Events of interest

CIPCT 2019 Annual Meeting & Orientation
September 20-21, Seattle, WA

American Medical Informatics Association (AMIA)
2019 Annual Symposium
Nov 16-20, Washington DC

HIMSS 2019
Global Conference and Exhibition
February 11-15, Orange County FL
It’s a pleasure to welcome you to a new academic year for the Clinical Informatics and Patient-Centered Technologies program. This year we welcome our new cohort of 20 students! We also have a number of CIPCT students graduating with promising scholarly project contributions - Congratulations!

In 2019, we look forward to welcoming our new program Co-Director, Dr. Donna Berry. Dr. Berry returned to University of Washington School of Nursing this fall as a Professor in Department of Biobehavioral Nursing and Health Informatics. Her research focuses on applying patient-centered technologies to improve care for people with cancer.

We wish to thank Dr. Hilaire Thompson for her tremendous support and contributions as outgoing program Co-Director. Drs. Hartzler, Berry, and Thompson will work together to ensure continued program success into the new year as Dr. Thompson’s spring sabbatical approaches. Thank you, Hilaire – you will be missed, but not forgotten, as we know you are remaining on faculty and will continue to support CIPCT student projects!

This year we are excited to embark on curriculum review using the Health Informatics Core Competencies recently published in the Journal of the American Medical Informatics Association (AMIA) last October. The master’s degree competencies cover 10 foundational domains and are the product of a careful deliberation by the AMIA Accreditation Committee. Examining curriculum for opportunities and ongoing program improvements will ensure we continue to produce the top clinical informatics leaders in the field!

We are looking forward to a productive academic year!
We had a very successful orientation for our 2018 cohort. We welcomed 20 new students and were excited to reconnect with our continuing students. David Masuda led the team building exercise with the marshmallow challenge. Please mark your calendar for the 2019 orientation scheduled to be held on September 20/21st at our Seattle campus.
**Q: Would you tell us a little about your research interests?**

I am an oncology nurse scientist who learned to appreciate the power of technology when I partnered with Bryant Karras and Bill Lober in 1999. My program of research in symptom management benefited from the development of a sophisticated web-based application that has been shown to reduce symptom distress and enhance patient-provider communication. My second program of research is in treatment decision making; with interventions that not only support the patient in communicating personal values and influential factors, but also teaches a synthesis of patient factors and medical factors. The Personal Patient Profile-Prostate, another tailored web-based application has been shown to significantly reduce the conflict associated with making a decision, along with a clinician, for localized prostate cancer. Finally, I have led clinical research to implement evidence-based practices in clinical settings.

**How do you see information technology impacting the health care ‘world’ in the near future?**

Information technology will impact every aspect of health care. The application of technology ranges widely from financial services to health records to patient reported outcomes (PRO) and patient-centered interventions. A challenge for the future is with integration of PRO within enterprise systems. Evidence from multiple positive trials, support from literature reviews and editorials, and the endorsements of professional societies and funding agencies all promote the use of patient-reported outcomes in clinical care. And yet, relatively few care settings have implemented consistent methods of PRO assessment and integrated interventions.
Q: What can our students do to best position themselves for a career in informatics?

Be broad! Understand policies as well as programs!

‘Q: What advice would you give to a student enrolling in CIPCT this autumn?

Start planning your project today. Get to know your advisor’s (or future chairperson’s) work by reading their publications. Imagine yourself contributing to such work. Talk about your ideas early and often to anyone that will listen.

CURRENT STUDENT HIGHLIGHT

Lauren Mikell (CIPCT), Tokunbu Akande (CIPCT), Lauren Snyder (BHI), and Ron Buie (BHI) represented UW at the 17th Master Class in Amsterdam, June 17 through the 21st. This biannual gathering is part of the International Program in Health Informatics Education. Along with faculty advisors Anne Turner and David Masuda, the delegation joined students and faculty from the Universities of Utah and Minnesota as well as Taipei Medical University, The University for Health Informatics and Technology in Innsbruck, and the University of Amsterdam. The Master Class includes an academic program with guest lecturers from The University of Amsterdam and a student team challenge focused on machine learning methods. Attendees also enjoyed tours of local informatics and telemedicine companies, a visit to the world famous Rijksmuseum and an evening sail on the inland bay Ijsselmeer.

The Master class will return to Seattle as UW BIME hosts the next IPHIE meeting in June, 2020.

Q: What did you learn from your experience at IPHIE?

Lauren Mikell

This year’s International Partnership in Health Informatics Education (IPHIE) took place in Amsterdam and consisted of 5 days of lectures from leaders in the field of informatics in Amsterdam, presentations by other students on the work they are currently researching or are interested in, and classwork that consisted of evaluating research and large amounts of patient data and working to visualize it accurately. This partnership between Universities in Taipei, Heidelberg, Amsterdam, Seattle, Salt Lake City, and Twin Cities allows a different host of specialties to intermingle with exciting results.

When the conference began, I was amazed by the sheer talent, passion, and expertise everyone brought forth to help contribute to the learning taking place. I glimpsed research from other areas of the world and learned things I never knew about systems I used frequently. Not only did I learn a significant amount from being involved with the project we implemented while there, I was also able to connect on a personal level and met unique and interesting people with similar skills, interest, and approaches within the world of informatics.

The activities the host school scheduled were engaging and enriching. We boarded a boat to go on a river cruise and enjoyed dinner out on the water. We visited the Rijksmuseum and surrounding cultural hotspots, and visited several innovative centers, including ChipSoft, the leading EHR software company in the Netherlands.

My skills grew as I learned from others far more experienced in the word of Informatics. The experiences that IPHIE afforded me will never be forgotten and has ignited a passion for pursuing more educational opportunities. I feel honored that I was chosen to represent the University of Washington and the CIPCT program and will take what I learned out into my career to teach others.
Electronic Family and Medical Leave Act Tools: A Post Implementation Usability Evaluation.

As the adoption of electronic health records (EHRs) by healthcare organizations continue to increase, satisfaction rates with EHRs have decreased within the past years due in part to usability challenges. Purpose: The purpose of this study is to measure and enhance end-user efficiency and satisfaction with the use of electronic Family and Medical Leave tools. Aims: 1. Conduct a post implementation usability evaluation of the electronic Family and Medical Leave tools. 2. Summarize key usability issues and present them to stakeholders Design: A post usability evaluation adapted from Jakob Nielsen’s heuristic principles will be conducted of the newly implemented Family and Medical Leave Act tools within Epic. Results: The largest number of heuristic violations found with the electronic Family and Medical Leave tools were in the following categories: Visibility of System Status, Match Between System and The Real World, User Control and Freedom, and Help. Conclusion: This post implementation usability evaluation identified usability violations in four different categories of Jakob Nielsen’s heuristic principles. If these issues remain unsolved, it will cut into end-user task efficiency and system satisfaction. Most of the issues can be fixed through a simple redesign of the FMLA tools in the areas needed. This study suggests conducting usability assessments on widely used health systems to increase usability satisfaction rates.

Summer 2018: Committee David Masuda, Peter Tarczy-Hornoch

Patient Centered Medical Home Recognition the Impetus for Implementation of Patient Navigator Role in Rural Pediatric Clinic at Academic Medical Center.

The purpose of this quality improvement project was to implement a workflow identifying patients who would benefit from enhanced care coordination and utilize the newly developed role of clinic patient navigator to address patient needs in a pediatric practice working toward Patient-Centered Medical Home (PCMH) recognition by the National Committee for Quality Assurance (NCQA). The clinic designed a questionnaire to identify patients with complex care needs. Patients requiring additional care coordination were routed to the clinic patient navigator, who provided additional interventions, including: phone calls pre- and post- clinic visits, additional teaching, and coordination with community resources. Integrating the patient navigator within the clinic as a part of the PCMH process change is intended to have a positive impact on high need patients.

Spring 2018: Committee Bill Lober, Sarah Itibarren, Martha Hellems
SCHOLARLY PROJECTS

**Tara L Conner**

**Impact of Total Laboratory Automation on Laboratory Turnaround Time in a Department of Defense Facility.**

Objective Laboratories across the country are facing workforce shortages while clinicians desire faster laboratory turnaround times (TATs). In an effort to improve efficiency despite having one-third of laboratory positions unfilled, Madigan Army Medical Center (MAMC) implemented total laboratory automation (TLA) in 2017. We evaluated the impact of laboratory test TAT by processing priority at each of the phases of implementation and for most phases, by ordering location.

Conclusion: DoD and civilian medical facilities are expected to continue to face a persisting laboratory workforce shortage while the clinical community relies heavily on rapid laboratory result turnaround times. We have shown that implementation of TLA with auto-verification is an effective solution to addressing the workforce shortage while meeting the expectations of clinicians.

*Spring 2018: Committee Peter Tarczy-Hornoch, Robert Marshall, David Sartori*

**Charlene Delrosario**

**Evaluating Nurses Perception and Use of Copy Forward and how it currently used in the EHR**

Increased nursing documentation burden related to the poor usability of electronic health records has impacted patient care. This dilemma has promoted the use of content importing technologies, such as copy forward (CF), also known as copy and paste. However, the use of this EHR functionality is not without risks. Health care organizations who have implemented them are encouraged to establish evidence-based safe documentation practices, one of which is user evaluation of copy forward use. Because our organization has not conducted such evaluation since its activation, the purpose of this scholarly project is to describe and evaluate the perception and use of copy forward among nurses of an academic children’s hospital using a cross-sectional survey study design adopting O’Donnell, et al.’s survey instrument. Results intend to describe nurses’ attitudes and practices, identify possible needs to optimize nursing documentation, and offer recommendations that incorporate end user feedback.

*Summer 2018: Committee Sarah Iriberren, Annette Nasr*

**Joy Harrigan**

**Knowledge, Attitudes, and Perceptions of Rural Patients with a Diagnosis of Anxiety and Depression Towards use of Telehealth: A Systematic Scoping Review**

Overview: Access to mental health professionals remains a significant obstacle for rural populations. Telehealth technologies can provide rural mental health patients access to care that might otherwise be inaccessible due to provider shortages. Numerous studies have investigated the effectiveness of telehealth, though few
SCHOLARLY PROJECTS

have explored the attitudes and perspectives of rural mental health patients. Patient perspectives on the benefits, limitations, and adaptability of telehealth are fundamental for future development and implementation of telehealth tools. Objective: The purpose of this scoping review is to investigate the knowledge, attitudes, and perspectives of rural patients with a diagnosis of anxiety and/or depression regarding telehealth technologies. Methods: Taking a systematic scoping review approach, PubMed, CINAHL, and PsychInfo databases were searched to identify peer-reviewed studies addressing rural patients with anxiety and depression perspectives concerning telehealth interventions. Thematic analysis was utilized to identify patient themes. Results: A total of 21 articles met inclusion and exclusion criteria, of which five articles featured qualitative findings from patients’ experiences. Patient’s expressed telehealth can provide an acceptable, convenient, and therapeutic option for those struggling with anxiety and depression in rural areas. Therapist involvement was a major contributor to patient satisfaction and perception of treatment. Nevertheless, a considerable number of patients still prefer face-to-face therapy. Conclusions: Studies examining the same patient population in urban areas did not have significant differences in perspectives, however, there is a significant gap of knowledge concerning rural mental health patient feedback regarding telehealth. Further research identifying patient preferences is essential to illuminating successful telehealth treatments for this population. Key Terms/Phrases: Rural Mental Health, Rural Population, Telehealth, Patient Perspectives, Anxiety/Depression

Summer 2018: Committee Sarah J Iribarren, Bill Lober

Xinran Liu

Proposal for creating a machine learning algorithm to predict the onset of hospital acquired sepsis.

Hospital acquired sepsis is one of the most dangerous and costly medical condition that can develop in patients who are admitted to the hospital. Early identification and treatment of hospital acquired sepsis is key to improving outcomes associated with it. Machine learning algorithms could potentially be created to help accurately identify patients at risk of developing hospital acquired sepsis, so that patients can be assessed and treated earlier, potentially leading to improved outcomes. The purpose of this scholarly project is to review current literature on sepsis machine learning models, identify limitations of current models, and propose how to develop novel hospital acquired sepsis machine learning model(s) that addresses current limitations, and potentially be more accurate. Specifically, I will propose patient population, data source, data types, how to identify positive cases of sepsis for model training, distribution of training/validation/test sets, handling longitudinal data, potential types of machine learning models to test, novel feature engineering, and model outcomes to focus on.
A Clinical Decision Support Tool for the Management of Resistant Hypertension

**Introduction:** Uncontrolled hypertension is a significant clinical problem resulting in increased patient morbidity and mortality. Half of the hypertensive patients in the United States do not have this condition under control. There are substantial clinical practice variations in hypertension management, with under treatment of such causes as blood renin and aldosterone level abnormalities. Clinical decision support (CDS) systems can optimize hypertension treatment, and the clinical outcomes associated with the use of these systems can be related to their usefulness and usability, as well as end-user acceptance. The purpose of this study was to evaluate the effectiveness of a hypertension treatment CDS tool at a tertiary-care military medical center, and to determine any correlation between its effectiveness and the end-user experience in terms of system usefulness and usability.

**Methods:** The ongoing pilot study uses a 2-phase, prospective, within-subject, repeated measures design to evaluate the blood pressure control rate among patient participants. It also utilizes questionnaires, with questions from validated computing system usability and acceptance models, to assess the end-user experience with the CDS tool.

**Results:** Of the 19 patient participants with resistant hypertension incorporated into this report, 63% (n=12) ultimately achieved hypertension control during the 6-month duration of this study, compared to 0% control (by definition) at the beginning of the study. Provider and patient end-user experiences with the use of the CDS tool were found to be trending positive (favorable). There was no statistically significant correlation between the individual patient’s degree of hypertension control and his or her end-user experience.

**Conclusion:** This pilot study showed that personalizing hypertension management with the assistance of a CDS tool can lead to better clinical outcomes, thereby helping to avoid morbidity and mortality and decrease the overall cost of care. There was no correlation between patient outcomes and CDS usability.

**The effect of cost transparency alerts on prescribing of high cost medication.**

Medication cost transparency alerts may represent a clinically acceptable means to influence prescriber behavior resulting in significant savings to health providers, payers, and patients alike. A block-randomized study was undertaken deploying active, computerized decision support alerts to 288 outpatient practices from February 2018 through April 2018. Prescribing alerts were created for four high cost generic medication classes suggesting substitution with equally available and effective replacements. The primary outcome included change in volume of high cost medications compared to control for each of 4 selected medication classes. A secondary outcome of dismissal rates of the alerts was examined. Prescribers included 6,000 practitioners among multiple specialties and levels of training. Preintervention trends of prescription rates were similar among the intervention and control groups. For the fluoxetine tabs substitution alert, a 47% drop in high cost medication prescribing volume was
noted (P < 0.001); for the doxycycline hyclate alert, a 64% drop in volume was noted (P < 0.001); for the clobetasol alert, a 26% drop in volume was noted (P < 0.001); and for the high cost triptans alert, a non-significant 9% drop in volume was noted (P = 0.65). Taken together, these changes implied a reduction in drug spending of $128,000 on an annualized basis if deployed across treatment arms. Alert dismissal rates were noted to be in the range of 53% to 82%, with the highest dismissal rate associated with the ineffective triptans alert. These findings suggest that medication cost transparency alerts do lead to lower cost prescribing.

*Spring 2018: Committee Michael Leu, Thomas Payne*

**Marc Opdhal**

**Finding Solutions to Adding Multiple Language Features to Patient Portals for Healthcare Consumers with Limited English Proficiency.**

Within the healthcare environment, patients with limited English proficiency (LEP) suffer a greater burden of disease and harm than those in American society whom are English proficient (EP), despite the fact that many tools, methods, and legislation are in place to help ensure that the LEP patients receive equitable care. As recent healthcare legislation is forcing healthcare providers to provide access to electronic health information and connect with their patients outside of the healthcare system via patient portals, it is clear there is no current legislation to ensure LEP consumer-users have equitable access to the portals. A qualitative study will be conducted to understand how to narrow the gap of inequality pertaining to LEP consumer-users and patient portals. The University of Washington Medicine (UWM), and its potential LEP consumer users spanning the entire 5-state WWAMI (Washington, Wyoming, Alaska, Montana, and Idaho) Region will be the setting of this study.

*Summer 2018: Committee Brenda Zierler, Bill Lober*

**Nikolay Titarenko**

**CHF Mobile Health Apps: The Needs of Older Adults.**

Congestive heart failure (CHF) has burdened many and has a strong influence on the morbidity and mortality in the US population. It causes a financial burden to health care systems, accounting for $21 billion in total direct medical costs. CHF exacerbations are the cause of many readmissions and healthcare organizations have taken action to reduce these exacerbations. Hospitals utilize various methods to educate patients on CHF management including nurse and provider education and educational videos, booklets and handouts. Research indicates that mobile health applications (apps) can increase patient education, improve engagement, and improve overall disease management. Prior research also indicates that older adults are a unique end-user and require special focus. The aim of this study was to conduct semi-structured interviews to explore the specific needs of CHF patients over the age of 65 in using mobile health apps. The results will help organizations tailor their mobile applications and minimize barriers for a more effective mobile health app use. The tailoring of heart failure applications to meet the needs of older adults will improve its effectiveness and therefore may improve disease management and reduce readmission rates.

*Summer 2018: Committee Sarah Iribarren, Hilaire Thompson*
Jessica Wallingford

Usability testing of a Mobile Health (mHealth) Application to Facilitate Self Medication Administration in Adults With Tuberculosis: A Qualitative Study

Tuberculosis (TB) currently affects more than 8.7 billion people worldwide. The World Health Organization estimates that in the year 2020 TB will remain on the world's top 10 causes of mortality. Strategies to help patients complete the full treatment course are vital in order to control the spread and possibly eradicate TB. The purpose of this research is to obtain input from design students using a mockup of a TB mobile phone application. The goal is to solicit design perspectives that include ease of use and refinement of key features. Students from the Human Centered Design and Engineering program were recruited to take a qualitative survey asking them for design feedback on a new application designed for TB medication adherence. The participating students submitted their feedback online answering open ended questions. Themes were developed and coded using a program called Nvivo which is designed to help extract themes. A summary report was created by the Lead Researcher with the identified design recommendations and given to the Principal Investigator.

Summer 2018: Committee Sarah Iribarren, George Demiris

Nicole Weissich

Perceived Barriers to Adoption of Ambulance-Based Telestroke Programs Among Established Hospital-Based Telestroke Networks: A Qualitative Study.

Acute ischemic stroke is a time critical illness with a narrow window between symptom onset and availability of appropriate intervention. One method identified as feasible and reliable in reducing time between symptom onset and intervention is ambulance-based telestroke programs. Although this method is supported by the American Heart Association, adoption remains low among established hospital-based telestroke networks. The purpose of this study is to identify the perceived barriers to adoption of the ambulance-based telestroke method in acute ischemic stroke care among established hospital-based telestroke networks. These barriers were identified through a qualitative approach of conducting semi-structured interviews with key stakeholders of hospital-based telestroke networks. Three themes of barriers were identified. These themes include connectivity, funding, and security concerns, with connectivity identified as the most outstanding barrier to adoption of the ambulance-based telestroke method. A recommendation of utilizing the FirstNet network is provided for organizations considering implementing the ambulance-based telestroke method as a possible solution to the barriers identified, especially connectivity.

Summer 2018: Committee Hilaire Thompson, Eeeseung Byun
Christopher Weissman

The Sustained Impact of an Integrated Health Information System on Emergency Department Operations and Productivity: A Pre-Post Implementation Analysis in an Academic Emergency Department

Stand-alone emergency department information systems (EDIS) render emergency departments and providers inefficient and less productive. Most emergency departments acquire stand-alone systems with limited or no interface with the hospital information system, in an effort to implement a best-of-breed system at a lower cost. This lack of interface forces providers and departments to implement changes in workflow to compensate for the lack of integration, leading to less efficiency and productivity. The impact of implementing an emergency department component of the primary health information system on efficiency and productivity is valuable information for hospitals and emergency departments investing in health information technology. This is a 10-month pre/post implementation analysis of an integrated health information system in an emergency department at an academic, military hospital. The outcome measures include emergency department throughput metrics, such as length of stay, and provider documentation based on CPT and E&M codes. A 4-month sub-analysis was done and showed an increase in the mean length of stay by 25 to 45 minutes and an increase in the percentage of patients with a greater than 6-hour length of stay by 4 to 8 percent daily. The provider productivity based on E&M code decreased but providers documented EKG interpretation more consistently. Operational metrics and some aspects of provider productivity did not improve with the implementation of an integrated health information system.

Spring 2018: Committee Peter Tarczy-Hornoch, Robert Marshall

Hiruye Aradom

Evaluating the Effectiveness of Health Information Exchange: Systematic Review

Background and Objective: Health information exchange (HIE), a system that allows healthcare professionals to access and share patient information electronically in a secure manner, is increasing in the United States, and it is incentivized by government policies. The implementation of such a system has the potential to improve patient care tremendously. The purpose of this study is to conduct a systematically review to evaluate the effects of HIE on clinical care.

Methods: The systematic review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. PubMed and CINAHL databases were used to identify empirical articles that evaluated HIE in the context of a healthcare outcome.

Results: Out of 1328 total articles retrieved, 24 met the inclusion criteria. The majority of the studies were from the United States representing 9 states; and a handful of HIEs studies occurred in New York. Seven of the 24 studies used designs more suitable for producing quality evidence and all reported some positive effect from HIE; none reported adverse effects.

Conclusions: The systematic review found that studies with more rigorous designs all reported benefits from HIE. Such benefits include fewer duplicated procedures, reduced imaging, lower costs, and improved patient safety. Moreover, studies evaluating community HIEs were more likely to find benefits that studies that evaluated enterprise HIEs or vendor-mediated exchanges. Overall these finding bode well for the HIEs ability to deliver on anticipated improvements in care delivery and reduction in costs.

Summer 2018: Committee Michael Leu, Bill Lober
Emelia Barani

Informatics tools for provider education: A literature review to inform the design of an interactive web-based educational module to support family caregivers’ pain management in end-of-life care

Pain management has been identified as the greatest area of burden among informal family caregivers in the end-of-life setting. The role of hospice involves the provision of holistic, patient-centered care along with caregiver support from a multidisciplinary team. Currently, there remains a need to identify new interventions to improve recognition of caregiver barriers to pain management, develop practical strategies for addressing such barriers, and ultimately improve pain management among hospice patients. While the focus of hospice care is a palliative one, many caregivers feel as if they do not have sufficient support or open communication with hospice providers. One potential approach to improve pain management and increase support for caregivers may be the use of technology or more broadly informatics tools to deliver cost-effective provider education. The purpose of this project is to perform a comprehensive literature review of research examining informatics tools for provider education and to synthesize findings into a summary of current understanding. Results will inform the design and development process of an interactive web-based educational module for providers to use in the hospice setting.

Summer 2018: Committee Hilaire Thompson, George Demiris


