Leveraging the Learning Health System to Improve Care and Promote Research

Yale has built a strong integrated informatics infrastructure to support safe, effective patient care and innovative research. Epic, Yale’s enterprise-wide electronic health record (EHR) and the cornerstone of this work, contains more than four million unique patient records that enable clinical scientists to harness the power of ever-increasing amounts of digital health data.

In September, Yale-New Haven Hospital (YNHH) was awarded the Healthcare Information and Management Systems Society (HIMSS) Stage 7 award, the highest stage in the HIMSS Analytics EMR Adoption Model, which evaluates the progress and impact of electronic health record systems in hospitals. Less than four percent of U.S. hospitals have achieved this prestigious designation. HIMSS noted that YNHH is leveraging its EHR technology in innovative ways that include saving time and improving the patient experience; implementing such functionality as the tele-ICU module, which allows intensivists to monitor ICU patients 24/7; integrating the recruitment of research subjects into the MyChart patient portal; and proving the value of clinical decision support.

“We’re thrilled that we received recognition for our efforts to collaborate with our colleagues at the School of Medicine to leverage technology to improve patient care and promote research,” said Lisa Stump, MS, senior vice president and chief information officer (interim) at Yale School of Medicine and Yale New Haven Health System.

YCCl has worked closely with the Yale Epic team to ensure that the EHR strategy integrates research with Yale’s Help Us Discover clinical research recruitment and awareness campaign. This integration has led to novel research recruitment tools, including implementation of a Help Us Discover tab in MyChart. The tab includes a categorized listing of all clinical trials at Yale that are open to new accruals, as well as enabling patients to build and submit their personalized clinical trial profiles, including the kinds of trials they’re interested in and how they wish to be contacted. The portal operates in conjunction with yalestudies.org, Yale’s clinical trial website for patients, where they can learn about clinical research and search for available clinical trials.

MyChart is a powerful tool for connecting potential subjects to clinical trials that incurs no additional cost, as it leverages technologies and licenses already purchased for clinical use. So far, almost 700 patients have built profiles through MyChart, even though this feature has not yet been promoted; approximately 100 of these patients have been referred to a clinical trial for possible enrollment. The Yale MyChart team, led by Timothy Cooney, is also creating MyHealth, a patient education section that will contain information and links to relevant clinical trials specifically targeted to the patient's health issues.

Yale also provides enterprise-wide access to patient data that enables cutting-edge research across the T1 through T4 spectrum. Yale’s Joint Data Analytics Team (JDAT), facilitates research analytics and reporting, utilizing Yale’s customized data warehouse and other tools to move research forward.

In this issue of our newsletter, you’ll read about the tremendous strides we’ve made in our informatics capabilities to integrate and enhance Yale’s learning health system in order to improve care and facilitate research.

The Yale New Haven Health System’s dedicated Epic team continues to refine and optimize the EHR as they work with us to leverage its research potential. We’re particularly excited about the Help Us Discover tab in the MyChart patient portal, which links patients directly to Yale’s clinical trials. This innovation is already drawing the attention of patients to our research program. Equally exciting is the implementation of Yale’s opt-out policy. Thanks to support from across the institution and health system, researchers with an IRB-approved protocol now have access to medical records from patients treated at our facilities unless the patient opts out.

We are continuing to integrate our EHR and CTMS in ways that ease the burden on research teams and increase the efficiency of conducting clinical trials. Our OnCore team, along with the Joint Data Analytics Team (JDAT), facilitates research analytics and reporting, utilizing Yale’s customized data warehouse and other tools to move research forward.

Yale has a decades-long history of training the next generation of investigators in bioinformatics, a tradition that continues today. Several graduates of the Yale Center for Medical Informatics fellowship training program are now our informatics leaders, while training opportunities for clinician-scientists are being expanded in this burgeoning field.

I hope this newsletter conveys the many informatics resources and experts available to investigators across the health system. There are tremendous opportunities to harness the huge amount of data available and open up new avenues of research. I hope you’ll take advantage of them.
Leveraging the Learning Health System to Improve Care and Promote Research
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By itself, Oncore, Yale’s comprehensive clinical trials management system (CTMS), has a high level of functionality that eases the burden of conducting clinical research. As a leader in the integration of an EHR with a CTMS, Yale stands on the cutting edge of defining new industry standards to create a bi-directional interface. This integration has benefited clinical research at Yale and other institutions around the country. Yale has worked with Epic and Forte Research Systems, the makers of Oncore, to define national standards for integrating research functions. These standards support an interface that moves information from the EHR to the CTMS, including:

• Demographic and laboratory data.
• Clinical research data.
• Patient enrollment and consent status.
• Serious adverse events.
• Clinical research billing and revenue management.

Data documented in the EHR by the clinician are automatically pushed to the CTMS and autopopulate case report forms for data collection and reporting. Integrating data can improve patient safety; allow for complete transparency; help with the management of timely reporting to regulatory authorities; and ensure appropriate clinical care for research subjects, especially if they have an adverse event related to a study intervention.

The Yale Oncore team is also working to build patient-facing questionnaires in MyChart for patient data collected throughout the life cycle of a clinical trial. These can be done prior to or during the study visit; it’s convenient for patients and translates to more efficient workflow for study staff. This information can also be moved into the EHR where clinicians can view it, as well as into the CTMS, where it can be used for data collection.

Collaborating with Other CTSA Sites

Fellow CTSA institutions have leveraged Yale’s standards-based approach to integrate clinical research management systems with EHRs, and Yale has been eager to share lessons learned. Through regular phone calls and a face-to-face meeting, Yale’s Oncore team members shared with their UCIA counterparts how they planned the interface and workflow, as well as how they developed and implemented fee schedules, calendar builds, and other sets of functions. Such collaborations highlight how Yale’s pioneering work with emerging data standards is helping...
DIGGING DEEP INTO DATA

Until recently, clinical and other types of data were siloed in data warehouses throughout the institution. Now, the implementation of a single unified EHR database offers new and varied opportunities to delve into data for research and analytics.

To help manage the vast amounts of data contained in the EHR and other databases, Yale utilizes Epic’s data warehouse, renamed Helix and customized with the capacity to contain all the clinical, research, financial, quality, and operational data across the Yale New Haven Health System (YNHHS) and the School of Medicine. Helix draws from such varied sources as the EHR, the Help Us Discover database with approximately 7,000 potential research subjects; patient satisfaction surveys; the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS), private databases; and the Social Security Death Index to provide clinicians and researchers with unprecedented access to information. “Having a unified database allows us to ask questions that are multidisciplinary, whereas before that was much harder to do,” said Medical Information Officer Prem Thomas, MD, who leads the YNHHS data warehouse development team.

In one initiative, a multidisciplinary group of hospitalists, hematologists, and informaticists studied the use of blood products across the health system. Variances in blood utilization were analyzed using data from Helix. When variances in certain cardiovascular surgeries were noted to be high compared to benchmarks, analyses were conducted that led to changes in equipment. Ultimately this process translated to dramatic decreases in intraoperative blood loss and a corresponding decrease in the need for transfusions. “Now we can open this up to all nursing units at Yale-New Haven and eventually Greenwich and Bridgeport Hospitals, because Helix can handle the volume of data streaming in,” said Charles Torre, Jr., ITT System Executive Director for Yale New Haven Health System. “It’s a patient and staff satisfier.” Torre and his team are starting to incorporate genomic data as well so that clinical researchers will be able to look at outcomes in the EHR and link them to genomic variants.

Recognising the need to provide investigators with data warehousing support, Yale has developed a toolkit that includes such resources as i2b2 (Informatics for Integrating Biology and the Bedside), an open source database structure originally developed at Harvard and by used at Medical and by Clinical and Translational Science Award (CTSA) institutions. This resource allows investigators to query for de-identified clinical cohorts for research. Other resources include the Shared Health Research Information Network (SHRINE), also used by CTSA sites, which expands this concept to other institutions and incorporates security measures; and Slicer Dicer, Epic’s data warehouse tool that works with Helix. Epic is also developing a platform that will allow institutions to opt in and share data on various disease registries and performance metrics, ultimately contributing to national and international benchmarking. With Epic’s patient base — the system is used with more than half of the U.S. population — this database will be very useful for investigators interested in extremely large cohorts and/or multicenter subject populations.

The EHR contains a wealth of data captured in clinical notes accessible only by reading them. Yale is working on implementing a natural language processing (NLP) engine to utilize this untapped source of potentially useful information. Data from written or dictated physician notes will be exported to Helix and Epic in real time. The data will be useful for qualifying diagnoses and accessing data for research, and could eventually be expanded to include pharmacy, diagnostic radiology, and lab notes.

It’s not just the quantity of data contained in these platforms that is relevant to clinical care. Data quality is a concern. Thomas and his colleagues are responsible for ensuring that the underlying database structures, technologies, and data models provide the answers clinicians and researchers are seeking. For example, there are about 40,000 terms within the EHR for categorizing the various types of diabetes and their complications, so discerning which patients meet certain criteria is critical. Thomas thinks of his job as that of the Information T echnology Services (ITS) team as a national leader in creating a centralized analytics team for both clinical and research data.

Yale staff members work collaboratively, drawing upon one another’s expertise as necessary. They are trained and certified by Epic in analytics, database administration, and maintenance. Those dedicated to research receive additional training in order to understand research protocols, patient safety and protection guidelines/processes, and how to navigate Yale’s CTMS.

The increasingly complex and intertwined landscapes of health care and research require collaboration. “That’s the underlying philosophy of the Joint Data Analytics Team (JDAT),” said Thomas. “It’s gratifying to see what they’ve accomplished in a short time, and I look forward to building on the momentum we’ve begun.”

HOW TO SUBMIT A REQUEST TO JDAT

The Joint Data Analytics Team (JDAT) helps researchers and Epic analysts to access data stored in the EHR. The JDAT request form is available in several places: http://medicine.yale.edu/ycci/oncore/ Select “Please click here for procedures” in the lower right corner of the page to access the form.

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Help Us Discover | Be Part of Clinical Research at Yale.

Treating and Preventing Diabetes

“Clinical research is really important and it’s really all the way things are going to change.”

- Amy Rosenfield

When Hannah Rosenfield was diagnosed with type 1 diabetes at age 10, her mother Amy immediately looked beyond the standard treatment for something that might benefit her daughter long term. Amy’s search led her to a clinical trial at Yale for those newly diagnosed with type 1 diabetes, sometimes called pediatric-onset diabetes. Within weeks of her diagnosis, Hannah was enrolled in the two-year study. Hannah responded well to the experimental treatment. Almost four years after her diagnosis, she was still producing small amounts of insulin. Hannah also participated in a follow-up study to find out if the longer-term effects of the new drug she had taken, Hannah’s three siblings have participated in a clinical trial for relatives of type 1 diabetes patients – part of a series to prevent and treat the disease in its early stages. Knowing whether other children are at risk for developing diabetes has given Hannah’s parents peace of mind. For the Rosenfields, participating in clinical trials has offered both hope and encouragement. They know they’ve done everything possible not just for Hannah and her siblings but also for countless others who suffer from diabetes.

Biorepository Study

Someday they will thank you for the few minutes you gave today.

Your clinical samples are important components of medical research. A new program will bring thousands of samples together so researchers can more easily develop life-saving treatments. Volunteering is as quick and easy as giving blood; or other clinical samples. Your donation will be held completely secure and your information in the strictest of confidence. Compensations will be provided.

To learn more, visit www.YaleStudies.org or call 1-877-979-studies

Sponsored by the National Institute of Allergy and Infectious Disease

HIC #080104617

Clinical Cancer Trials

Yale Cancer Center, one of only 41 comprehensive Cancer Centers in the country designated by the National Cancer Institute, harnesses the resources of the Yale School of Medicine and Yale-New Haven Hospital in order to advance cancer research and develop effective therapies for cancer treatment. None of these advances would be possible if people like you weren’t willing to take part in clinical trials. Our portfolio includes over 100 active trials, providing options beyond the standard care for patients with most cancers.

By participating in a study, you can help Yale continue its tradition of advancing medical knowledge. For more information about cancer research, visit www.yalecancercenter.org or call (203) 777-5700.

Autism Study

Is your child on the autism spectrum?

If you have a child who has been diagnosed with Autism Spectrum Disorder (ASD), Yale has clinical studies available that examine your child’s social, communication, and emotional skills. This research will lead to new treatments and a better understanding of the ASD genetics.

James McPartland, PhD, Principal Investigator. To find out more about the ABC-CT, call 1-877-978-8435 or visit www.audiomakers.org

Sponsored by the National Institute of Mental Health

HIC #090064477

Congenital Ichthyosis Study

Does your baby have congenital ichthyosis?

If you have a child who was diagnosed with congenital ichthyosis within their first 6 months, they may be eligible to participate in a study to help understand variations in genetic mutations in order to tailor standards of care to the genetic diagnostics.

To learn more or see if your child is eligible to participate, please contact Kristin DeFrancisco at (203) 785-1832 or email kristin.defrancisco@yale.edu

Sponsored by the Foundation for Ichthyosis and Related Skin Types (FIRST)

HIC #090054672

Homeownership, Reverse Mortgages & Well-Being Study

Are you age 60 or older and own your home or have a reverse mortgage (or have applied or are applying for a reverse mortgage), you may be eligible to participate in a study for older homeowners to share their experiences, aspirations, and expectations related to reverse mortgage loans.

Compensation up to $50

To learn more or see if you are eligible to participate, please call (103) 470-9138 or email reversemortgagesstudyjg@gmail.com

Sponsored by the Russell Sage Foundation

HIC #120057822

Yale has hundreds of clinical studies under way for a wide variety of conditions. None of them would be possible without volunteers who were willing to take part in clinical studies. Volunteers like you are the only way for medical breakthroughs to reach the public. Please consider participating in a clinical study and helping Yale continue its tradition of advancing medical knowledge.

Alcohol Drinkers Study

Do you drink alcohol?

If you are 21 to 55 years old, a heavy alcohol drinker, do not smoke cigarettes, and are medically healthy, you may be eligible to participate in this brain imaging research study.

Compensation up to $75

For more information or to see if you qualify for the study, please call (203) 777-9533.

Supported by the National Institute on Drug Abuse

HIC #090180407

Pregnancy & New Mothers Study

Are you about to give birth or have an infant under 9 months old?

You may be eligible to participate in a paid research study at the Yale Child Study Center.

We are looking for pregnant women (40 or more months) and women who have given birth within the last 9 months to participate in a study that looks at how people respond to seeing photographs of infant faces and to hearing infant cries. This study monitors brain activity while you perform simple tasks. Non-invasive, safe, and no medications involved.

Compensation up to $330

To learn more, please call (203) 785-3902 or email youcare@yale.edu

Supported by the Yale and Griddex Foundation National Institute on Drug Abuse

HIC #090200615, 11035

Children’s Air Pollution Study (CAPS)

Does your child have asthma?

Millions of children suffer with asthma. Please join us in studying how cleaner indoor air can help.

If you have a 5 to 11 year old child with asthma, you may be eligible to participate in an 18-week clinical trial of indoor air cleaners. The study involves a brief phone screening, sampling of your home’s indoor air, and home visits every 6 weeks to install a new air cleaner and collect information on your child’s asthma symptoms and medication use.

Compensation of $200 for full 18-week study

To learn more or see if you are eligible, contact (203) 777-6490 or email CAPS@yale.edu. Visit our website for more information: www.yale.edu/epic/CAPS.html

Sponsored by the National Institute of Environmental Health

HIC #080038704, Clinical Trials.gov NCT00520889

Restless Legs Syndrome Study

Do you suffer from restless legs syndrome (RLS)?

Neurologists at Yale-New Haven Hospital are conducting research concerning restless legs syndrome (RLS). There is evidence to suggest that RLS may be associated with a particular skin-related hormone and genetic mutations in the receptor that binds this hormone. The research involves determining if you have these genetic mutations and/or increased levels of this hormone. The research requires one visit to the New Haven area.

If interested, please contact: Brian Koo, M.D. at (203) 523-5711 x 546 or email: Brian.koo@yale.edu

Supported by the Restless Legs Syndrome (RLS) Foundation

HIC #120094182

Weight Loss Trial Study

Are you overweight or obese and interested in losing weight?

The John B. Pierce Laboratory and Yale University are looking for individuals who are 18 to 45 years old, non-smoking, and right-handed to participate in a study that focuses on taste, smell, and food to help us understand how the brain works. The study may involve consuming beverages and food, filling out questionnaires, taking a nutritional supplement, undergoing an fMRI scan, and giving blood samples.

Compensation up to $1,120

To learn more or see if you qualify, please contact (203) 510-9001, ext. 210, email foodandflavor@jbppierce.org, or visit www.jbppierce.org/foodandflavor

Supported by the National Cancer Institute

HIC #110057337

To find out more about trials at Yale, visit our website, www.yalestudies.org.

Or call 1-877-y-studies for more information.

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Yale
### Supporting Data Management and Statistics

The Yale Data Coordinating Core (YDCC) provides data management and statistical expertise to support multicenter studies. The core is a partnership among YCCI, the Yale Center for Analytical Sciences (YCAS), Emergency Medicine, the Yale Program on Aging (YPA), and the Yale Center for Medical Informatics (YCMI). It comprises faculty from the School of Medicine and School of Public Health with decades of expertise in biostatistics, epidemiology, clinical trials, and informatics, along with a highly trained technical staff skilled in systems programming, data management, data analysis, and statistical programming. Headed by YDCS director Peter Peduzzi, PhD, its faculty members include YCAS deputy director James Diasma, MPH, PhD; Peter Charpentier, associate director for data management; Heather Alloro, PhD, director of the Yale Program on Aging biostatistics core; Cynthia Brandt, MD, MPH; and Charles Lu, associate director for technology and system development/ bioinformatics.

The center works with the Program on Aging, the Alzheimer’s Disease Research Center, Yale Cancer Center, and other programs to support such projects as:

- The Autism Biomarkers Consortium for Clinical Trials (ABC-CT), a multicenter study to develop objective measurements of social functioning and communication in children with autism, for which it is the Data Coordinating Core.
- Guanciave for the Treatment of Hyperactivity in Pervasive Development Disorder, a multicenter trial that involves managing regulatory matters, data management, and biostatistical services.

- Integrated Stepped Care for Unhealthy Alcohol Use in HIV, a multicenter trial that involves data management services, preparation of Data and Safety Monitoring Board (DSMB) reports, and statistical analysis.
- Strategies to Reduce Injuries and Develop Confidence in Eiders (STRIDEC), a multicenter trial that involves data management services, DSMB reports, and statistical analysis.

“We recognized that supporting large multicenter trials requires high-quality analytics and data cores,” said YCCI director Robert Sherwin, MD. “We’ve excited to be able to bring these resources together to support this work, which can benefit so many patients.”

### CoreS: Utilizing New Approaches

Several of YSM’s core research facilities utilize state-of-the-art technologies to generate data that shed light on human diseases. YCCI helps support these facilities and the underlying informatics resources and expertise necessary to manage and analyze the data they generate.

At the Yale Center for Genome Analysis (YCGA), James Knight, PhD, research scientist in genetics, leads the development of new analytical tools and pipelines for exome sequencing, transcriptome analysis, and interfacing with clinical studies. Hadoop, the data management system, compresses and stores sequencing data, which are placed in Yale’s Helix data warehouse for clinical use and comparison with other databases. Knight is working with colleagues at Yale Cancer Center, for example, to match variant data from tumor profiling with laboratory and pathology data.

From a research perspective, clinicians are interested in variant data,” noted Shrikant Mane, PhD, director of the Yale Center for Genome Analysis. One early example that laid the groundwork for this concept involved three members of a family in which whole-exome sequencing revealed a genetic mutation causing an illness that had never been described before. As a result, YCGA, YSM, and Yale-New Haven Hospital established a program to sequence the exomes of children and adolescents with unexplained illnesses. More broadly, the availability of genomic information will allow clinicians to mine these data in order to identify proactively disease-causing variants in clinical situations.

The emerging CyTOF (cytometry by time-of-flight) Core is an exciting new technology for cell analysis that overcomes many of the limitations of flow cytometry. It is another illustration of the marriage of informatics and core technologies. CyTOF uses heavy metal ions as labels combined with mass spectrometry to analyze complex human cell samples, providing more than 40 crystal-clear markers in samples as small as 1,000 cells. Yale’s highly ranked immunology department and cancer research community are utilizing CyTOF to explore conditions in which modulating the immune system may offer better treatments.

CyTOF allows investigators to obtain an unprecedented level of detail about cells, generating complex data that have required a new field of computational analysis. “The data is now so high-throughput that it’s beyond routine analysis,” said CyTOF director Ruth Montgomery, PhD, associate professor of medicine (rheumatology) and associate dean for scientific affairs, who has used CyTOF to show the diversity of natural killer cell responses in West Nile virus infections.

The massive data sets generated by CyTOF, exome sequencing, and other core technologies have required new bioinformatics-based approaches and collaborations. “Several generations ago, you measured one thing and you could keep track of it yourself, but we can’t do that anymore,” said Montgomery “The problems are so complex, and the methods of study have become so complex, we have to bring in another element, and we can make more progress.”

### EHR/CTMS Integration Continues to Evolve

The emerging CyTOF Core is an example of the kind of collaboration that is being pursued across the research community to support innovative research. The integration of EHR and CTMS systems is critical to support this work, which can benefit so many patients.

### Research-in-Progress Meetings

These meetings feature presentations from YCCI Scholars and Investigative Medicine Program students as well as trainers from the Medical Research Scholars Program. We encourage all faculty and staff to attend.

- **January 25, February 8 and 22, March 14 and 28, April 11 and 25**
  Noon; lunch is provided
  DACEN6

Please visit the YCCI website to find the list of presenters and projects.

### Faculty Dinner Series

This quarterly dinner series focuses on topics relevant to Yale clinical research faculty.

- **February 2016**
  
  **“Good Clinical Practice”**
  April 18, 2016, 5:30 – 7:30 pm

For schedules and registration information for training events, visit [http://ycci.yale.edu/education/stafftrain/](http://ycci.yale.edu/education/stafftrain/)

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YCCI faculty and staff
ENGAGING PATIENTS THROUGH A PERSONAL HEALTH RECORD

Research is evolving from considering patients as subjects to be studied to partners who are actively engaged in many aspects of the research. That engagement can be increased when people are in a position to choose to participate actively in research and donate their data. The NIH Precision Medicine Initiative is setting the pace for this new era of relationships between scientists and study participants. The challenge is that people have not been in a position to donate their data because they have had limited access to the data. Moreover, when data have been available, they have been in formats that often require manual entry.

A new initiative led by Harlan Krumholz, MD, SM, the Harold H. Hines, Jr. Professor of Medicine and director of the Yale Center for Outcomes Research and Evaluation (CORE), is developing HUGO PHR, a personal health platform that will empower people with their own data and put them in a position to leverage the data for their clinical care as well as participate actively with researchers. Developed in partnership with Yale New Haven Health System, HUGO is a cloud-based highly secure personal health platform that can beonautized and updated with data and images from the EHR, as well as receive data from wearable devices and other sources. When available to Yale patients in 2016, HUGO will be free of charge, and easily accessible via the Internet and on mobile devices. It conforms to new standards and can be easily applied regardless of the electronic health record vendor.

HUGO offers an efficient way to:

- Match individuals to clinical studies.
- Move data to researchers with participants’ authorization.
- Ensure that patients are vital components of the research process.
- Enable researchers to communicate easily with participants and share study data and results.
- Provide a conduit for patient-generated data from patient-reported outcome measures and wearable devices.

YCCI is helping Krumholz and his team assess the suitability of integrating HUGO in clinical research studies as well as evaluate the system with feedback from the IRB, the Yale New Haven Health System, the informatics team, community organizations, and patient representatives. If successful, HUGO has the potential to be adopted readily by other CTSA sites and academic medical centers. HUGO could mark the end of an era in which patients are simply research subjects who never learn about study results or how their data were used, said Krumholz. “They will be the ones who make the decision to partner with us, to share their data; and to help us work together to generate the knowledge that will help them and the people that will follow them.”

INFORMATICS OVERSIGHT REDUCES BARRIERS TO CONDUCTING RESEARCH

Informatics support requires oversight to ensure that institutional policies and practices don’t become barriers to research. The Clinical Research Leadership Committee, led by Brian Smith, MD, professor and chair of laboratory medicine, is responsible for this guidance. Formed by the School of Medicine, Yale Medical Group (YMG), and Yale New Haven Health System (YNHHS), the committee is responsible for coordinating Yale’s health care delivery system with the translational research enterprise.

The committee is charged with shaping policy and resolving research issues identified in the context of health care delivery. The group was instrumental in the approval of Yale’s opt-out policy, which required changes in YMG and YNHHS privacy policies in order to allow for the use of blood, tissue, and health record data for research unless the patient opts out.

“The idea is to have a governance structure in place so that our informatics policies facilitate research, instead of standing in the way,” said Smith.

The committee’s membership includes senior faculty and leaders from the Human Research Protection Program, YNHHS, YMG, YCCI, and the Schools of Medicine, Nursing, and Public Health. Amy Justice, MD, MSc, PhD, professor of medicine (general medicine) and public health (health policy) and section chief of general medicine in the VA Connecticut Healthcare System, provides additional oversight, serving as lead advisor and representing faculty users of informatics resources. She has extensive experience in analyzing large and complex observational datasets, including comparing results across databases and conducting observational studies. She works to ensure that informatics services are research- and user-friendly. “I was delighted to be asked to serve in this role to help YCCI ensure that its informatics resources and investments meet the needs of faculty carrying out research,” she said.

The Research Prioritization Subcommittee comprises senior faculty and staff members from the health system and the university. The committee works on behalf of the School of Medicine and the entire health system to guide the Joint Data Analytics Team (JDAT) in prioritizing requests and allocating resources. This guidance ensures that the needs of investigators as well as institutional goals are met.

The idea is to have a governance structure in place so that our informatics policies facilitate research, instead of standing in the way.

Brian Smith MD, professor and chair of laboratory medicine

CLINICAL RESEARCH LEADERSHIP COMMITTEE

Brian Smith, MD
Chair, Professor and Chair of Laboratory Medicine

Susan Anderson RN, BSN, MFA
Director of Training, YCCI

Thomas Balekzad, MD, MPH
Chief Medical Officer, Yale-New Haven Hospital

Richard Carson, PhD
Professor of Radiology and Biomedical Imaging and of Biomedical Engineering

Keven Herold, MD
Professor of Immunology and of Medicine, Deputy Director, YCCI

Howard Hochster, MD
Professor of Medicine (Medical Oncology)

Allen Hsiao, MD
Chief Medical Information Officer, Yale School of Medicine and Yale New Haven Health System

Amy Justice, MD, MSc, PhD
Professor of Medicine (General Medicine) and of Public Health (Health Policy)

Alexandra Lansky, MD
Professor of Medicine (Cardiology)

Stephanie O’Malley, PhD
Professor of Psychiatry

Joseph Paolillo
Director, Data Network Operations, Yale University

Chirag Parikh, MD, PhD
Professor of Medicine (Nephrology)

Pat Seymour
Infocus Director, Human Research Protection Program

Robert Sherwin, MD
C.N.H. Lang Professor of Medicine (Endocrinology), Director, YCCI

Lisa Stump
Senior Vice President and Chief Information Officer (Interim), Yale New Haven Health System

Robin Whittemore, PhD, APRN
Professor of Nursing

Committee Staff:
Tahsia Johnson, MBA, AHS
Chief Operating Officer, YCCI

Sharlene Seidman
Executive Director, Corporate Business Services, Yale New Haven Health System
INFORMATICS TRAINING FOCUSES ON ADVANCED TOOLS AND APPROACHES

For nearly three decades, the Yale Center for Medical Informatics (YCMI) has been widely known for its research training program supported by the National Library of Medicine (NLM), serving as a hub for biomedical informatics education, training, and research. YCMI has trained roughly 100 postdoctoral fellows and graduate students over the past 30 years. Many have gone into academic careers nationwide. Many others are working for health systems, industry, consulting, and government agencies.

Led by Perry Miller, MD, PhD, professor of anesthesiology, with co-directors Cynthia Brandt, MD, MPH, professor of emergency medicine, and Michael Krauthammer, MD, PhD, associate professor of pathology, now heading the NLM-supported training program, YCMI has produced many leaders in the field of informatics, including those at Yale. Among them are Brandt and Allen Hsiao, MD, associate professor of pediatrics, who serves as chief medical information officer for the School of Medicine and Yale New Haven Health System (YNHHS). Other graduates of YCMI’s biomedical informatics postdoctoral training program include Prem Thomas, MD, who leads the health system’s data warehouse development team; Nitu Kashyap, MD, executive director of clinical informatics for YNHHS; Ryan O’Connell, MD, vice president for performance and risk management for Bridgeport Hospital; Yauheni Solad, MD, medical information officer for Greenwich Hospital; and Hyung Paek, MD, medical information officer, Fair Haven Health Center.

“When we were going through the fellowship, it wasn’t clear how it would play out, but informatics needs and activities have exploded,” said Thomas, who works closely with the Joint Data Analytics Team and the population health team in building Yale’s underlying database structures, technologies, data models, and data quality. “There’s a whole set of concepts and topics that have sprung up out of this new field and there’s now a huge need for clinicians who understand this.”

Together with Mark Gerstein, PhD, professor of molecular biophysics & biochemistry and computer science, Miller also co-founded Yale’s PhD program in Computational Biology and Bioinformatics. He and Richard Shiffman, MD, professor of pediatrics, co-direct the Clinical Informatics Pathway of Yale’s Master of Health Science program, which trains postdoctoral clinicians. YCMI faculty members also teach workshops and didactic courses on such topics as data management and analysis; database design for clinical research; and clinical and translational informatics.

For medical students, who will need to be proficient in utilizing EHRs in their clinical practice and research, Yale Information Technology Services has created a version of the Epic application. The virtual EHR contains the same order sets, documentation templates, and modules as the version used to care for patients. Medical school staff will also be able to create standardized patients for students to follow, populating their records with new results and other content. This initiative is part of the new medical school curriculum, allowing students early in their preclinical years to follow and virtually care for patients over time in a real and dynamically changing system.

YCMI and YCCI will continue to expand informatics training activities to help investigators develop key competencies that include managing big data; integrating population sciences; and the ability to use data across platforms.