VCLIC

VANDERBILT CLINICAL INFORMATICS CENTER

VCLIC ANNUAL REPORT

2021-2022

DIRECTOR'S WELCOME

ADAM WRIGHT, PhD
VCLIC Director
Professor of Biomedical Informatics

Welcome to the VCLIC 2021-2022 annual report! It was a great year for VCLIC, and I'm so grateful for your participation and support of our center. Our second year gave us a chance to grow our community, pave new roads at the medical center, and offer new initiatives, including our first hackathon. It was also exciting to see the work you, our members, did — we set presentation records for several conferences, and had 275 member publications in leading informatics, medical, and quality and safety journals. We offered our broadest range yet of educational programs, including workshops, lectures, a semester-long course, and electives for medical students and residents. We also kicked off the VCLIC Core, which gives researchers the ability to purchase informatics services for a predictable cost, with certainty that they'll be able to get their funded research work done in a timely fashion. As always, VCLIC is looking for new ideas and ways we can improve informatics research and practice at VUMC. Please stay in touch and share your ideas — we are grateful for your partnership and looking forward to reaching even greater heights together in our third year!

VCLIC BY THE NUMBERS

67
Members

12
Departments Represented

19
AMIA Fellows

275
Member Publications

47
AMIA Symposium, AMIA CIC, and Epic XGM Presentations

14
Educational Programs

84
Core Requests Received

16
VDAWGs Participants

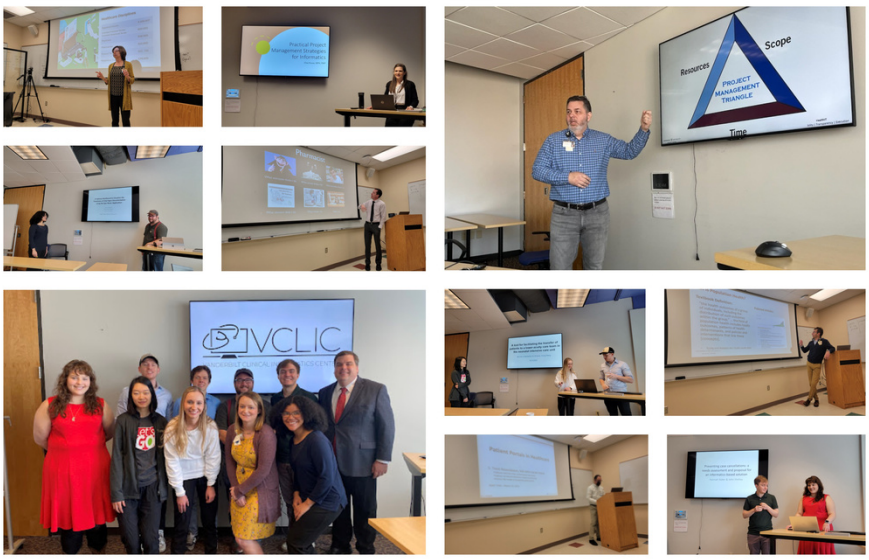
EDUCATION

This year, VCLIC chose to focus on innovative care delivery models for mental health, and many of our educational activities, including our monthly seminars, hands-on workshops, and even our hackathon event centered around this theme. We did also sneak in a few events that focused on hot topics in informatics more broadly.

Thank you to all of our amazing presenters: **Cheryl Cobb, MD**, "Innovative Care Delivery Models for Mental Health"; **Colin Walsh, MD, MA**, "Vanderbilt SafeCourse: Multidiscplinary Informatics to Prevent Suicide"; **Dean Sittig, PhD,** (UTHSC-H), "Simple Steps for Safer EHRs"; **Natalie Benda, PhD**, (Weill Cornell), "Does an age limit exist? Facilitators and challenges to incorporating technology into mental health treatment for older adults"; **John Torous, MD, MBI**, (BIDMC), "Beyond Telehealth: Advances in Digital Mental Health Research and Practical Clinical Considerations for Smartphone Apps in Care"; **David Marcovitz, MD**, and **Scott Schepers, PhD**, (Pear Therapeutics), "Motivational Enhancement Therapy (MET) to Support Adoption of Digital Therapeutics in a Low Threshold Bridge Clinic"; **Karandeep Singh, MD, MMSc**, (University of Michigan), "Bringing Machine Learning Models to the Bedside"; **Charleson Bell, PhD**, and **Deanna Meador, MA**, "The Biomedical Innovation Continuum at VU and VUMC"; and finally, **Valentin Tablan, PhD**, (ieso health), "Using Artificial Intelligence to Improve Mental Health Care."

In addition to our monthly speaker series, we held several hands-on workshops, including "Epic for Non-Clinicians," given by **Aileen Wright, MD, MS**, and **Allison McCoy, PhD**; "Data Resources and Analytics in Mental Health: Basics," given by **Allison McCoy, PhD**, and **Bryan Steitz, PhD**; "Data Resources and Analytics: Intermediate," given by **Bryan Steitz, PhD**, and **Sanjay Mishra, PhD**; the "App Design Workshop," given by **Tom Reese, PharmD, PhD** and **Megan Salwei, PhD**; and the "FHIR App Building Workshop," given by **Tim Coffman** and **Simeon Hearring** of VUMC HealthIT.

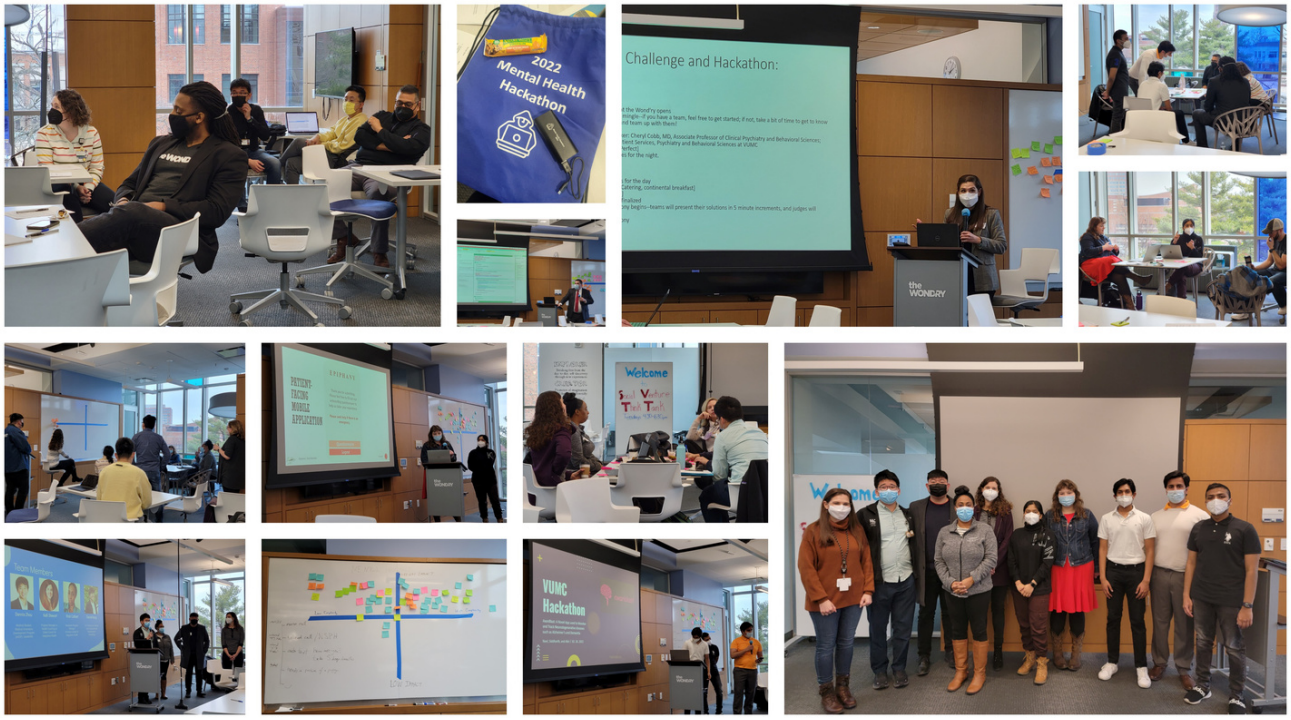
In spring semester, VCLIC leaders **Adam Wright, PhD**, and **Allison McCoy, PhD** offered **BMIF 7340: Clinical Informatics**. This course covered a range of topics in clinical informatics, including EHRs, departmental systems, patient computing, nursing, terminology, standards, clinical decision support, population health, leadership, and project management. Students in the course partnered with clinical departments and HealthIT teams to analyze a current clinical problem and design a solution to it. The course received strong feedback, and we are looking forward to teaching it again next spring.



MENTAL HEALTH HACKATHON

On February 25th and 26th, 2022, the Vanderbilt Clinical Informatics Center held its inaugural Innovation Challenge and Hackathon. Hackathons provide a space for groups of people from diverse backgrounds to come together and creatively problem solve, usually in a condensed period of time (like a weekend). VCLIC's 2021-2022 theme was "Innovative Care Delivery Models for Mental Health," and as such, this event centered on a mental health theme.

Groups of participants with backgrounds as diverse as undergraduate freshmen engineers, MIDP students, DBMI students, VUMC project managers, and nurses from the Osher Integrative Health Clinic, came together and developed novel applications (or wire frames) with the help of VCLIC Member Mentors, who staffed the event to provide clinical, technical, and informatics input as the teams worked toward their solutions. **Cheryl Cobb, MD** delivered a fantastic keynote address that helped the teams to focus their work. At the conclusion of the event, the teams had seven minutes to pitch their work to a panel of judges, including **Neal Patel, MD, MPH**, Chief Information Officer, VUMC; **Cheryl Cobb, MD**, Associate Professor of Clinical Psychiatry and Behavioral Sciences, and Medical Director of Outpatient Services for Psychiatry and Behavioral Sciences; and **Charleson Bell, PhD**, Director of Biomedical Innovation, Biodesign, and I-Corps for the Wond'ry.



The atmosphere of the hackathon was inspiring, and we think both the teams and mentors learned a lot through their participation! We were impressed to see the final products of the weekend's work and look forward to continued partnerships with participants across VU and VUMC. **Thank you so much to all the Mentors who helped make this event a success: Adam Wright, PhD; Allison McCoy, PhD; Peter Shave, MBA; Tom Reese, PhD; Bryan Steitz, PhD; Jon Wanderer, MD; Donnie Sengstack, MS; Patty Sengstack, DNP; Alvin Jeffery, PhD; Dara Mize, MD; Cheryl Cobb, MD; Zhiyu Wan, PhD; Chao Yan, PhD; Eboné Ingram, MD; Reid Finlayson, MD; Sara Horst, MD, MPH; Shelagh Mulvaney, PhD.**

MENTAL HEALTH HACKATHON: WINNERS

1st Place: Team Bridger
Dennis Zhou, Daniel Kang, Ricki Calbert, and Kelli Stewart, pictured right
We sought to address the problem of patients with mental health challenges feeling unequal in the physician-patient power dynamic and the lack of follow-up between clinic visits/hospital discharges. Our solution was to create a MHAV chatbot that can engage with patients before but especially after visits. The chatbot utilizes natural language processing to interact with the patient using motivational interviewing precepts. This way, the chatbot could triage problems that patients are facing and create a symptom score history/tracker for the patient that populates directly on the EPIC dashboard for provider review. The chatbot could also alert healthcare teams of complex patients who may need additional support and/or patients with rapidly deteriorating mental health symptoms. We would like to thank the Osher Center for Integrative Health, Medical Innovators Development Program, and the Wond'ry for resources and training.

2nd Place: Team Zany Zebrafish
Hannah Slater, Seth Smith, and Pragnya Adapa, pictured top left
Team Zany Zebrafish pitched a mobile app that identifies people with high suicide risk using machine learning by passively collecting data from their smart devices (phones, watches, etc.), electronic health record, and optional patient-reported outcomes. Based on the risk stratification of the user, the app encourages the patient to engage in mitigative behavior such as going for a walk, notifies an external contact such as a loving family member, or notifies their healthcare provider to contact the patient. This app allows healthcare providers the ability to identify high risk patients by better understanding patient behavior outside the clinic.

3rd Place: Team AxonBlast
Neelesh Raj, Siddharth Shah, and Tahsinul Abir, pictured bottom left
Over 55 million people around the world are currently suffering from a neurodegenerative disease, and this number is slated to reach over 140 million by 2050. Our group developed AxonBlast, an online platform that monitors mental decline over time and provides engaging activities to ensure that the brain stays active in a patient's elderly years. Currently, the app tracks memory through quizzes that contain a mix of personalized questions about the patient's family, as well as general knowledge questions. We propose that this diagnostic quiz, combined with other future features such as flashcards, crossword puzzles, and other personalized hobbies, can be used by the patient to ensure daily mental stimulation. Working with hospitals, this app can be used by physicians to track memory scores and serve as a tool to guide medical action while allowing the patient to stay sharp.

SELF-SERVICE PROGRAMS

VDAWGs

The Vanderbilt Database Access Working Group (VDAWGs), which VCLIC administers, provides a pathway for faculty to access VUMC's Clarity data warehouse and a community for exchanging ideas and techniques for data science. VDAWGs attend Epic training and apply for participation through VCLIC. At the end of our first year of operation, we have 16 participants.

Benefits of Participation in VDAWGs

- Ready access to EHR data
- Ability to easily conduct meaningful research and QI Projects
- Guidance on how to set up your access and system
- A community of like-minded individuals with similar skills and interests
- A query repository to review for help

Physician Builder Program

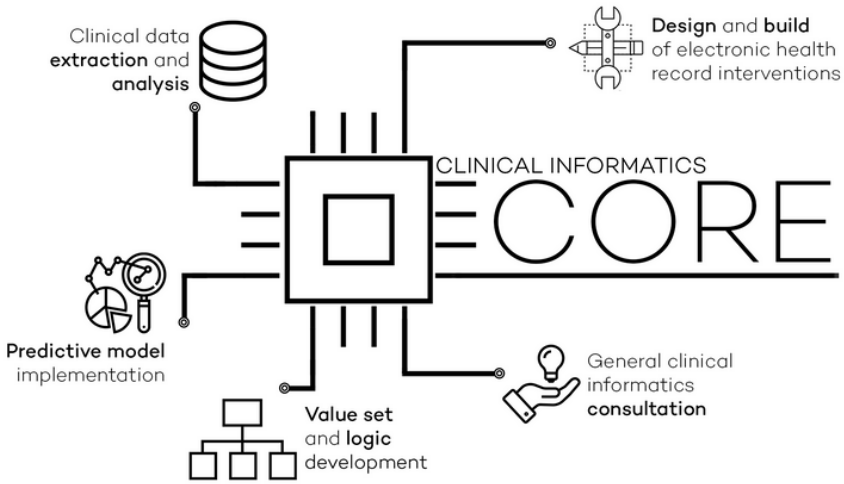
The eStar Physician Builder Program supports VUMC physicians and other employees in devising and implementing new content and tools for VUMC's health IT system, eStar. The program is directed by **Jonathan Wanderer, MD**, professor of Anesthesiology and Biomedical Informatics and medical director of Perioperative Informatics at VUMC.

VUMC's Physician Builder program has 83 participants. According to Epic, this is the second largest program of all their clients, and VUMC has the highest participation rate of any Epic Physician Builder program.

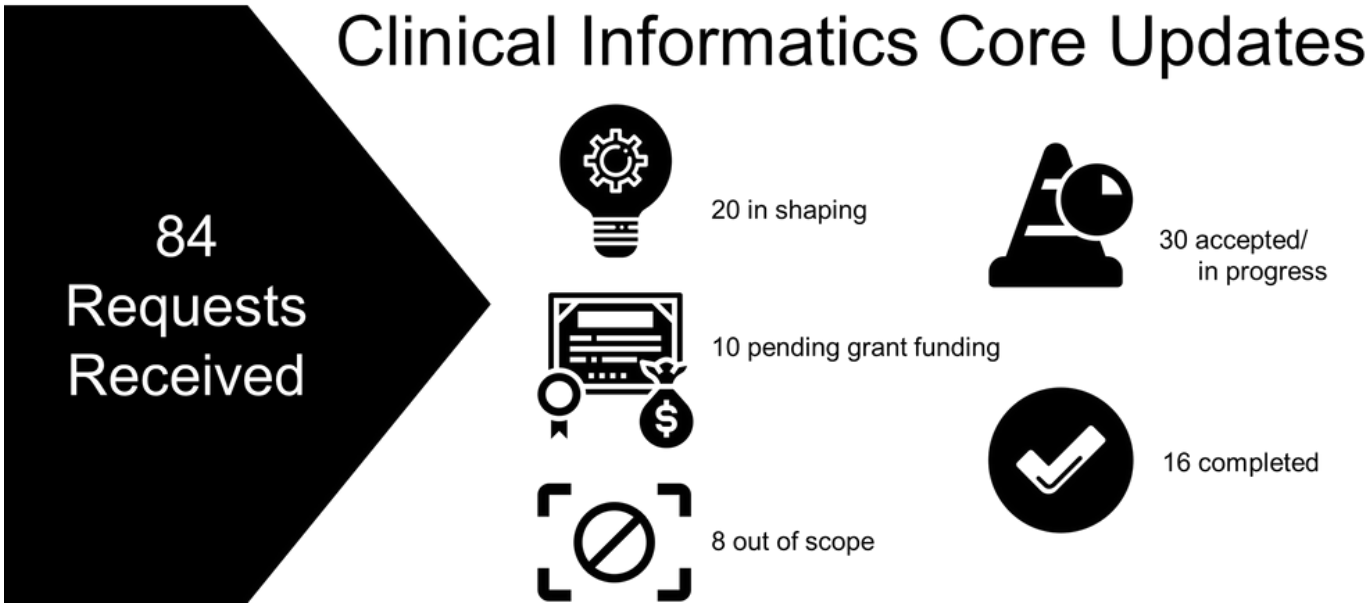
For the second year, VCLIC has helped the Physician Builder Program recognize two Builders who have contributed significant and impactful service through work that develops and/or supports operational usage of eStar.

This year's awardees are **Sara Horst, MD, MPH**, and **Barron Patterson, MD**.

CLINICAL INFORMATICS CORE



The mission of the Clinical Informatics Core is to enable Vanderbilt University Medical Center researchers to design and implement electronic health record (EHR)-related tools, functionalities, and interventions with input and assistance from clinical informatics experts, as well as to gain access to and analyze EHR-based data. The Core is directed by **Allison McCoy, PhD,** and supported by project manager **Elise Russo, MPH, PMP,** and analyst **Donnie Sengstack, MS.**



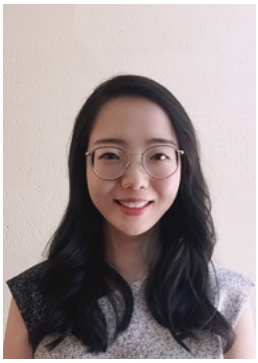
"My request was completed very quickly and when I asked for slight adjustments, this was also done the same day. It helped to guide my research and I am incredibly grateful for this service."

"I love VCLIC! The data I need for research is NOT easy to obtain without VCLIC, and in fact, I have found other ways to obtain the kind of data I need at a very high cost (10x the cost!) so I'm very happy to have found VCLIC. I have already shared this resource with many others!"

PROJECT SPOTLIGHTS

14% of patients at VUMC have a penicillin allergy documented. People often think that allergies are for life, but the reality is that many patients outgrow these allergies, and many penicillin allergies aren't really allergies at all. An incorrect penicillin allergy causes patients to receive alternative antibiotics which may be less effective or have more side effects. **Cosby Stone, MD,** from allergy worked with VCLIC leaders **Allison McCoy, PhD,** and **Adam Wright, PhD,** to develop a toolkit for removing low-risk penicillin allergies. VCLIC built a patient list of all patients admitted to VUMC with penicillin allergies, which guides pharmacists through a risk stratification process, and supports giving a challenge dose of amoxicillin to appropriate patients. The vast majority of patients so far have passed their amoxicillin challenge, and had their allergy removed from the chart. They then get a letter and a wallet card to show all their other doctors and providers that they don't need to keep their penicillin allergy anymore.

Dara Mize, MD, has led an effort with VCLIC members and informaticists (**Aileen Wright MD, MS; Ashley Spann, MD, MSACI; and Casey Distaso, MD**) alongside departmental leads **Ed Shackelford, MD,** and **Nate Miller, MD,** to implement AgileMD pathways, an EHR-integrated clinical decision support tool, into the adult emergency department and outpatient walk-in clinics. The goal of this effort is to assist providers with accessing orders, using risk stratification calculators, and adhering to up-to-date practice guidelines for high yield chief complaints. The team has developed flowchart-style pathways for common scenarios such as chest pain, opioid use disorder, cellulitis, and upper respiratory infections, which providers can order from. They look forward to expanding the initial launch of this product throughout VUMC by adding additional pathways to streamline provider workflows.



VCLIC member **Siru Liu, PhD,** developed an explainable machine learning-based tool to predict new-onset delirium in the ICU. Siru's project was selected for the 2022 AMIA Artificial Intelligence Showcase. Over the course of the project, Siru developed a highly-accurate model using EHR data (AUC =0.927) and then worked with the VCLIC core to develop a new patient list in Epic which provides delirium prediction, as well as detailed explanations, to users. Siru also conducted user-centered design research and evaluation with clinical partners in our ICUs to make sure the tool was usable and effective. The tool has been deployed as part of a pilot test at VUMC, and Siru will continue evaluating it.