare graduates who are versed in acute and chronic care only, making today's delivery model outdated and ineffective. A third form of preparation — a new complex care training model — is needed to truly improve patient care. This model must address the unmet health and social needs of super-utilizer patients by first recognizing that these needs exist. It then needs to translate and apply the lessons learned from effective clinical care models — lessons supporting a holistic approach to caring for super-utilizers that draws on the principles of harm reduction, trauma-informed care, case management, transitional care, and integrated medical, social, and behavioral services[4,5] — into the fabric of health professions curricula.

> *"As 'learning laboratories' dedicated to supporting the science of health, AHCs have a responsibility to respond to the recent call to action to create high-performing health systems that address current gaps in care."*

Teams are critical to complex care because, in many instances, a patient's medical conditions are compounded by functional limitations, behavioral health issues, challenges in obtaining medications, and access to preventive care, housing, and food security. Complex care may be aided by artificial intelligence, innovations in technology,[6] new diagnostic algorithms, and

pharmacological adjustments, but first it must be tailored to meet the layers of needs for each individual patient.

The Goal

Based on the growing evidence that we must relinquish a "one size fits all" model of health care delivery and embrace team-based, coordinated, responsive, and adaptable collaborative practice to improve outcomes for super-utilizer patients, we aimed to implement a new integrated complex care curriculum at Thomas Jefferson University (Jefferson). Jefferson is a large urban AHC based in Philadelphia, the county with the highest number of super-utilizers per capita in Pennsylvania. In 2017, Jefferson was selected to become one of four new national hubs for the Interprofessional Student Hotspotting Learning Collaborative, working with Camden Coalition of Healthcare Providers as part of a Robert Wood Johnson Foundation sub-award. Student Hotspotting, based on the work of Camden Coalition founder Jeffrey Brenner, MD, emphasizes building authentic relationships with, and bringing care into, high-need, high-cost communities by including students as part of the extended care team.[7] As a Student Hotspotting hub, we aimed to push the boundaries of the clinical learning environment by systematically incorporating, expanding, and evaluating a new complex care curriculum across five health professions schools at Jefferson, while also serving as a training site for additional regional institutions assigned to us by Camden Coalition.

Inspired by the principles of value-added education,[8] in which students add value to patients and populations by actively participating in experiential roles, the longitudinal program was designed to engage interprofessional students in a genuine experience as part of a team providing care to super-utilizers. Our primary educational goals were to train health professions students to (1) think more broadly about the lives of patients with complex health and social needs, (2) recognize the impact of SDOH on health outcomes, (3) learn to work as collaborative team members, and (4) positively impact health outcomes of enrolled super-utilizer patients. Our societal goals were to (1) broaden the reach of our existing inpatient and outpatient care teams to address the unmet needs of super-utilizers in our community and (2) lower costs resulting from inappropriate health care utilization.

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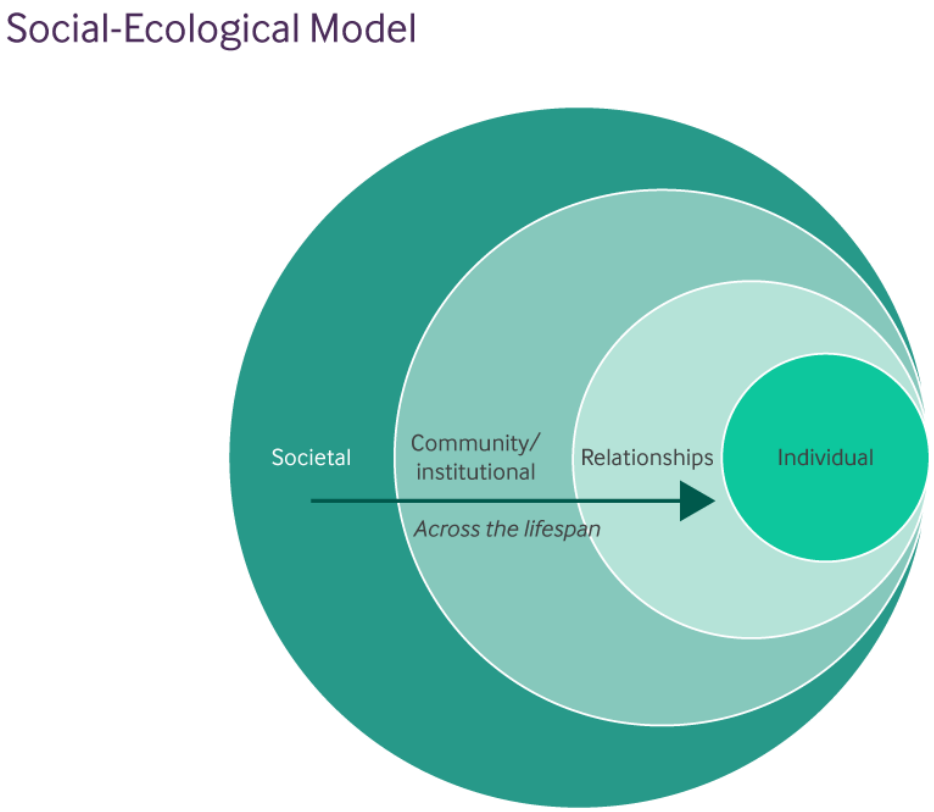
The Execution

To prepare for the execution of this curriculum, our team spent more than a year planning for systematic integration of Student Hotspotting into our advanced interprofessional practice and education (IPE) offerings at Jefferson. We embedded aspects of Camden Coalition's hybrid curriculum into the immersive, experiential aspects of our required foundational IPE program,

the Jefferson Health Mentors Program, which trains approximately 1,400 students from nine professions each year.[9, 10] Specifically, we added a new curricular focus on the Social-Ecological Model (Figure 1),[11] SDOH, and teamwork and communication skills. We formed a Student Steering Committee that involved 10 senior students and alumni who had participated on the first several Jefferson Student Hotspotting teams (starting in 2014) and who were fully engaged in the pre-planning process.

FIGURE 1



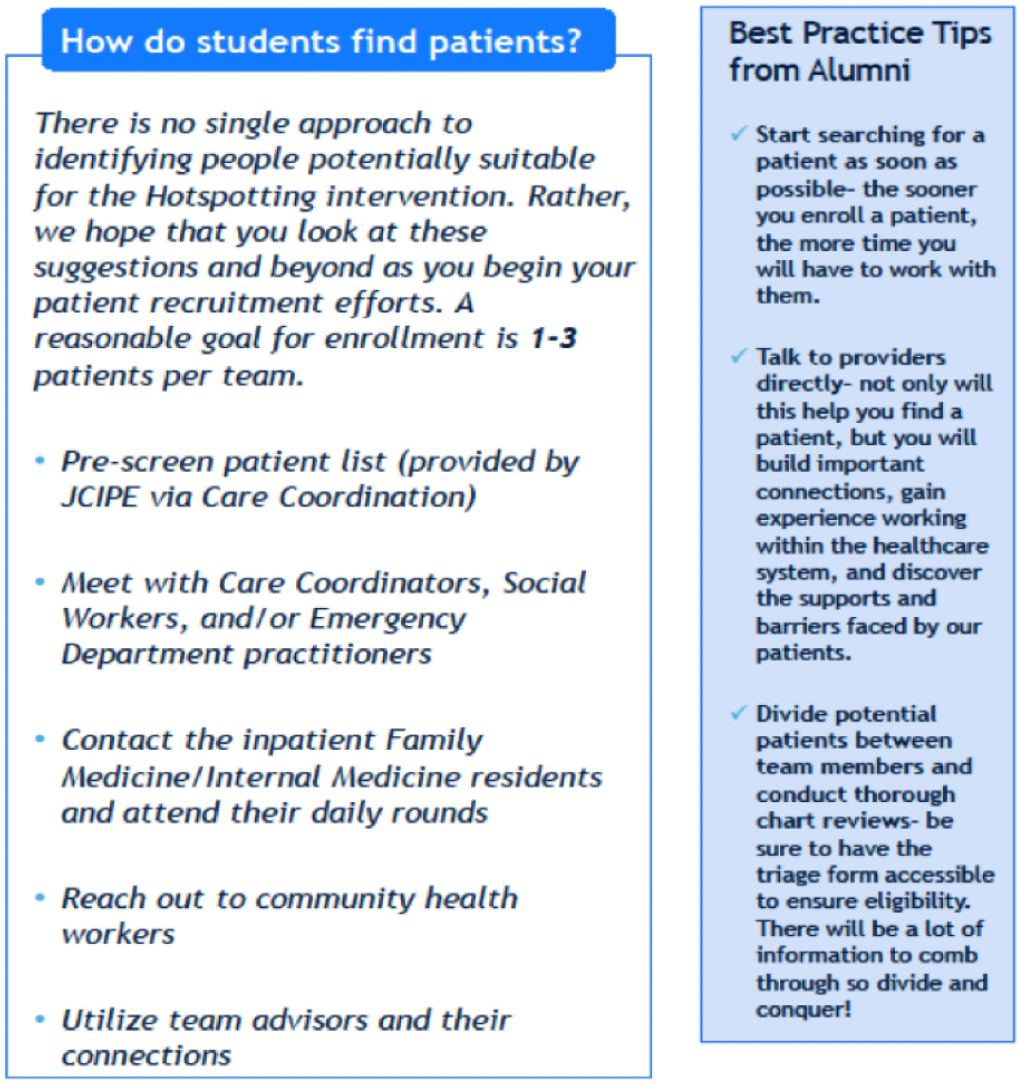
Source: Adapted from McLeroy, K. R., Steckler, A. and Bibeau, D. (Eds.). (1988). The social ecology of health promotion interventions. *Health Education Quarterly*, 15(4), 351-377

We also assembled a team of dedicated faculty to work on a Faculty Steering Committee, with enthusiastic engagement of leaders from social work, medicine, nursing, pharmacy, and care coordination. During this time, we developed numerous additional curricular resources, including a student application; a student toolkit (Figure 2); recruitment flyers for students, advisors, and patients; and guidelines and objectives for related capstone projects. We also offered dedicated informational sessions about Student Hotspotting on campus. As pre-planning concluded, we

started a formal process of recruiting students who had already completed foundational IPE training programs at Jefferson.

FIGURE 2

Sample Text from Student Hotspotting Toolkit: A Guide to Finding and Enrolling Patients



Source: Jefferson Center for Interprofessional Practice and Education (JCIPE)
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In addition to taking steps to integrate Student Hotspotting into our broader IPE curriculum, we identified champions across the academic and clinical pillars at our institution and met with numerous student, faculty, institutional, and community leaders to gain buy-in for the program. In our year of pre-planning, we hosted more than 40 meetings with potential stakeholders,

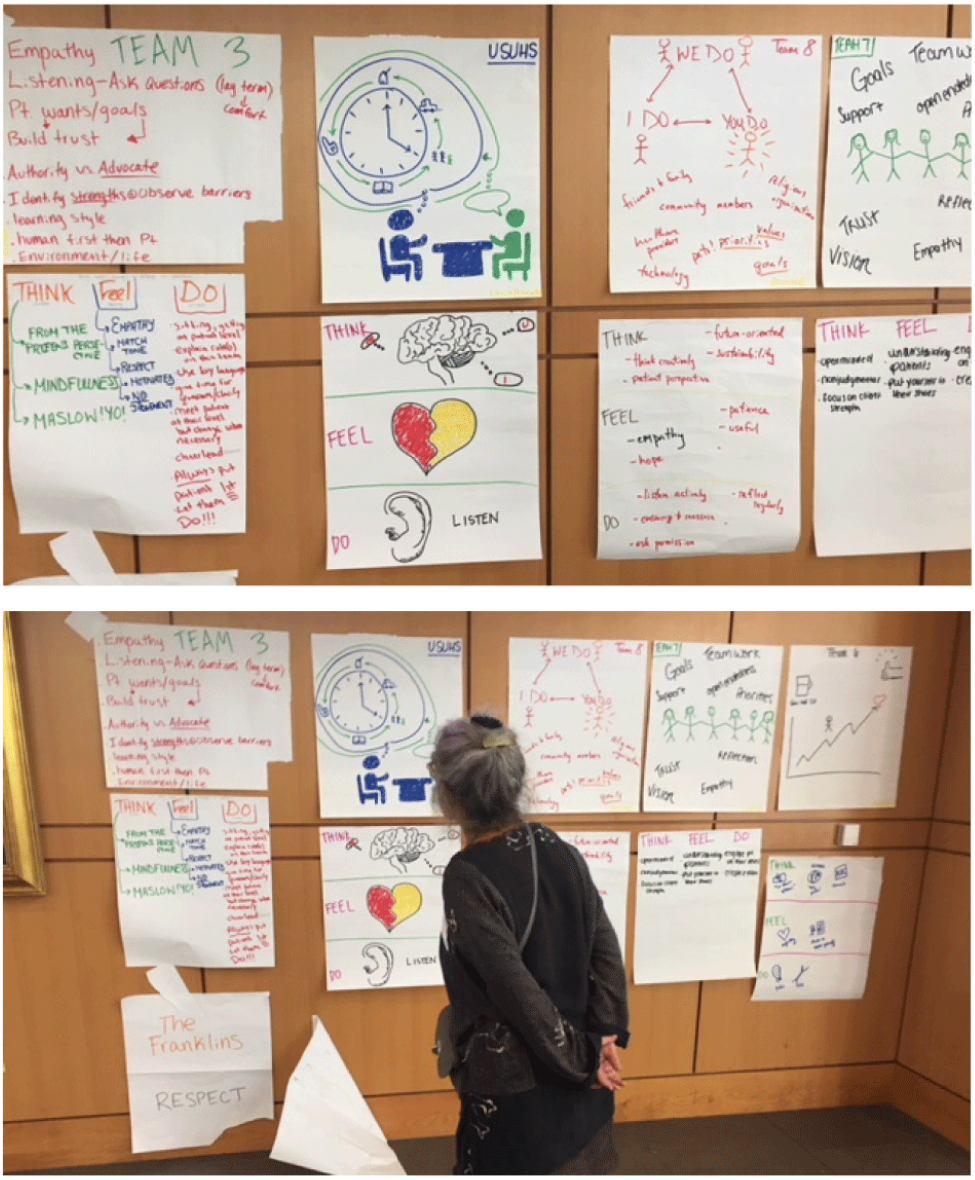
garnering ideas and support for the program's successful implementation. As part of this process, Jefferson academic leadership agreed to award a new special transcript designation, *Excellence in Collaborative Practice*, to students who successfully completed this novel longitudinal program. Furthermore, Jefferson clinical leaders and Care Coordinators committed to helping us secure a list of super-utilizer patients from our clinical practice sites and gather data that would be key to determining intervention results.

> *"Despite showing similar levels of self-efficacy and empathy at the start of the Student Hotspotting program, Hierarchical Linear Modeling suggested that group membership significantly influenced students' self-efficacy and empathy scores from the start to the end of the program."*

After devoting a year to planning, curricular refinement, and engagement of key stakeholders, Jefferson launched the Student Hotspotting hub in September 2017. During the 2017–2018 academic year, the Jefferson hub expanded on-campus Student Hotspotting to train eight internal (Jefferson-based) teams with 45 students (out of 59 applicants) and 33 faculty advisors, as well as an additional 12 teams from our partner universities, comprising 86 students and 48 faculty. In total, 212 students and advisors from 15 professions participated in our hub during the first year. As part of the Jefferson curriculum, learners participated in a day-long orientation, monthly complex case conferencing, skills labs, weekly or biweekly team meetings, monthly lunch-and-learn sessions, and a final wrap-up event (Figure 3, Figure 4, Figure 5). With guidance from three or four interprofessional advisors (faculty, clinicians, and/or care coordinators), learners were given an opportunity to work on teams comprising five or six interprofessional team members to enroll a panel of super-utilizers, to assist these patients in setting personal goals, and to co-create solutions to address the many factors impeding the patients' ability to achieve these goals.

FIGURE 3

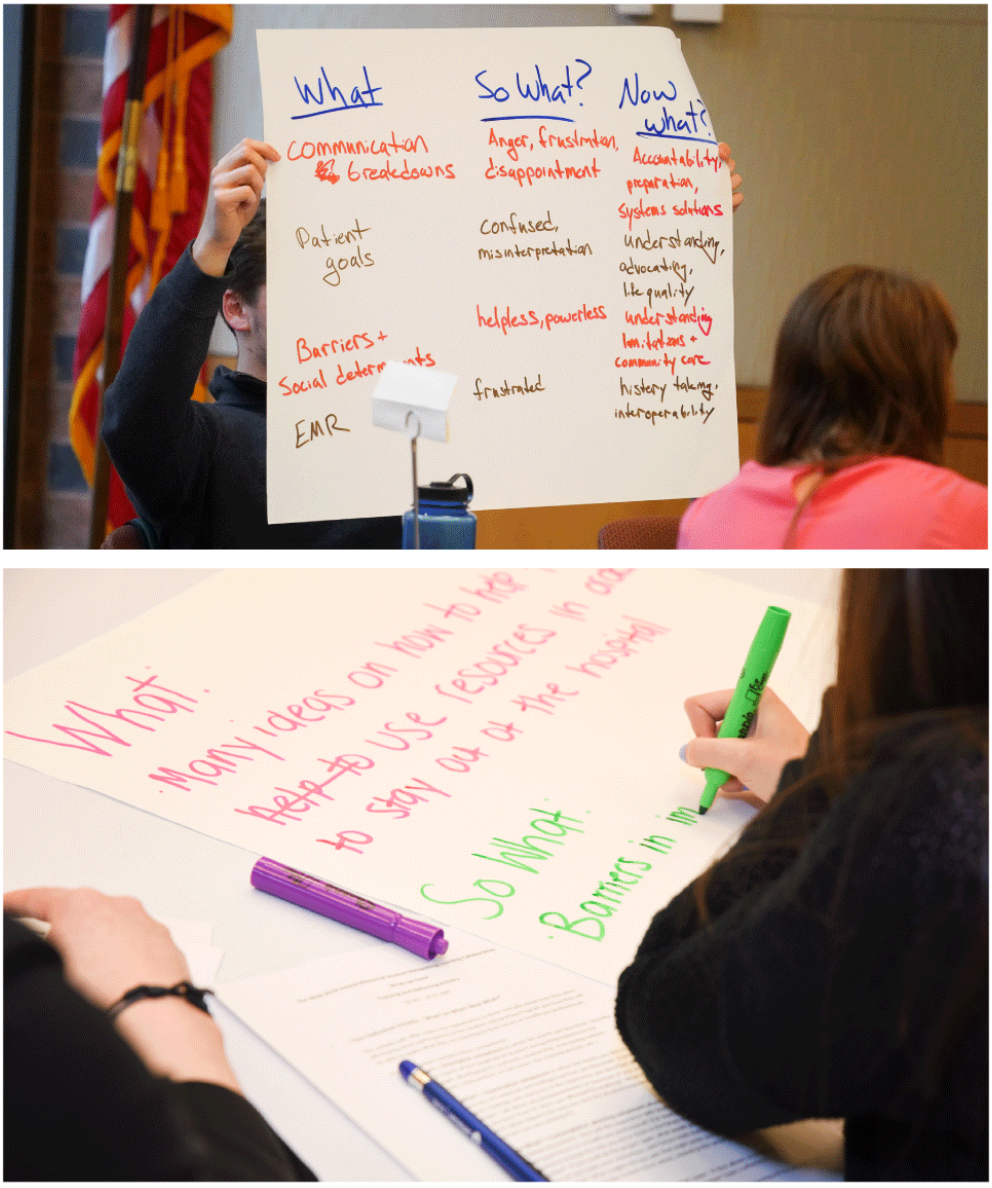
Student Hotspotting Pre-Intervention Planning (from the program kick-off)



Source: The authors

FIGURE 4

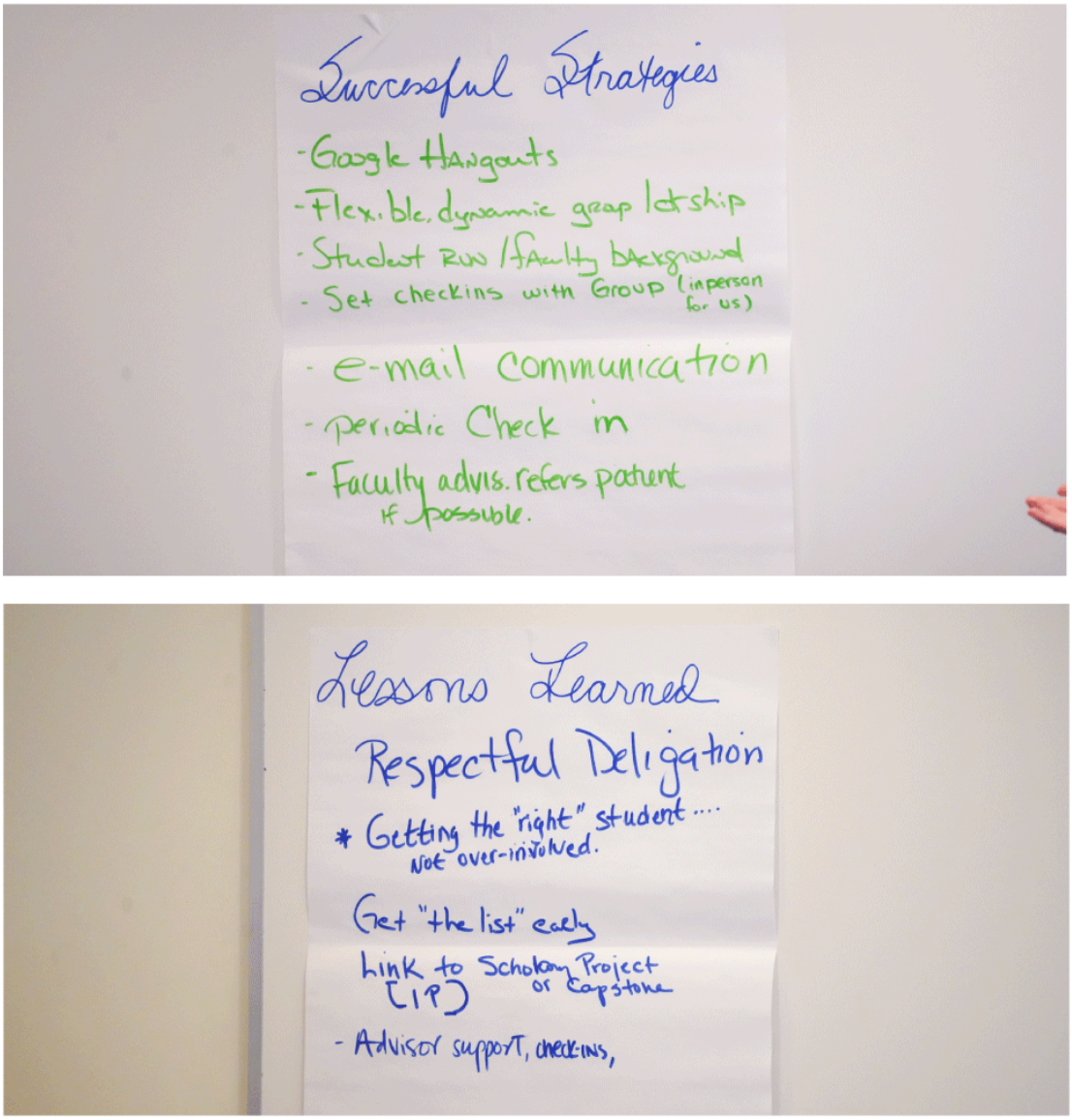
Team Reflections on the Student Hotspotting Experience (from the program wrap-up)



Source: The authors

FIGURE 5

Student Hotspotting Advisor Strategies/Lessons Learned (from the program wrap-up)



Source: The authors

The Team

Our core design and implementation team was based out of Jefferson's Center for Interprofessional Practice and Education (JCIPE) with support from Jefferson academic and clinical leadership as well as faculty and clinical volunteers, Care Coordinators, and a Student and Faculty Steering Committee. We received additional input from our IPE Curriculum Committee and IPE Research

Committee as we refined curricular tools and assessment measures. Our hub worked in close collaboration with the chief learning officer, Student Hotspotting program manager, and program assistant from Camden Coalition, as well as each of the faculty leaders from the three other national hubs at the University of Utah, Southern Illinois University, and Samuel Merritt University. During this first year, the four hubs instituted monthly check-in calls and formalized an Executive Steering Committee that met monthly with quarterly input from Camden Coalition. The hubs discussed hurdles and programmatic challenges, shared best practices, and outlined goals for the future, which included standardizing aspects of curricular content that might be transferable to other AHCs, developing plans for shared data collection, and initiating discussions to ensure long-term sustainability.

Metrics

Although Student Hotspotting was started by Camden Coalition in 2014, there has been little data on the impact of this model on student knowledge, skills, and attitudes or patient measures.[12] To address this evaluation gap, we worked with an external consultant to develop a guiding logic model[13] to drive our assessment plan so that we could begin to measure the impact of the program on student, patient, and health system outcomes. As part of these early evaluation efforts, changes in student participant knowledge, skills, attitudes, and empathy were measured over a 7-month period from September 2017 through April 2018 using a controlled, pre-/post-survey design.[14-17] The control group comprised students who were not enrolled in Student Hotspotting but who were involved in similar disciplines at comparable stages of their training. Patient and system-based outcomes that were assessed included utilization and cost data for 6 months before the intervention to 6 months after the intervention. Results were compared with a patient control group consisting of patients who were eligible to participate in Hotspotting at the same time as enrollees but who declined or were otherwise not enrolled.

Despite showing similar levels of self-efficacy and empathy at the start of the Student Hotspotting program, Hierarchical Linear Modeling suggested that group membership significantly influenced students' self-efficacy and empathy scores from the start to the end of the program. An initial self-efficacy gap between the Student Hotspotting and control groups widened after the course of the program, with those in Student Hotspotting showing a higher level. In terms of empathy, control group scores declined whereas the Student Hotspotting group scores increased at the end of the program. Qualitative feedback from student interviews further reinforced the value of the program in preparing future health care professionals to practice collaboratively to meet the needs of complex patients (Sample Student Feedback).

> *"It takes a village! True coordinated care comes from collaboration from all disciplines. If a care team is successful at working together, we can find pieces of our client's diagnosis that 'fell through the cracks' and hopefully alleviate the situation so that the client receives the care they need."*

We noted a preliminary trend toward reduced utilization and costs among the nine enrolled patients, following a patient chart review of visit dates and types (using random-effects Poisson regression) as well as pertinent diagnostic information. These patients demonstrated a 6% decrease in emergency department visits and a 48% decrease in outpatient visits in comparison with a control group of nine patients. The overall rate of inpatient admissions was low for both groups, inflating the effect of each patient, but the rates for both groups declined from 6 months before to 6 months after the Hotspotting program. Costs for both groups declined as well; mirroring utilization trends, the results from the first patient cohort at Jefferson demonstrated a 36% cost reduction per enrolled patient and a 15% reduction per control patient, based on visit counts and state and national figures for emergency department visits and inpatient days. While these results are positive, more robust analysis for this small sample size using Bayesian inference, which relies on prior evidence to calculate probabilities of treatment effects, is forthcoming, as are further details pertaining to student outcomes, which are currently under review. Moving forward, the analysis of longitudinal, aggregated, and standardized data from multiple sites implementing Student Hotspotting as part of a complex care curriculum will help to mitigate confounding variables from this early sample set (Sample Student Feedback).

Sample Student Feedback from Participants in a Complex Care Curriculum

"Hotspotting is one of those opportunities to throw yourself into the unknown and learn from clients about their lives and experiences with health care. Many of these individuals are those who fall between the cracks and they are the ones who need us the most."

"The lessons I learned [in the Hotspotting program] continue to shape the way that I think and work with clients as an OT student and will definitely impact my future as an [OT] practitioner."

"Throughout the months of [the Hotspotting] program, we met our patients across a wide variety of settings, including their home, their doctor's appointments, the ED, and even Dunkin Donuts. In doing so, we comprehensively identified and addressed multiple aspects of their health."

"[I learned] how to interact with complex patients. How to view patients differently through a humanistic lens. Really got me thinking a ton about possible health care innovations that would lighten people's burden."

"High utilizers are falling through the cracks. Problems can become so big it's easy for medical professionals to push them along to the next provider without addressing core health and lifestyle issues central to the growing problems these patients deal with. Writing prescriptions or providing expensive medical equipment can't be the answer anymore. These patients need to be worked with not on — and it can be done; we just did it."

"It takes a village! True coordinated care comes from collaboration from all disciplines. If a care team is successful at working together, we can find pieces of our client's diagnosis that 'fell through the cracks' and hopefully alleviate the situation so that the client receives the care they need."

"I will carry [the Hotspotting program's] team-oriented, whatever-it-takes approach with me in my career as a physician. I will also feel more confident effectively utilizing my health professional colleagues, nursing, PT, OT, Pharmacy and others, in coordinating patient care."

Where to Start

As "learning laboratories" dedicated to supporting the science of health, AHCs have a responsibility to respond to the recent call to action to create high-performing health systems that address current gaps in care.[2] For institutions interested in starting a similar program, information on Student Hotspotting can be found on the websites of the Camden Coalition, the National Center for Complex Health and Social Needs, and JCIPE, as well as from other universities that have implemented similar programs, such as Virginia Commonwealth University.[18] A first step for an AHC starting a similar curriculum is a willingness to be creative, to be adaptive, and to push the boundaries of traditional medical and health professions training. A central organizing leadership team, such as a center for IPE with strong institutional support, can serve as a galvanizing force to bring a program like this to fruition. Building relationships that cross practice and education and that span clinical and community settings helps to bridge the educational void in this area while also achieving a broader goal of improved care for this vulnerable population.

Hurdles and Opportunities

In our first year, we encountered a number of hurdles to the successful implementation of this complex care curriculum initiative. First, the "hub" model was brand new in 2017, and a roadmap for curricular integration into an AHC was nonexistent. Faculty advisors' training in and experience with directly addressing SDOH were often limited, and faculty development materials had not yet been generated. Identifying patients who met the criteria for enrollment was challenging despite electronic health record access, and the lists that we received from our data reporting partners were often inaccurate, requiring chart reviews by students. Once correctly identified, patients were not always interested in participating in this program, which was often offered to them outside of the context of an admission or an outpatient office visit. Scalability was a constraint, as the curriculum is offered at an additional expense to academic institutions. Furthermore, systematic integration of this program will always face some barriers common to IPE,[19] including organizational structures (scheduling, space logistics, equal representation of professions, alignment of learner levels, faculty development, academic credit recognition), organizational cultures (negative perception about utility, perception of extra work), and power imbalances (formal and informal turf wars). These factors are often exaggerated when a program is longitudinal rather than a one-time event.

> *"Problems can become so big it's easy for medical professionals to push them along to the next provider without addressing core health and lifestyle issues central to the growing problems these patients deal with. Writing prescriptions or providing expensive medical equipment can't be the answer anymore. These patients need to be worked with not on — and it can be done; we just did it."*

At Jefferson, we have been able to overcome many of these hurdles because we have had over 12 years of experience in the development, implementation, and assessment of large-scale IPE programming. Our dedicated Center for Interprofessional Practice and Education (JCIPE), founded in 2007, has broad institutional support. JCIPE has a core team of faculty and staff that is funded by our leadership, and we have strong support from our President, Provost, Deans, faculty, students, and alumni. In fact, students across professions have repeatedly noted that IPE is one of their top reasons (ranked 7 of 28 in 2017) for choosing Jefferson for their health professions training. On matriculation, many students already want to participate in clinically relevant value-added experiences. We also have diverse IPE curriculum and IPE research committees to guide continuous quality improvement and support our program's success.

Strong relationships with internal departments and external community partners also have been invaluable. Internally, we developed a rich partnership with our Care Coordination team, which has resulted in (1) the participation of engaged and knowledgeable advisors, (2) access to catalogues of patients who are eligible for Student Hotspotting, and (3) patient data that our research team can analyze and use to generate further support for the program. Externally, we have worked with a number of community-based organizations to add greater value to the local community as well as to increase access for our Student Hubspotting patient population. Our growing alliance with Camden Coalition and regular communication with the three other hubs has also been critical as we navigate long-term sustainability and create a roadmap and toolkits to share with other institutions (Table 1).

For many AHCs, financial constraints are the hardest hurdle to overcome. We were fortunate to have seed funding from the Robert Wood Johnson Foundation, but we have also enlisted Jefferson's Office of Institutional Advancement to help raise awareness of our efforts to deliver this new training model and to help secure additional philanthropic support. Our President and Provost have committed a substantial investment as "early adopters" of the model on the basis of its alignment with our institution's academic and clinical missions as well as our preliminary outcomes. However, we need to broaden the investment in robust studies to produce the data needed to garner long-term system and payer support to enable widespread dissemination of this innovative training model.

Ultimately, adoption of this model will require a culture shift. This new culture will encompass the recognition that students are levers of change, capable of providing person-centered, low-cost interventions to patients and communities."

Ultimately, adoption of this model will require a culture shift.[20, 21] This new culture will encompass the recognition that students are levers of change, capable of providing person-centered, low-cost interventions to patients and communities; the extension of the clinical learning environment beyond the hospital or outpatient office doors; and reimbursement by payers for efforts to manage risk among super-utilizer patients, thereby offsetting programmatic expenses (such as paid faculty and staff support and implementation and assessment costs).

Next Steps

Hotspotting begins to tackle the crisis in complex care by using social and population data to pinpoint people who are struggling with complex issues and have become super-utilizers. As the national dialogue on the importance of SDOH relative to health outcomes gains momentum, innovative strategies for teaching learners how to deliver effective care to these patients have emerged as a top priority for health professions training programs.[1] Utilizing interprofessional teams is increasingly recognized as central to developing a meaningful response to this crisis in complex care. Innovative complex care curricula must be scaled, evaluated, and adequately supported to facilitate dissemination across AHCs and to prepare our workforce for complex care.

Finally, this pilot worked well to meet its goals, but the vision of tackling complex care requires more resources to develop ideal learning environments for much greater numbers of students throughout the health professions training continuum. Furthermore, the project highlighted the reimbursement conundrum — namely, that simple, nonmedical solutions are not reimbursed in a fee-for-service environment. By its success, this pilot demonstrates that complex care works to address the needs of super-utilizers, which reinforces the need for an intelligent payment system that ensures that teams are paid to unravel complex problems, even if the answers do not consist of complex medical procedures.

Table 1. Jefferson's Roadmap for a Complex Care Curriculum

Curricular Threads	Content Areas	Outcome Measures	Longitudinal Goals Across All 3 Curricular Threads
Complex Health Care Systems	• Advocacy for at-risk patients • Care coordination/navigation • Complexity science • Confidentiality principles • Epidemiology of complex care • Legal issues for at-risk populations • The Quadruple Aim • Understanding resources: challenges and strategies • What is "value" in health care	Decreased • ED visits • Readmissions • Inpatient admissions • Length of stay • Total cost of care Increased • Use of outpatient services • Attribution to primary care providers • Financial and stakeholder commitment	• Design, implement, and scale the curriculum • Measure impact and increase evidence base • Refine and disseminate the model • Sustain expanded model
Interprofessional Teams	• Effective strategies for team communication • Forming a team/group process • Leadership • Peer support and conflict resolution • Professionalism vs. interprofessionalism • Team roles and responsibilities • Values/ethics	Decreased • Burnout Increased • Knowledge • Skills • Attitudes • Empathy • Primary care providers working with complex patients	
Complex Patients and Populations	• Cultural humility/ understanding bias • Disparities in health care • Harm reduction • Healing relationships • Integrating behavioral health • Person-centered communication • Safety in at-risk populations • Setting boundaries • Social determinants of health • Supporting wellness • The socio-ecological model • Trauma-informed care	Increased • Patient health outcomes • Patient experience • Population health	

Source: The Authors

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