VCLIC

VANDERBILT CLINICAL INFORMATICS CENTER

VCLIC ANNUAL REPORT

2023-2024

DIRECTOR'S WELCOME

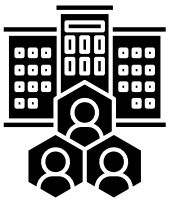
Adam Wright, PhD
VCLIC Director
Professor of Biomedical Informatics and Medicine

The magic of VCLIC comes from our incredible community, our close relationship with HealthIT and our ability to get “hands on” with data and our EHR to make care better at VUMC. This year, more than ever, we are seeing the fruits of our collaborations with HealthIT and our clinical departments as we've delivered research and innovation that has improved care at Vanderbilt and beyond, while generating new and impactful knowledge and training the next generation of clinical informatics leaders. This year, several of our junior faculty received career development awards which will accelerate their path to independence, and our senior researchers received many grants as well.

In 2023-2024, we also started to see the impacts of large language models (LLMs) and clinical AI. Our members published some of the most exciting work in these areas, taking advantage of VCLIC infrastructure like our clinical informatics core, physician builder program and VDAWGS data access program. We also doubled the number of VCLIPS videos we offer, and saw thousands of views – if there's a topic you're interested in, see if we have a video for it, and if you have a skill to share, please help us make more! We've also welcomed several new VCLIC members and faculty, and expect continued growth in the next academic year. Thanks for all you do in advancing our mission to make care better at Vanderbilt through clinical informatics, and to ensure that everyone at VUMC has access to the tools, systems and data they need to make a difference. Our greatest privilege is to support your work, so please reach out if I, or our team, can help you in any way!

VCLIC BY THE NUMBERS

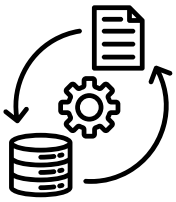
86 MEMBERS



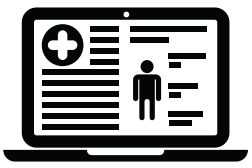
26 DEPARTMENTS REPRESENTED

310 MEMBER PUBLICATIONS

91 PHYSICIAN BUILDERS



22 VDAWGS



88 CORE REQUESTS

2538 VCLIPS VIEWS

INFORMATICCON 2023

This year InformaticCon returned! We again featured 8 lightning talks and held a poster session with 29 presenters. We also added a panel on how to get involved in Clinical Informatics at Vanderbilt over the lunch hour! 130 people attended the event this year, making this our largest event yet!

An archive of InformaticCon talks and presentations can be found on our website: vumc.org/vclic/informaticcon-fall-2023

Our Lightning Talk presenters and topics include:

- **Barron Patterson** – Going Paperless "Plus": Using Electronic Questionnaires to Improve the Quality of Well-Child Care
- **Mollie Boland & Angie Lockridge** – Getting on the Right Track: Developing a New Model to Engage End Users
- **Parker Evans & Joseph Vento** – Epic-Based Tool for the Improvement of Preoperative High Risk Patient Screening
- **Connor Hartzell** – "Are My Blood Products Coming?" A Novel Blood Tracker in Our Electronic Medical Record
- **Gwen Holder** – Decreasing Sliding Scale Insulin Alert Fatigue by 66%
- **Alvin Jeffery** – Customizing EHR Interfaces to Support Diverse Settings, Users, & Workflows
- **Brent Moseng** – Beyond the Classroom: Clinician EHR Efficiency Efforts Never Stop
- **Kathy Moss** – Leveraging Virtual Care Technology to Sustain New Models of Care

VCLIC PRACTICAL SHORTS (VCLIPS)

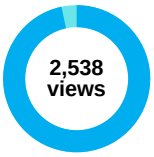
Our VCLIPS Library has continued to grow this year!

This academic year, we added:

- Using Epic to Support Clinical Research (**Eddie Qian, MD**)
- Signal Data (**Sean Huang, MD**)
- Address Geocoding (**Bryan Steitz, PhD**)
- Exempt IRB Research (**Elise Russo, MPH**)
- Agile Methods for Leading a Clinical Research Team (**Alvin Jeffery, PhD**)
- Medication Data Tools (**Joey LeGrand, PharmD, MS**)
- Patient Reported Outcome Measures **(Justin Bachmann, MD; Emily Burnell; Emma Barnes, MPH**)

The videos are available on the VCLIC website, as well as our internal Confluence. We've seen great uptake, with over 2,500 views and hundreds of hours of watch time:

Top Sources

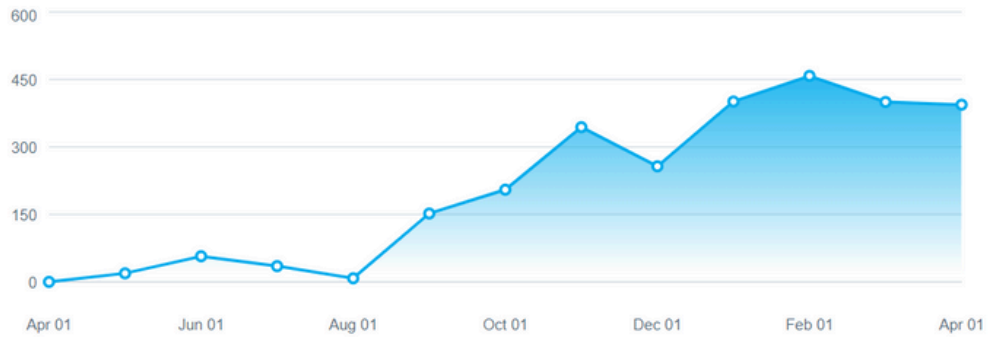


Source	Views
vumc.org	2,454
confluence.app.vumc.org	84

Total time watched
9 days, 1 hour, 10 minutes, 55 seconds

Average view duration
5 minutes, 8 seconds

Overview



Views
2,730
+2.6K% from previous 1 year

Impressions
38.1 K

Unique viewers
773

Top Regions

Location	Views
United States	2,259
Canada	71
India	63
United Kingdom	19
Israel	14
Other	112

Top Videos

	Views
Intro to eStar - Outpatient clinic visit demo - Part 1 (Uploaded Jan 13, 2023)	458
Introduction to BPAs (Uploaded Nov 2, 2022)	311
BPA Basics.mp4 (Uploaded Jan 6, 2023)	285

Please reach out to us if you have an idea for a new video – we always love to grow our collection!

EDUCATION

Clinical Informatics Course

In spring semester, **Adam Wright, PhD**, and **Allison McCoy, PhD** offered BMIF 7340: Clinical Informatics for a third year. This year's student projects included:

- Creating a Dashboard for Patient Questionnaires in Pre-Visit (**Hyunjoon Lee**, **Alison Carroll**, Mentor: **Sara Horst, MD, MPH**)
- Improving the pre-operative medication instructions process in the VPEC clinic: an assessment of needs and approaches (**Veronica Fraley**, **Nick Jackson**, **Matt Christensen**, Mentor: **Jon Wanderer, MD, MPhil**)
- Preventing Medication Overdoses: Dose Alerting and Novel Strategies (**Creea Shannon**, **Tianying Zhao**, Mentor: **Scott Nelson, PharmD, MS**)

Grand Rounds Speakers

VCLIC continued to host Department of Biomedical Informatics Grand Rounds speakers throughout the year. Thank you to all of our speakers, near and far!

Ethan Gershon, MD
"The EHR Vendor Viewpoint"

Craig Joseph, MD &
Jerome Pagani, PhD
"Designing for Health"

Siru Liu, PhD; Eddie Qian, MD, MS; Adam Wright, PhD; Dara Mize, MD
"Clinical Informatics Update"

Lindsey, Knake, MD, MS
"A Guide to Exploring Epic's Cosmos Universe"

MS-ACI

The **MS in Applied Clinical Informatics (MS-ACI)** program provides innovative clinical informatics education for working professionals in the health care field. If you are interested in applying or learning more, visit vu.edu/ms-aci or contact **Scott Nelson, PharmD, MS**.
This year's capstone presentations included:

- **Jay Patel, PharmD, MS-ACI** developed a chatbot prototype using a retrieval augmented generation (RAG) framework to answer drug information questions.
- **Eric Brown, MD, PhD, MS-ACI** worked on a critical gap by bringing structured optic nerve OCT interpretations into Epic.
- **Adam Broslat, MS-ACI** worked on the implementation of a Virtual Nursing Care Model, introducing technology-driven efficiencies.
- **Julie Bauml, MD, MS-ACI** built custom forms and other enhancements in Epic to streamline radiology imaging protocols.
- **Nick Goldsmith, PharmD, MHSA, MS-ACI** built a process to synchronize medication frequencies across the EHR and automated dispensing systems, enhancing patient safety.
- **Hanna Semega, PharmD, MBA, MS-ACI** researched how automated dispensing system alerts are designed across different health systems.

SELF-SERVICE PROGRAMS

VDAWGS

VCLIC continues to administrate the Vanderbilt Database Access Working Group (VDAWGs) Program, which has grown to include 22 participants this year. VDAWGs continue to move essential research and quality improvement initiatives forward using their Clarity, Caboodle, and/or Databricks access, and VCLIC continues to provide a community for these folks as they work.

During our monthly workgroup meetings, we have had several fantastic Query of the Month presentations this year, including topics like:

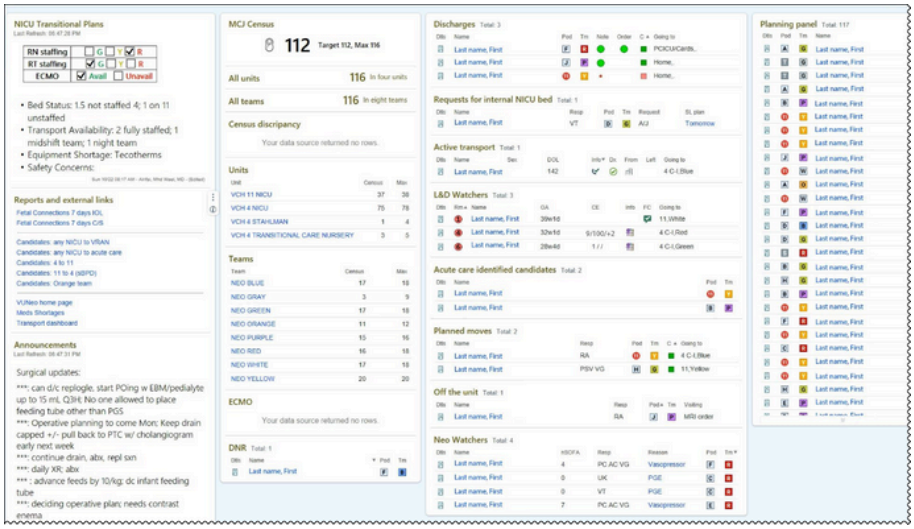
- Radiology data (orders, protocols and results)
- Using LLMs to support SQL query writing
- Advanced SparkSQL concepts, including time travel, common table expressions, set operations, plus DataBricks jobs and alerts
- Querying Epic's user access logs

PHYSICIAN BUILDER PROGRAM

The VUMC Physician Builder program continues to grow, with 10 new physician builders entering the program this academic year (totaling 91) and a number of clinicians who have started training. We continued our focus on creating a vibrant community of builders through sharing of best practices and group review of impactful projects. Over the course of the year, we had presentations from nursing, pharmacy, and cloud computing, and covered topics such as complex rule construction and advanced SmartForm scripting. News of our successful program is spreading widely, with organizations across the country asking for our advice about how they can start or grow their programs. Our builders gave numerous presentations at UGM, XGM and other conferences about their innovative work.

Epic recently made builder training more flexible and efficient, so if you've considered it, now is the time! By splitting the existing two core courses into multiple smaller courses (which can be taken virtually, in any order and at off hours), the new program should make it easier than ever. Remember that advanced practice providers, nurses, pharmacists, other clinicians and informaticians are all eligible for the program at VUMC!

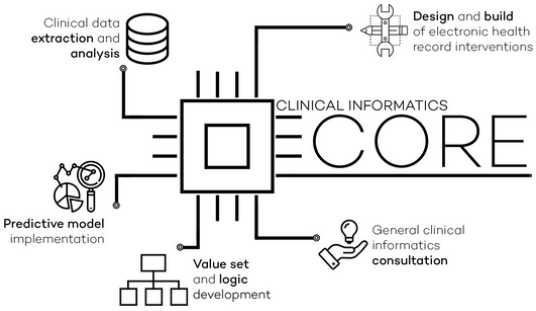
Project Spotlight: NeoCommand
The neonatal intensive care unit is a busy and dynamic place. VCLIC member **Wael Alrifai, MD**, built a single dashboard to track patient flow, capacity and needs. It was so successful that Epic has featured it at XGM, in their own dashboard training and as a Physician Builder Spotlight. NICUs across the country are replicating it, and it is now being incorporated into Epic Foundation system.

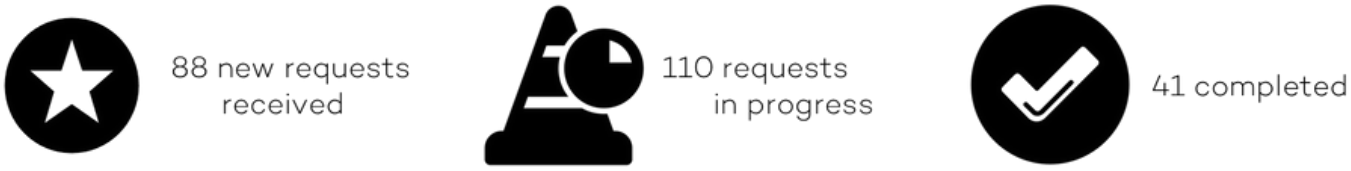


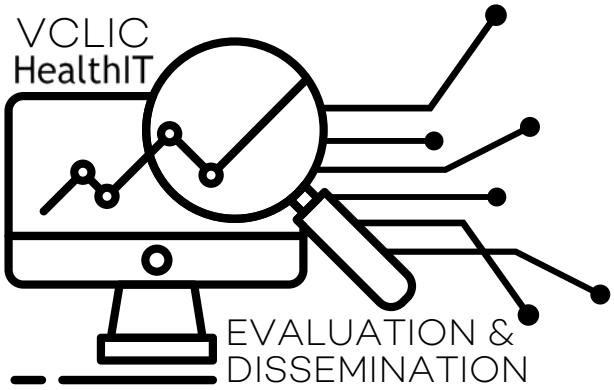
CLINICAL INFORMATICS SERVICES

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**, analyst **Donnie Sengstack, MS**, and physician builders **Julian Genkins, MD**, and **Ashley Spann, MD, MS-ACI.**



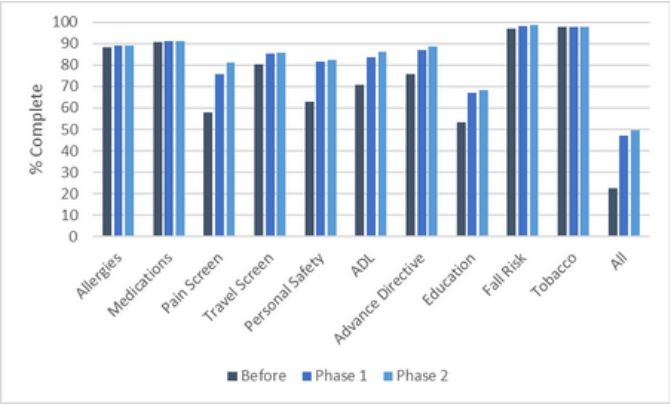




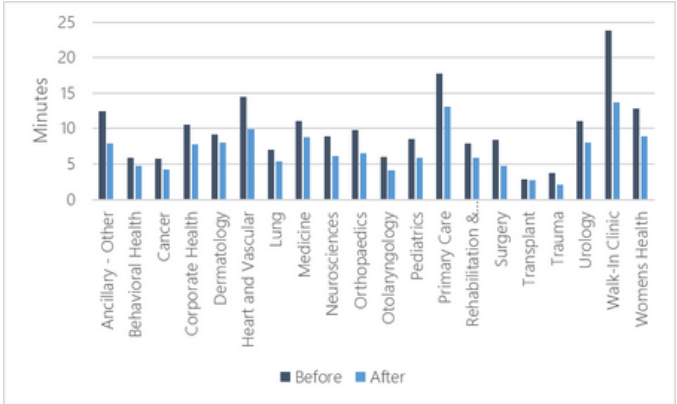
VCLIC + HealthIT Evaluation and Dissemination Program

Led by **Allison McCoy, PhD** and supported by **Laura Zahn, MS**, this program ensures that we effectively evaluate innovative HealthIT initiatives across VUMC, and disseminate our findings widely. We pair VCLIC informaticians with HealthIT staff to complete evaluations by providing methodologic expertise, data extraction and analysis. and abstract or manuscript preparation to facilitate conference participation and publication.

This year, the program has completed work on 5 projects with others in progress or in backlog. Two projects, which were presented this year at Epic's XGM meeting, are summarized below.



An intake checklist for nurses doubled completion of necessary tasks, from 23% to 50%, without increasing time spent by nurses in the patient room.



The Current Visit tab, combining the Plan and Wrap-Up tabs resulted in a 30% decrease in time spent in these activities, saving 5-10 minutes per user per day.

HEALTHIT HEADLINES

By Dara Mize, MD, MS, VUMC Chief Medical Information Officer

The collaboration between VUMC HealthIT and VCLIC exemplifies a shared commitment to advancing healthcare technology and informatics. In the past year, HealthIT launched several innovative solutions that are shaping the future of healthcare, and VCLIC members have played a critical role in many of those initiatives. To ensure the latest innovations in technology will meet the needs of the patients and clinicians at VUMC, we constructed a Clinical Workflow Lab. Located on the sixth floor of 3401, the lab contains reproductions of a hospital room, emergency department (ED) beds and other clinical settings, providing the opportunity to test the impact of HealthIT initiatives in a real-world setting. One of the first technologies we tested in the Clinical Workflow Lab was Masimo's vital signs products, including the Radius VSM and iSirona devices, which allow for continuous monitoring of patient vitals and automatically input these vital signs into Epic. The use of these devices will contribute to an increase in time savings, patient safety, compliance, and staff satisfaction and accuracy. On March 11, VUMC successfully launched Masimo technology in our ED, and we are looking for opportunities to expand its use.

We've also launched two virtual initiatives to improve the patient and clinician experience. It started with the Virtual Nursing pilot on July 17. This pilot allows for virtual nurses to handle admissions and discharges, so bedside nurses can focus on patient care. This setup includes a large monitor, microphone, and camera in patients' rooms that will only be used with the consent of the patient. The goal is to have AI in the rooms to assist with sensory checks. The second virtual initiative is the Virtual Front Desk, also known as self-check-in. This was already implemented at our walk-in clinics but as of August 30, 2023, adult patients in our ambulatory clinics at Vanderbilt Health One Hundred Oaks were able to save time and skip the line by checking in to their appointments using the My Health at Vanderbilt app. Since then, self check-in has been launched at more locations, including Medical Center East. This technology has many benefits including allowing patients to maintain distance from others, ensuring others won't hear personal information, and saving time for patients. Looking forward, HealthIT and VCLIC will continue to look for opportunities to partner to deliver the personalized healthcare experience VUMC patients have come to know and expect.

REMEMBERING STUART WEINBERG

VCLIC mourns the loss of retired member Stuart Weinberg, MD who passed away this year. Dr. Weinberg was a pediatrician and clinical informatician who came to Vanderbilt in 2004. He was interested in immunization registries and clinical decision support, camp medicine and standards and interoperability. Weinberg loved VUMC, observing "I was so glad to be a part of an environment in which I could explore innovation and collaboration and learn about best practices in large production programming. If you need expertise in any topic in informatics, you can find it among our faculty. And I greatly enjoyed teaching students over the years." Within VCLIC, Stuart was an advocate for using open standards and rigorous knowledge models. We learned so much from him.

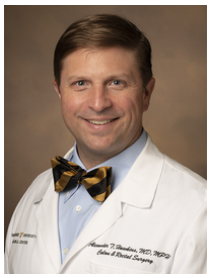
AWARDS

Physician Builder Award


For the third 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. **Eddie Qian, MD, MS** won the award for his outstanding work on ACORN, other trials and his support of the ICU. **Parker Evans, MD** won for outstanding contributions improving workflows in surgery.

Clinical Informatics Core Outstanding Data Project

The Clinical Informatics Core recognizes **Alex Hawkins, MD, MPH** and **Megan Shroder, MD** for their data project, "Patient Reported Outcome Measures (PROMs) in Diverticulitis." This project identified higher overall PROMs scores related to quality of life in patients who chose to pursue elective colectomy after consultation for recurrent diverticulitis.

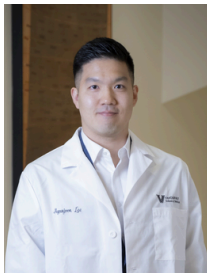



Clinical Informatics Core Outstanding Build Project

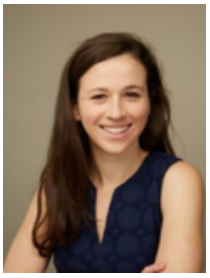
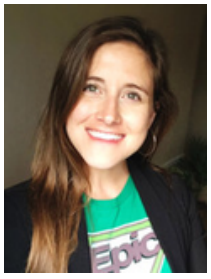
The Clinical Informatics Core recognizes **April Barnado, MD, MSCI** for her build project, "Antinuclear Antibodies (ANA) Risk Model Implementation". This project implemented a validated a risk model that helps predict whether patients with an elevated ANA result are at risk for developing systemic autoimmune diseases . The model was implemented by the VCLIC Core and is now being evaluated as part of a randomized, controlled trial to optimize referrals to rheumatology and reduce wait times for higher-risk patients.

Outstanding Clinical Informatics Course Student Project

This semester, **Hyunjoon Lee, MS**, and **Ali Carroll, MD, MPH,** mentored by **Sara Horst, MD** completed the outstanding project in BMIF 7340 by designing a dashboard to track PROM viewing rates and inform decisions about efforts to prioritize improving viewing rates for PROMs. Their work will be used to build tools that can help monitor and optimize other department-specific questionnaires.



Outstanding Evaluation and Dissemination Project

For their work implementing, evaluating, and presenting the Current Visit tab to combine the Plan and Wrap-Up tabs in eStar, VCLIC recognizes **Brooke Walker** and **Jenna Cabler**. The project was presented at this year's Epic XGM meeting with an impressive 13% reduction in clicks and 30% decreased time (5-10 minutes per user per day) in relevant activities among physicians and advance practice providers. Epic has since released new utilities to allow all customers to make this change.

K AWARD KORNER

Siru Liu, PhD

Optimizing Clinical Decision Support Alerts Using Explainable Artificial Intelligence (XAI) ***(K99/R00, National Library of Medicine)***
The overall objective of this project is to develop and evaluate a data-driven process that generates suggestions to improve clinical decision support alert criteria. The process will provide an XAI model to predict user responses to alerts using alert log and EHR data combined with a bias mitigation approach to generate transparent and fair suggestions. These methods could be widely applied to other components of EHRs to achieve more intelligent, efficient, and equitable healthcare.

Integrative Data Science Approach to Advance Care Coordination of ADRD by Primary Care Providers ***(K01, National Institute on Aging)***
Older adults with Alzheimer's disease and related dementias (ADRD) require effective coordination to manage numerous longitudinal care needs including diagnosis, exacerbation of symptoms, and to treat existing comorbidities. Supporting primary care providers to manage and coordinate healthcare delivery among specialist teams is important to improve outcomes and quality of life for patients with ADRD. The goal of this project is to develop approaches that monitor trends in care coordination among primary care providers and specialist teams and recommend actionable opportunities for improvement, which will ensure that patients receive high-quality multidisciplinary care necessary to maintain long-term wellbeing.

Bryan Steitz, PhD

Thomas Reese, PharmD, PhD

Patient-centered decision making to improve opioid use disorder treatment ***(K08, Agency for Healthcare Research and Quality)***
Opioid use disorder, a physical and psychological reliance on opioids, kills more than 60,000 Americans each year and has cost the United States healthcare system more than $30 billion. Continuous treatment with pharmacotherapy for the duration of physical and psychological reliance is crucial to optimal outcomes of opioid use disorder but patients face barriers with co-occurring substance use disorders. Findings from this study will support the development of health information technology that can help overcome barriers to routinely incorporate patient needs in clinical decision making.

Artificial Intelligence-Assisted Clinical Decision Support for Preventing Hypoglycemia in Hospitalized Patients ***(K23, National Institute of Diabetes and Digestive and Kidney Diseases)***
Hypoglycemia, when blood sugar levels become too low, is the most common complication of insulin, and can be deadly. While models for predicting hypoglycemia exist, they lack accuracy and have not been integrated into the EHR. Dr. Wright plans to use state-of-the-art machine learning techniques to improve upon existing models, and then to integrate a predictive model into Epic for prospective validation. Her goal is to use human-centered design and AI to develop clinical decision support tools that reduce harm for patients and lift burdens for clinicians.

Aileen Wright, MD, MS

CENTER MEMBERS


VCLIC