

Virtual Curriculum for Updated Management of Ulcerative Colitis: A Longitudinal Program for Gastroenterology Trainees

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Abstract:

We propose to offer a virtual longitudinal curriculum on ulcerative colitis (UC) designed with the needs of gastroenterology trainees in mind. The interruptions in clinical care across the United States due to the COVID-19 pandemic have significantly impacted the training trajectories of our fellows, and innovative education is needed to fill this void. We have already piloted a virtual education program with trainees, with success across the southeastern United States.

The objectives of our virtual program on UC will be to improve: 1) timely diagnosis, 2) management of the mild to moderate patient, 3) management of the moderate to severe patient, 4) management of the hospitalized patient, 5) implementation of disease-specific guidelines, 6) management of special populations, 7) health maintenance and prevention, 8) pipeline novel therapies and 9) implementation of telehealth and shared decision making.

The program will uniquely offer a series of weekly lectures, with moderated answers to questions from trainees, including opportunities for trainees to present their own cases to faculty. There will be subsequent teleECHO clinics™ consisting of virtual case-based discussions with faculty each week after the lecture. This innovative structure will maximize knowledge retention and interaction amongst attendees. The program will also have an enduring component, with recordings available on our website for continued access.

This program will be offered by the faculty of the University of North Carolina at Chapel Hill, which houses an internationally-renowned inflammatory bowel disease center, and includes faculty members who are authors of three recent guidelines on inflammatory bowel disease. The course director, Dr. Millie Long, is a current gastroenterology and hepatology program

director, who understands the needs of trainees during this turbulent time and has received feedback from trainees on development of this curriculum.

Goals and Objectives:

With the COVID-19 pandemic, training has been interrupted for gastroenterology and hepatology trainees throughout the country. Some of these fellows have been called to service as internists, caring for COVID-19 patients. Others have been moved to the sidelines, on reserve, where they are at home without actively being engaged in in-person care. Outpatient endoscopy suites and clinics have closed for months at a time, reducing our trainees' ability to learn. Fellows have found themselves at home, often reading and doing board preparation, but are lacking direct faculty mentorship and specific longitudinal educational activities.

One such area of education that has been dramatically impacted is the management of inflammatory bowel disease (IBD). The majority of IBD management comes in the outpatient setting, where medical therapies such as biologics and small molecules have dramatically changed the management of IBD in the past decade. Unfortunately, outpatient clinics are closed due to the pandemic. Also, as patients' jobs are lost and circumstances change, we are seeing ever sicker IBD patients in the hospital, particularly those with ulcerative colitis (UC).

There is a need to focus on a better understanding of UC management for trainees, specifically in a longitudinal curriculum that addresses a continuum of care: from the mild to severe patient, including special populations. There is also a need to understand appropriate implementation of telehealth in these populations, and delivery of outpatient care to prevent complications of disease. Therefore, the overarching goal of this proposal is to provide trainees with a comprehensive and applicable curriculum on ulcerative colitis which can be implemented on their first day back in practice.

While one aspect of this program will be a weekly virtual lecture series, we will also reinforce the curriculum content through a series of Project ECHO (Extension for Community Healthcare Outcomes) teleconferences with faculty, utilizing case-based scenarios to reinforce content knowledge presented each week in the virtual series. This novel application of the Project ECHO® methodologies in the IBD field will enhance the education and confidence of trainees and serve as a first step towards the development of an ongoing learning network and community of practice for IBD management.

To accomplish this goal, we have developed a longitudinal series with a two-pronged approach. Each week will feature:

- 1) a virtual lecture with an interactive, moderated, question and answer session, followed by**
- 2) a Project ECHO® teleconference (teleECHO™ clinic) with faculty focusing on case presentations and discussion of the week's topic.**

We propose the following weekly learning objectives and expected outcomes for this interactive, virtual lecture series designed for trainees:

- 1) To understand the epidemiology of ulcerative colitis and how to provide accurate diagnosis, including an individualized assessment of disease severity (rather than disease activity)
- 2) To understand management of mild to moderate ulcerative colitis, including available therapeutics (medical as well as complementary)
- 3) To understand management of moderate to severe ulcerative colitis, including available medical therapeutics, specifically biologics (including biosimilars) and small molecules (JAK inhibitors)
- 4) To improve the management of the hospitalized, severe ulcerative colitis patient, including the role of colectomy
- 5) To review and implement the latest guidelines for the management of ulcerative colitis, including optimization of therapies and the use of therapeutic drug monitoring and dysplasia surveillance
- 6) To understand the management of special populations: the pregnant patient
- 7) To understand the management of special populations: the patient with extra-intestinal manifestations
- 8) To understand the management of special populations: the patient with liver disease (primary sclerosing cholangitis, non-alcoholic fatty liver disease)
- 9) To understand the management of special populations: the elderly, those with comorbidities and prior malignancy
- 10) To optimize health maintenance and prevention in patients with ulcerative colitis
- 11) To understand the future of IBD: personalization of therapies and the novel therapies in the pipeline for ulcerative colitis
- 12) To understand best practices surrounding telehealth delivery and shared decision-making in patients with ulcerative colitis

This will be a longitudinal weekly series, with a total of 12 lectures at the start of each week (approximately 45 minutes each), provided by nationally-renowned faculty. Each lecture will conclude with a 15-minute moderated question and answer session, with the ability for trainees to submit cases for discussion during this time period. Later in the week, following the lecture, there will be a separate teleECHO™ clinic with faculty, modeled on the successful Project ECHO® utilized in hepatitis C management¹⁻³ and also in non-medical settings where standardization of practice is needed, such as law enforcement.⁴

The expected outcomes of this series will be a) improvement in knowledge of management of ulcerative colitis b) improved comfort in preventive health recommendations and c) improved ability to implement these recommendations by trainees via new vehicles of care (telehealth). To measure these outcomes, we will provide

pre- and post-program questions and evaluations both short term and long term to participating trainees.

Needs Assessment for this Project:

Gaps in education of trainees during this pandemic have been recognized as a stressor for trainees, for program directors, and as an issue for governing bodies such as the Accreditation Council for of Graduate Medical Education (ACGME). Current guidance to program directors is that decisions on competency will be left to the individual program:

Topic:	Resident/Fellow Successful Completion of Education/Training
Guidance:	<p>A resident/fellow may not complete all of the planned experiences in the curriculum. The decision to graduate a resident/fellow is made by the program director, with input from the Clinical Competency Committee, based on that individual's ability to perform the medical, diagnostic, and/or surgical procedures considered essential for the area of practice.</p> <p>The determination for a resident/fellow to graduate as previously scheduled can be made even if the curriculum as originally planned is not completed. However, an extension of the educational program/training may be necessary if the program director determines that an individual is not fully ready for autonomous practice.</p>

Given that IBD management is an outpatient experience that will be missed during this pandemic, there is a need for verified educational activities designed specifically with trainees in mind. In particular, there is a need for case discussion and interactivity amongst fellows, which was previously a part of a routine IBD curriculum. We propose to meet this need via a novel, longitudinal curriculum, the infrastructure for which we have already piloted in the southeastern United States. In a survey pre-dating the COVID-19 pandemic, co-authored by a member of the UNC IBD center, a needs assessment was performed of gastroenterology providers on gaps in knowledge.⁵ The results demonstrated that the areas of greatest need included: prescribing medical cannabis (if approved locally) for pain management (62%); caring for patients with prior malignancy (35%); caring for pregnant patients and family planning (33%); caring for elderly patients (30%); and therapy decisions, including use of JAK inhibitors (29%), drug holidays (25%), and use of biosimilars (24%). More than 50% of respondents stated they do not participate in shared decision-making, citing time as the most common limiting factor. The majority of providers cited live education as their preferred learning format, and they wish to earn continuing medical education (CME) hours. Therefore, this needs assessment melds perfectly with the objectives, goals and design of our longitudinal, live virtual program. We will provide CME credit and sustained interaction with faculty for reinforcement of the concepts introduced each week.

Target Audience:

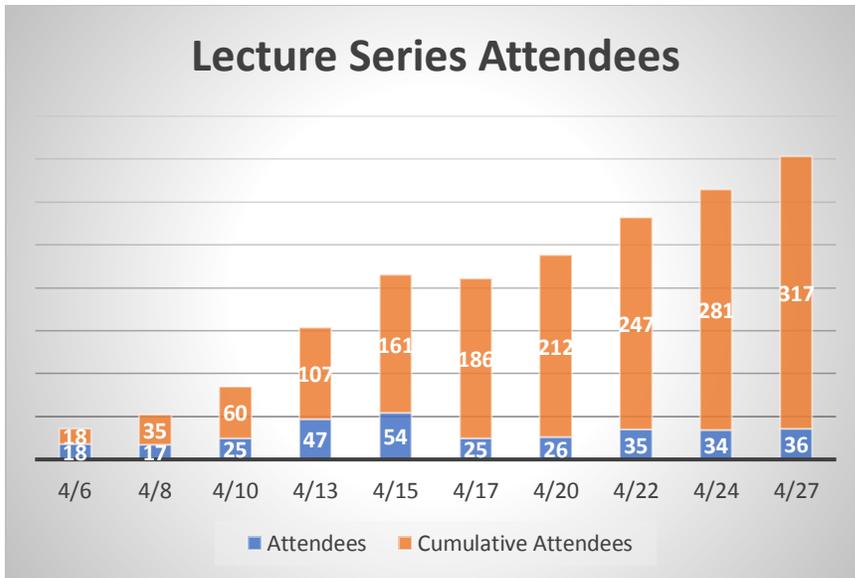
The target audience for this program includes trainees across the US, with a particular focus on the southeast. As COVID-19 impacts are felt across the country, effective social distancing has lengthened the timeline of impact. While this equates with improved access to intensive care unit (ICU) and hospital beds for the critically ill, it corresponds with a much longer impact on trainees in specialties such as gastroenterology and hepatology. Much of the traditional education in gastroenterology is done in outpatient clinics and endoscopy suites. Therefore, we have targeted the training programs in the southeastern United States with this grant. We have also piloted a similar platform during the months of March and April, with only participants from the state of North Carolina. If granted, this award would allow us to expand these offerings across the US with appropriate advertisement on fellowship program directors' listserves, state medical society email groups, targeted mailings to program directors, and social media. With this advertisement ability, we expect to have 300-500 individual participants in our curriculum, with weekly participation rates of approximately 150. While designed for trainees, all providers will be welcomed, and the content will also be applicable for advanced providers across the area who may be missing active involvement in outpatient settings during this time as well. With no advertisement, our pilot educational series reached a total of 317 participants (approximately 30 participants per session over 10 sessions).

Project Design and Methods:

The project will use a series of nationally-renowned faculty to develop specific lecture content addressing trainees' needs. The program will be implemented by the Division of Gastroenterology and Hepatology at the University of North Carolina at Chapel Hill – a trusted name recognized by program directors across the country for educational excellence and cutting-edge research. Our pilot curriculum boasts participation from fellows at five different programs, encouraged by their program directors, and the distribution list continues to grow by the week.

For this project, the lectures will be delivered live, and each lecture will be moderated by one of the course directors. Questions from attendees will be posed to the speaker in real time. To adequately address any questions not answered during the presentation, links will be posted on our website with detailed responses. Individual participants will also be provided with the opportunity to submit cases for community discussion. In our pilot programs, there were a wide range of submitted questions for each presentation, from 10 to upwards of 50. Figure 1, below, shows the number of participants for each of these pilot sessions.

Figure 1:



The pilot series was not specific to IBD, and allowed us to modify the curriculum based on feedback from attendees (such as providing more time for discussion, recruiting a presenter from a particular subject area, allowing for case submission, answering all submitted questions that were not addressed during the program, and providing opportunities for discussion across fellowship programs, not only within them). Additionally, with this grant, we will be able to engage learners via a novel virtual education technique - Project Echo®.



Project Echo® is a methodology to connect providers virtually and engage them in a learning network and community of practice. Its implementation has been linked to improved outcomes and standardization of treatment for a number of other disease states, such as hepatitis C and chronic opioid management. We will schedule an interactive case-based teleECHO™ clinic the same week as the virtual presentation. The Project ECHO®

approach has a proven track record of translating knowledge into practice and improving patient care. MAHEC has robust experience with Project ECHO® and the expertise to run these platforms, which makes them a crucial partner and collaborator for the success of this project.

The content areas of the prior needs-assessment will be directly addressed through the design of this longitudinal curriculum. Our methodology allows for a greater retention of

knowledge for trainees through its basis in proven pedagogical techniques. The following educational methods will be utilized to ensure optimal retention.

Educational Methods / Pedagogy

1. Specific learning objectives with a pedagogical focus on problem-based learning
 - a. Problem-based learning theory is based on the idea that “realistic, complex, and ill-structured problems are used to stimulate learners to actively construct knowledge”⁶, and that small group discussions are an essential part of this process (addressed with method number 4, below).
 - b. Objectives for the program as a whole will be addressed over a series of 12 sessions to ensure appropriate breadth for each topic.

2. Telling a story
 - a. Human brains are wired to look for meaning through patterning, which is crucial for assimilation of information – ideally, information should be presented in a way that allows learners to extract these patterns. Research indicates that emotions are critical to the development of brain patterning and retention of information.⁷
 - b. All teleECHO™ clinics following the weekly presentation will be case-based, and participants will be encouraged to share their own (de-identified) case experiences with patients.

3. Testing and re-testing (routinely quizzing participants)
 - a. Repeat testing is a proven method for retention⁸, and post-test feedback results in better retention than testing alone⁹.
 - b. Research indicates that a delay between when the information is initially provided and the point of testing has an improved effect on retention¹⁰, thus, we will test concepts covered during one week’s session at the start of the following week’s session and provide immediate feedback.

4. Encouraging active participation and social engagement through discussion
 - a. We will encourage digital interaction, submission of cases and questions, as well as interactive participation with a faculty mentor in a Project ECHO® teleconference session.
 - b. Many of the lecturers in our pilot program have presented interactive material that requires participant feedback, such as on-topic DDSEP questions, or photo identification of certain conditions (e.g., types of polyps and whether they are likely to be cancerous). The inclusion of these methods and has been met with enthusiasm and positive feedback from participants.

- c. According to a meta-analysis, “learning is best supported when the student is engaged in active, meaningful exercises via technological tools that provide cognitive support”.¹¹
5. Repetition and reflection for retention – this longitudinal curriculum will build on prior sessions, and the teleECHO™ clinic each week will be based on the virtual presentation content.
 - a. Covering the information through two different modalities – a lecture-based virtual session as well as a Project ECHO® teleconference with other learners will reinforce the content, but also provide multiple avenues for exposure to the material.
 - i. “Because memories are located in several parts of the brain, a variety of instructional techniques should be used to assist in the laying down of several neural pathways.”¹²
6. Apply the learning to the real world
 - a. We will utilize case scenarios with a focus on problem-based learning, which will prepare them for application in their future practice settings
 - b. We will also be measuring “intention to change practice” and “impact of this training” among attendees.
7. Each presentation will be structured for optimal retention and learning efficacy
 - a. We will conclude each virtual lecture with review and summarization of key concepts, including a mental model infographic that will ensure learners have an accurate understanding of the novel information
 - b. The mental model infographic will be consistently developed across all presentations, will be available in enduring materials, and shared via social media
 - c. Research suggests that adults require a break for about every 20 minutes of focused attention in order to consolidate new information¹². As such, we will incorporate breaks for questions and practice of the new information before moving on to review and reinforcement of the material.
8. For the enduring content, we will guide participants through with text bubbles and avatars as appropriate, mimicking the live interaction format as best possible.

Innovation

University of North Carolina at Chapel Hill has a longstanding tradition of excellence in education. UNC was the first public university in the nation and the only public institution to award degrees in the 18th century. Over the course of the last two centuries, this

educational mission has dramatically expanded. UNC is known as a trusted leader across disciplines, including medicine. UNC is home to 2 Nobel laureates in medicine. UNC's Division of Gastroenterology and Hepatology has followed in these footsteps of excellence, a leading center in clinical and basic research. The IBD Center at UNC, originally developed in the 1990's, provides care for over 5,000 patients with IBD. This multidisciplinary center is comprised of IBD gastroenterologists, colorectal surgeons, a social worker, a psychologist, a nutritionist, ostomy nurses, research coordinators, and IBD nurse coordinators. The center also offers over 30 different clinical trials and registries to our patients. It is home to federally-funded, foundation-funded, and industry-funded researchers in nearly every therapeutic arena of IBD. In addition to training a total of 15 general fellows in gastroenterology and hepatology each year, the center has a longstanding history of providing training in advanced IBD to 1-2 fellows after completion of general GI training. These advanced IBD fellows have joined academic practices throughout the country, from participation in established IBD centers to development of a new IBD center at their respective new institutions: (<https://www.med.unc.edu/medicine/gi/education/advanced-inflammatory-bowel-disease-fellowship/>). The UNC IBD Center also has experience offering annual provider CME education events for >10 years as well as patient education events annually in conjunction with the Crohn's and Colitis Foundation. The course director, Dr. Millie Long, is also the course director for the successful Advances in IBD Conference, held annually in December in Orlando, FL. The educational objectives for this virtual course are informed by the feedback from this conference with upwards of 2,000 participants annually. This storied history in IBD clinical care, research, and education, along with the accomplished educational leadership of Dr. Long and Dr. Herfarth allows for ongoing innovation in IBD education. The proposed innovative of a longitudinal virtual curriculum meets the needs of providers across the country.

This project builds upon prior pilot work at UNC with a virtual, general GI educational series. This pilot series was implemented in March 2020 to enhance the educational curriculum of fellows on reserve status at home. As described by one of UNC's fellows, "It is clear that UNC GI has invested in the education of trainees, providing even more education content than prior to COVID-19," – Sonia A. With this innovative project, we plan to further enhance the education of all trainees whose standard curriculum has been interrupted by COVID19.

These pilot data demonstrate that our virtual program is feasible, scalable, and that even with only word of mouth, has excellent participation.

Evaluation and Outcomes

CME credit will be provided for all participants over each session. We will measure time logged on to the program to ensure participation throughout the entire session. Additionally, we will perform a pre- and post-test for each session, allowing us to capture gains in knowledge specific to the learning objective. We will also circulate faculty and

content evaluations to participants after each session, allowing for real-time changes to subsequent programs.

We will specifically measure the gap addressed for the target groups (each provider will also self-describe his or her practice type in the pre-test, whether they are a fellow, a nurse practitioner, or a gastroenterology provider in community or academic practice). We expect pre-test correct answers to range from 50-70% depending on individual topic discussed, with an improvement in scores to the 70-90% range post- test. We will compare post data with baseline data from the same individual, so that factors outside this project do not influence the outcomes. Full engagement will also be measured by the number of “chat questions” typed by participants, the submission of cases, and the hits to our website where content is stored, and answers to questions will be posted.

Additionally, at the conclusion of the program, we will specifically measure the intention to change practice generated by our curriculum, in addition to the impact of this virtual training. We hope to generate lasting connections amongst faculty mentors and trainees, as well as amongst the trainees themselves.

Project ECHO® also provides its partners with evaluation materials, which we will utilize as a part of our measurement efforts as well.

Dissemination Plan

The lecture series will be recorded and posted on our website for enduring use. We will also post answers to all questions posed during each lecture of the series. Additionally, we will provide the ability to pre-submit cases to discuss with faculty during the teleECHO™ clinic component of the program each week. Our education program manager will publish a mental map or infographic focused on the key concepts from each lecture in the series. These infographics will be posted online on our website, and will also be shared on social media for broader consumption and advertising of the enduring series.

Example infographic on the impact of IBD on young people:

THE IMPACT OF IBD ON YOUNG PEOPLE



Anticipated Project Timeline

We propose starting this 12-part series as soon as funding is provided, so that this can continue throughout the summer, when many trainees will still be on modified educational schedules due to COVID-19. (Potential date range: June 15 – September 11, 2020, or as soon as funding is made available).

Additional Information

We feel that UNC is uniquely situated to launch this educational initiative targeting fellows in gastroenterology, with a trusted name in education, outstanding faculty, and **one of the few institutions to immediately launch virtual content during COVID-19 as a pilot.**

Proposed Faculty Include:

Millie D. Long MD, MPH University of North Carolina at Chapel Hill, *Course Director*

Hans H. Herfarth MD, PhD University of North Carolina at Chapel Hill, *Co-Course Director*

Kim Isaacs MD, PhD University of North Carolina at Chapel Hill

Michael D. Kappelman MD, MPH University of North Carolina at Chapel Hill

Edward Barnes MD, MPH University of North Carolina at Chapel Hill

Animesh Jain MD University of North Carolina at Chapel Hill

Jonathan Hansen MD, PhD University of North Carolina at Chapel Hill

Bharati Kochar MD, MSCR Massachusetts General Hospital, Boston MA *Elderly IBD

Alfred S. Barritt MD, MSCR University of North Carolina at Chapel Hill, *Liver Center

Raymond Cross MD University of Maryland *federally funded researcher in telemedicine

David Rubin MD, University of Chicago *UC guidelines author

Uma Mahadevan MD, University of California- San Francisco *pregnancy and IBD

References:

1. Arora S. Project ECHO: democratising knowledge for the elimination of viral hepatitis. *Lancet Gastroenterol Hepatol* 2019;4:91-93.
2. Page K, Qeadan F, Qualls C, et al. Project ECHO Revisited: Propensity Score Analysis And HCV Treatment Outcomes. *Hepat Med* 2019;11:149-152.
3. Struminger BB, Arora S. Leveraging Telehealth to Improve Health Care Access in Rural America: It Takes More Than Bandwidth. *Ann Intern Med* 2019;171:376-377.
4. Crisanti AS, Earheart JA, Rosenbaum NA, et al. Beyond crisis intervention team (CIT) classroom training: Videoconference continuing education for law enforcement. *Int J Law Psychiatry* 2019;62:104-110.
5. Malter L, Jain A, Cohen BL, et al. Identifying IBD Providers' Knowledge Gaps Using a Prospective Web-based Survey. *Inflamm Bowel Dis* 2020.
6. Bridges, S., Chan, L. K., & Hmelo-Silver, C. E. (Eds.). (2016). *Educational technologies in medical and health sciences education*. Dordrecht, The Netherlands: Springer.
7. Caine, R. N., & Caine, G. (1990). Understanding a brain-based approach to learning and teaching. *Educational leadership*, 48(2), 66-70.
8. McDaniel, M. A., Anderson, J. L., Derbish, M. H., Morrisette, N. (2007) Testing the testing effect in the classroom, *European Journal of Cognitive Psychology*, 19:4-5, 494-513
9. Karpicke, J.D., Roediger, H.L. Is expanding retrieval a superior method for learning text materials?. *Memory & Cognition* **38**, 116–124 (2010).
10. Roediger, H., & Karpicke, J. (2006). The Power of Testing Memory: Basic Research and Implications for Educational Practice. *Perspectives on Psychological Science*, 1(3), 181-210.
11. Schmid, R. F., Bernard, R. M., Borokhovski, E., Tamim, R. M., Abrami, P. C., Surkes, M. A., Woods, J. (2014). The effects of technology use in postsecondary education: A meta-analysis of classroom applications. *Computers & Education*, 72, 271–291.
12. Dwyer, B. M. (2002). Training strategies for the twenty-first century: Using recent research on learning to enhance training. *Innovations in Education and Teaching International*, 39(4), 265-270.

Proposed agenda:

Dates	Webinar Title	Speaker
July 7 & 9	Epidemiology of Ulcerative Colitis	Michael D. Kappelman MD, MPH University of North Carolina
July 14 & 16	Mild to Moderate Ulcerative Colitis	Hans H. Herfarth MD, PhD University of North Carolina
July 21 & 23	Moderate to Severe Ulcerative Colitis	Kim L. Isaacs MD, PhD University of North Carolina
July 28 & 30	Extraintestinal Manifestations of Inflammatory Bowel Disease	Jonathan Hansen MD, PhD University of North Carolina
August 4 & 6	Health Maintenance and Prevention in Inflammatory Bowel Disease	Millie D. Long MD, MPH University of North Carolina
August 11 & 13	Pregnancy in Inflammatory Bowel Disease	Uma Mahadevan MD University of California, San Francisco
August 18 & 20	Management of Acute Severe Ulcerative Colitis	Edward L. Barnes MD, MPH University of North Carolina
August 25 & 27	Management of Liver Disease Associated with Inflammatory Bowel Disease	A. Sidney Barritt MD, MSCR University of North Carolina
September 1 & 3	Guidelines for the Management of Ulcerative Colitis	David Rubin MD University of Chicago
September 8 & 10	Telehealth in Inflammatory Bowel Disease: The New Frontier	Raymond Cross, MD, MS University of Maryland
September 15 & 17	A Focus on Elderly Patients with IBD: Role of Comorbidities and Malignancies	Bharati Kochar MD, MSCR Massachusetts General Hospital
September 22 & 24	Personalized Therapy in Ulcerative Colitis: What's on the Horizon?	Animesh Jain MD University of North Carolina