Interprofessional Student Hotspotting at Grady Hospital

Background and Aims

The Interprofessional Student Hotspotting Curriculum is a national service-learning curriculum that provides opportunity for students from diverse fields of study with a shared interest in improving health outcomes and reducing costs for *high utilizers*. High utilizers are medically and socially complex patients that have had four or more inpatient admissions in less than one calendar year. This curriculum was brought to Atlanta in 2017 through the partnership of student leaders from three schools: Emory School of Medicine, Emory School of Nursing, and Georgia State University School of Social Work. The students and faculty mentors (*Table 1 in Appendix*) that participated in this curriculum this past year have laid the foundation to expand this student-initiated interprofessional hotspotting curriculum in Atlanta. Seed grant funds will be used to expand, measure, and evaluate the benefits of this service-learning curriculum using validated metrics and data collection methods. Data capture and analysis methodology has been designed with the help of the Georgia CTSA BERD Consult service. Ultimately, after demonstrating the benefits of this program to students, patients, and hospital systems we will be able to advocate to our host academic institutions the adoption of this curriculum and associated costs to further expand the program. For example, Emory School of Medicine has already voiced support for this program (*see attached Letter of Support from Dr. Ira Schwartz*).

Why work with high utilizers?

In 2015, healthcare made up 17.8% of the U.S. economy[1], and in less than ten years (by 2025) that number is expected to rise to 19.9%. The government will be expected to pay almost half of these costs; That is to say government-sponsored share of health spending is projected to account for 47% of national health expenditures by 2025.[2] These costs are driven largely by a group of patients called *High-Utilizers*, which are a group of high-need, high-cost patients who constitute a very small percentage of the population but account for a disproportionally high amount of health care utilization. This demographically, clinically, and socioeconomically diverse population comprises only 5% of the U.S. population but incurs 50% of healthcare expenditures, and are.[3] High rates of utilization point to challenges in coordination of care and inadequate access.[4] Hence, strategies aimed at improving the delivery and management of healthcare to high-utilizers have become the focus.

What is the Interprofessional Student Hotspotting Curriculum?

Atlanta's student hotspotting team is part of an annual program established in 2015 that trains interdisciplinary teams of professional students from schools around the country. The national program is arranged by the Camden Coalition of Healthcare Providers, and hosted by the Association of American Medical Colleges, Primary Care Progress, National Academies of Practice, Council on Social Work Education, and American Association of Colleges of Nursing. One of the main tenants of the program is that students learn by doing. In their respective communities, student hotspotters provide support to high-utilizers in navigating personal and systemic barriers that contribute to over-utilization. Hotspotters do *not* provide medical care or advice. By working alongside patients to navigate roadblocks to efficient and effective outpatient management of patients' health, student hotspotters learn not only about the unique challenges experienced by these patients, but also the efforts required to address them. In doing so, student hotspotters gain valuable training that enables them to be more compassionate, collaborative, effective, and comprehensive professionals (social workers, doctors, nurses, lawyers, businesspeople, administrators, etc).

Aim 1: Expand the number of Interprofessional Student Hotspotting teams in Atlanta participating in the six-month curriculum from currently one team to three teams during the 2018-2019 academic year. Each team will

be comprised of 4-6 interdisciplinary students and three interprofessional mentors collectively working between 5-10 hours per week with five high-utilizer patients.
Rationale: Our ultimate goal is for this curriculum to be adopted by our academic institutions. Demonstrating a high-level of independent student and faculty interest in this program as an extracurricular activity will provide the influential support. Furthermore, including more teams will provide increased power for our statistical analysis described in Aim 2.

Aim 2a: Design a dynamic, scalable, data-collection REDCap tool for students participating in the curriculum with the help of Georgia CTSA BERD consultation. This will capture important metrics pertaining to student learning, patient well-being, and hospital cost-savings.
Aim 2b: Automate the data analysis process for future student hotspotters without any coding experience by writing an R code that analyzes data captured in REDCap and generates a well-designed, aesthetically pleasing report using R Markdown. This report can then be shared with stakeholders.
Rationale: To demonstrate that this service-learning curriculum can effectively be adopted by our academic institutions, it is critical that we know how successful our efforts are at improving specific metrics. We aim to measure and evaluate the quality of life of the patients, the educational value of the program for the students involved, the effectiveness of interdisciplinary communication and collaboration within teams, and cost-savings to Grady Hospital.

Methodology and Technology Employed

The purpose of our intervention is to decrease emergency room visits and hospital admissions for high utilizer patients at Grady Hospital. To do this, we have partnered with and received a Letter of Support from Leslie Marshburn, MPH/MBA, Director of Population Health for the Grady Healthcare System (*see attached*). Mrs. Marshburn manages the Chronic Care Clinic (CCC) at Grady Hospital, which was designed for patients that disproportionately utilize the Grady Emergency Department and which will serve as our recruitment site (*see attached article).*

Many of the patients that are diverted to the CCC also meet our intervention's **inclusion criteria** of being insured by either Medicaid or Medicare and having ≥ 4 inpatient hospital admissions in ≤ 12 months. The student interdisciplinary team is working in partnership with the Chronic Care Clinic to offer additional support and referral assistance to help patients as they adjust to diagnosis and are discharged from the hospital. The team is striving to educate and connect the patients with the community to decrease their number of visits the hospital. Our faculty advisors have engaged high utilizers and mentored students in similar curricula in the past. The student team is *not* providing medical advice to the identified patients in the intervention.

We have adapted the Interprofessional Student Hotspotting Intervention (Figure 1) to the recruitment and care coordination of high-utilizers diverted to the CCC:

1. **Recruit Students to Join Teams:** We expect to fill all teams easily. There were more applications to join our team than there were spots for this year, indicating broad interest. In addition to publicizing this opportunity to medical, nursing, and social work students, we will also invite students in law, business, and pharmacy. Student groups like Primary Care Progress have indicated strong interest in creating teams of their own.
2. **Attend Kick-Off Event (already funded through School of Nursing Grant):** The Camden Coalition hosts a kick-off event where students gather skills, collaborate, and share hotspotting strategies that worked at other institutions.
3. **Identify Patients:** Using established partnerships with case managers and social workers at the CCC, each team will identify 5 patients to engage. After establishing a relationship and explaining the purpose

of the intervention, patients will be asked to sign a consent form. Consent forms are currently being approved by Grady legal department.

4. **Create a care plan:** Help patients uncover the cause of their over-utilization of healthcare service. Create a plan to tackle these issues, and help motivate patient to take charge of their health by educating and setting achievable goals. Focus on establishing and maintaining links to social supports and the CCC. Calling upon team's interdisciplinary knowledge is key.
5. **Support and navigate care plan:** Student teams act as extensions of the CCC care team. Students guide patients as they navigate the social service system and attend medical appointments. Teams also provide support as patients learn to take a more active role in their healthcare.
6. **Final report and Wrap-Up Event:** Students capture and analyze data, record their experience, and relay patient stories in a final report. The wrap up event is for students to reflect on the impact that they made on their community as well as learn how to best present results of their program to key stakeholders.

In addition to learning by working with patients, students also learn through an interactive online curriculum created by the Camden Coalition (*Figure 2 in Appendix*). The curriculum is composed of seven themes: Motivational interviewing, programmatic operations, trauma informed care, COACH (Camden's patient engagement model), harm reduction, safety, and leadership. Lessons on the seven themes are to be taken independently by students by watching quick YouTube® videos throughout the year. In addition to watching the curricular videos, students learn through skills labs, which are online opportunities to practice skills such as motivational interviewing, capturing patient stories, and delivering trauma-informed care with other students participating in the program. Though not part of the curriculum itself, students also learn by participating in online case conferencing, in which they have the chance to troubleshoot barriers and discuss successes with teams in different cities.

Data Capture and Analysis Methods

When working with patients, student hotspotters use the following technologies:

1. **Epic**: Grady's EHR to screen for eligible patients. Students will not chart in Epic, but they will sift through necessary notes to learn about patients' patterns of hospitalization and unique medical/social histories.
2. **TrackVia**: TrackVia is the workflow manager used by the Camden Coalition to allow student hotspotters to log encounters and manage care plans with de-identified patient information. In TrackVia, teams share access to careplans, encounter logs, and utilization records, which promotes communication among group members. TrackVia is HIPAA compliant.
3. **Slack**: Both the Atlanta hotspotting team and National organizers from the Camden Coalition use this messaging and document-sharing app as their primary means of communication.
4. **REDCap:** REDCap is a metadata driven electronic data capture system available for investigators to use for form-based data collection. The system is supported by Emory on a virtual machine (VM) environment with nightly backup and full redundancy for high application availability and reliability. REDCap is a web-based system with the Apache/PHP web server located in the DMZ and the MySQL database backend hosted in a HIPAA compliant secure data zone. Access to the system requires and Emory University or Emory Healthcare user account iwht external users supported using Emory University sponsored accounts.

We have consulted with Dr. Amita Manatunga from the Georgia CTSA Biostatistics, Epidemiology, & Research Design (BERD) program, which provides free comprehensive biostatistical and epidemiological support. These services include support for protocol development, statistical analysis plans, and sample size/power calculations, among many other services.

Given the limited sample size of patients per team, most analysis will be concentrated on using descriptive statistics. With more data available over time, we will iteratively expand our data metrics. Values at six months will be compared to the baseline values.

1. **Students:** The Public Affairs Scale has been developed as a valid and reliable measure of civic learning in the three domains of community engagement, cultural competence, and ethical leadership. A validated 15-item short scale version of the PAS[1] will be used to measure service-learning outcomes. We will also request a short qualitative "Reflection" response pre- and post-intervention (first and sixth month). The reflection can cover any topic, but we will provide the following topics as prompts: Barriers to care, Data's role in healthcare intervention, Importance of coordinated care and patient-centered approach, Value of interdisciplinary collaboration, Patient experiences and stories, and/or identifying, selecting, and building a relationship with complex patients.
2. **Patients:** Quality of Life will be assessed pre- and post-intervention using the 36-Item Short Form Survey (SF-36) developed by RAND. SF-36 is a set of generic, coherent, and easily administered quality-of-life measures. These measures rely upon patient self-reporting and are now widely utilized by managed care organizations and by Medicare for routine monitoring and assessment of care outcomes in adult patients. Values at 6-months will be compared to the baseline values using a paired-T-test. Potential confounders such as age and gender will be investigated using regression. In addition, evidence suggests that childhood traumatic events may be the strongest predictor of high-utilization, and as such we will conduct the validated Adverse Childhood Experiences (ACEs) survey. Finally we will track total number of medication prescriptions at each visit during the intervention.
3. **Cost-Savings to Grady Hospital:** Using the EMR, we will retrospectively collect the following descriptive data for each patient that participates in the 6-month intervention:
    - **Number of hospital emergency department visits and inpatient admissions** (a) 6 months prior to, (b) during, and (c) one year after enrollment in the intervention.
    - **Bills paid by CMS for each patient**: Using the patients Medicare Number and Effective Date for Part A, billing records can be requested from CMS directly by setting up a MyMedicare account with the patient. This allows us to to access three years of claims data (inpatient, outpatient, ED) with the patients permission. We will get billing data for (a) 6 months prior to, (b) during, and (c) in one year after enrollment in the intervention.
    - **Number of CCC made and missed appointments** (a) 6 months prior to, (b) during, and (c) in the 6 months after enrollment in the intervention. For patients that were not followed by CCC prior to the intervention, we will use made and missed Primary Care visits as a proxy. As a part of the intervention, the patient provides the locations of all of their providers including their PCP.

We are in the process of designing an evaluation and results dissemination process that is easy for future students to implement regardless of statistical or data-management proficiency. This will allow future students to share information with stakeholders such as administrators from our academic institutions, Grady Hospital, and the patients. The program will be written using R in R-Markdown, which is a free authoring framework for data science that can be used to both save and execute code and generate high quality reports that can be shared with an audience. R Markdown documents are fully reproducible and support dozens of static and dynamic output formats. Michael Arenson, co-PI of this project and current MD/MSCR student has the skills to create this R Markdown program as well as R mentors to advise him (Beau Bruce, MD/PhD, Analytics Specialist, Epidemiology Branch, CDC). In its final form, statistical analysis programs will be automated so that students will simply be required to collect de-identified data using TrackVia.

[1]Chantal Levesque-Bristol and K. Andrew R. Richards. Evaluating Civic Learning in Service-Learning Programs: Creation and Validation of the Public Affairs Scale–Short Survey (PAS-SS). JPAE 20(3), 413–428. http://www.naspaa.org/JPAEMessenger/Article/VOL20-3/10_Levesque-Bristol_Richards.pdf.

Anticipated Results

This current school year was a chance for us to establish clinical partnership at Grady, learn the expectations and intricacies of the Camden Coalition model, and to form relationships with key stakeholders at Emory School of Medicine, Emory School of Nursing, and Georgia State University School of Social Work.

By the end of the 2018-2019 academic school year, we will have expanded the number of Interprofessional Student Hotspotting teams in Atlanta from one to three. We anticipate this to be attainable based on strong interest from students in the three programs, the present need from Grady's high-utilizer population for such work, and the establishment of clinical relations between Grady and the 2017-2018 pilot team. We will have also designed a data-collection tool in REDCap that will capture metrics related to student learning, patient well-being, and hospital cost-savings. We anticipate this to be attainable due to collaboration among Georgia CTSA BERD and the current interprofessional student hotspotters in identifying assessment tools to capture outcomes along the three domains of interest (students, patients, and hospital), as well as the group's familiarity with REDCap. Finally, we will have a code using R Markdown that will automate data analysis of information collected in RedCap throughout the year. Automation of data analysis will allow future hotspotters to generate well-designed and easily-understood reports for stakeholders on the outcomes of the program. We anticipate this to be attainable due to the current student hotspotters' familiarity with RedCap and coding in R.

Impact on Healthcare Delivery Quality, Cost, and Access

Quality: high-utilizing patients experience complex social and medical needs, which contribute to difficulty managing health in the outpatient setting. High-utilization is due in part to anonymity and intricacy in navigating the healthcare system as well as social support programs in place. Through the student hotspotting program, high-utilizers will have the chance to work individually with people in the healthcare field (the students) to address social and logistical barriers.

Cost: As mentioned previously, increased utilization of primary care and outpatient chronic disease management services due to the student hotspotting intervention will contribute to decreased hospitalization, thus decreasing overall costs in the long run. This will help Grady sustainably manage the expense of caring for high-utilizers.

Access: by working individually with student hotspotters, high-utilizing patients will ideally learn methods to integrate outpatient preventative services and self-health maintenance into their lives. Though one goal of this project is to decrease overall utilization, it is likely not at the expense of milder medical resources to manage health in the outpatient, preventative care setting. In fact, access to a broader range of health-related services and support groups would ideally be achieved in attempts to decrease utilization.

Significance

Nearly twenty schools are participating in the Interprofessional Student Hotspotting Learning Collaborative during the 2017-2018 school year. Emory and Georgia State's participation in the project is significant in that it marks the universities' interests in providing compassionate, efficient, and effective care to some of Atlanta's most complex patients, while promoting interdisciplinary learning among their students. High-utilizers are a unique patient population that consume a large portion of healthcare resources, often without close associations to healthcare workers or spectacular long-term outcomes. By taking part in a program with students, high-utilizers have the opportunity to form a close relationship with a member of the healthcare community, while costs can be saved. Students participating in the program have the opportunity to learn about complex medical and social needs of high-utilizers while discovering intricacies of the healthcare system that do and do not facilitate health maintenance. Health professions schools recognize the importance of interprofessional education, but often have difficulty identifying opportunities for it to be integrated into distinct curricula. This program offers the opportunity for students to learn from members of interdisciplinary teams, which will prepare them well for the diverse workforce in which coordination and communication are imperative.

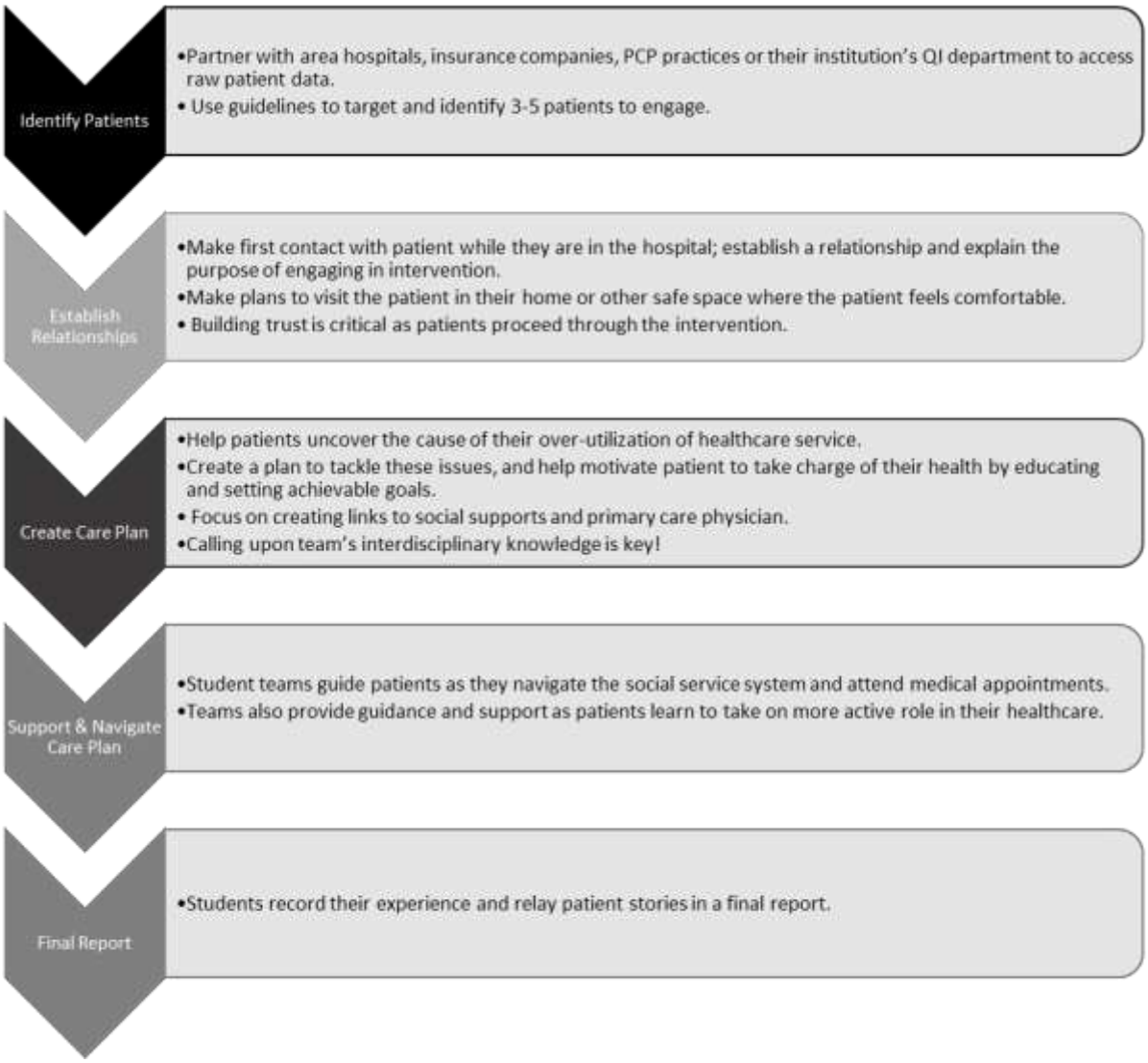
Appendix

Table 1

Name	Role	Institution	Training Program/Title	Years in Training	Phone	Email
Michael Arenson	Student	Emory	MD	4	Cell: 952-240-6882	michael.arenson@emory.edu
Colin McNamara	Student	Emory	AMSN (joint BSN+MSN, FNP track)	2	609-475-2656	colin.jude.mcnamara@emory.edu
Jennifer R. Dyson	Student	GSU	MSW	2		jdyson3@student.gsu.edu
Sindhuja Surapaneni	Student	Emory	MD	3	404-432-0327	sindhuja.surapaneni@emory.edu
Madeleine Rutledge	Student	Emory	AMSN	2	508-641-8934	maddie.rutledge@emory.edu
Ann E. Horigan PhD, RN	Mentor	Emory	Assistant Clinical Professor, Nell Hodgson Woodruff School of Nursing		Office: 404-727-3596	ahoriga@emory.edu
John Marshall, MD	Mentor	Emory	Resident, Emory Department of Medicine		912-690-0137	jmarsh9@emory.edu
Renanda W. Dear, Ed. D, LMSW	Mentor	GSU	Director of Student and Community Services		Office: 404-413-1057	rwood@gsu.edu
Sara Turbow, MD, MPH	Mentor	Emory	Assistant Professor, School of Medicine		Office: 404-251-8897	sara.turbow@emory.edu

Figure 1

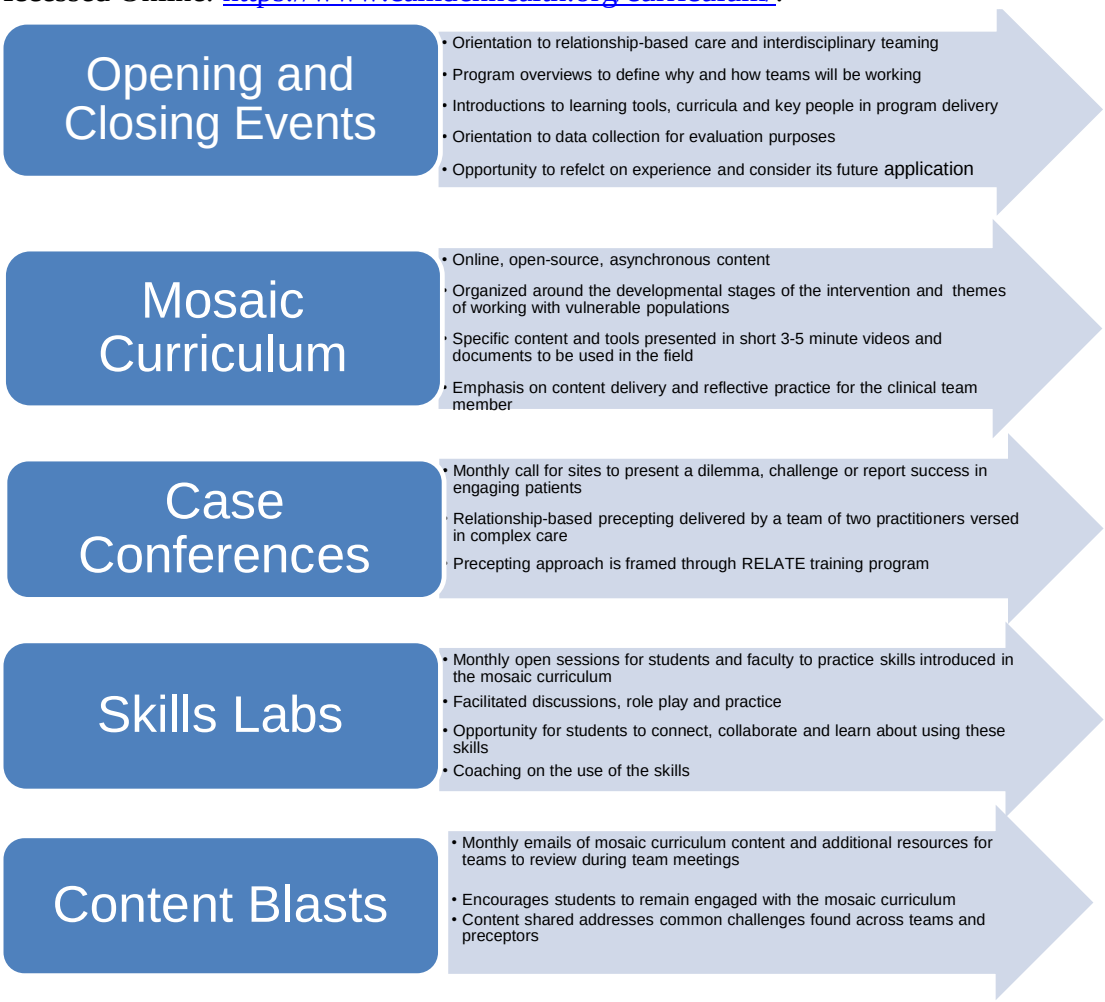
The Hotspotting Intervention



Camden Coalition of Healthcare Providers, 2017.

Figure 2

Camden Coalition Hot Spotting Curriculum
Accessed Online: https://www.camdenhealth.org/curriculum/.



Camden Coalition, 2017

Additional information

1. IRB exemption
2. Letter of Support from Leslie
3. Letter of Support from EUSOM
4. Chronic Care Article