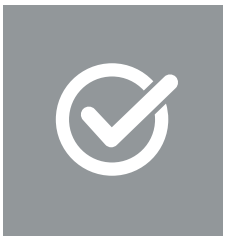


2019  
2020

CENTER FOR HEALTH ORGANIZATION TRANSFORMATION (CHOT)

# RESEARCH COMPENDIUM



A National Science Foundation Industry-  
University Cooperative Research Center



**CHOT**  
CELEBRATING 10 YEARS



# TABLE OF CONTENTS

1

## **ABOUT**

NSF Center for Health Organization Transformation (CHOT)  
Contact Information  
National Science Foundation I/UCRC Model

7

## **CHOT INSIGHTS**

16

### **PROJECTS: POPULATION HEALTH**

Advancements in Social Determinants of Health  
Culturally-Responsive Approaches for Caregiving Innovation  
Smoketown Hopebox  
Utilize Culture/Creative Industry to Impact Obesity Prevention  
Linking Social Determinants to Healthcare Delivery for At-Risk Pediatric Populations  
Professional Healthcare Chaplaincy Certification

23

### **PROJECTS: CARE COORDINATION**

Evaluation and Optimization of Inter-Unit Efficiency and Workflow Within Departments/Systems  
Developing a Risk Prediction Model for Hospital Acquired Clostridium Difficile Infection (CDI)  
Evaluation of Interventions Related to Workers Compensation Injuries  
Developing an Inpatient to Community Transition of Care Model for Spinal Cord Injuries (SCI)

27

### **PROJECTS: ANALYTICS AND INNOVATIVE TECHNOLOGY**

Risk and Predictive Modeling for Improving and Advancing Quality of Care Delivery  
Building Heterogenous Health Databanks: Costs, Benefits, Limitations, and Best Practices  
Developing a Globally Scalable B-C-B Data Sharing Platform

30

### **PROJECTS: PATIENT EXPERIENCE**

Effective Genetic Test Authorization and Coordination for Improved Patient Care

31

### **PROJECTS: ACCESS TO CARE**

Prediction and Intervention Models for Combating the Opioid Epidemic

# NSF Center for Health Organization Transformation

## Mission

The mission of the NSF Center for Health Organization Transformation (CHOT) is to advance the knowledge and practice of transformational strategies in evidence-based management and clinical practice.

CHOT conducts cooperative research among universities, health systems and other health-related industries. The Center relies on multi-disciplinary approaches to advance and link system design and organizational technologies in innovation research. The three main areas in which CHOT conducts research are:

- Developing research-informed strategy
- Validating innovations in healthcare delivery
- Implementing evidence-based innovation across settings

## CURRENT CHOT INDUSTRY MEMBERS

Association of Professional  
Chaplains

AT&T

Central Texas Veterans Health  
Care System

Children's National Health System

Highmark

Home Instead Senior Care

Ideas xLab

KentuckyOne Health

LakeShore Foundation

Main Line Health

National Association of Catholic  
Chaplains

Opelousas General Health System

Passport Health Plan

Penn State Health Milton S. Hershey  
Medical Center

Philips Healthcare

Sanofi

Seattle Children's Hospital

Siemens

Susan G Komen

Texas A&M College of Medicine

University of Louisville Hospital

York Risk Group

Youth Build

## PAST CHOT INDUSTRY MEMBERS

Alacare Home Health & Hospice

American Society of  
Anesthesiologists

Avizia, Inc.

Beth Israel Deaconess Medical  
Center

Care Coordination Institute

Children's Healthcare of Atlanta  
Sibley Heart Center

East Texas Medical Center

Georgia Trauma Care Network  
Commission

Grady

GTech Procure

HealthSouth

HEB

HKS, Inc.

Last Best Chance, LLC

Lockheed Martin

Lone Star Circle of Care

Maine Medical Center

MD Anderson Cancer Center

Meadows Regional Medical  
Center

Morehouse School of Medicine

MultiCare Health System

Northside Anesthesiology  
Consultants, LLC

Our Lady of the Lake Regional  
Medical Center

Palm Health Foundation

Partners Healthcare

Pennsylvania Office of Rural  
Health

Quantum Innovation

Restore Medical Solution

Scott & White

St. Luke's Episcopal Health  
System

Studer Group, LLC

Texas A&M Coastal Bend Health  
Education Center

Texas Children's Hospital

Texas Health Resources

University of Alabama at  
Birmingham Health System

US Department of Veterans  
Affairs: Center for Applied  
Systems Engineering

Ustawi Biomedical Research  
Innovation and Industrial Centers  
of Africa (UBRICA)

Verizon

## CHOT UNIVERSITY SITES



## PRIMARY CONTACTS

### **Thomas Ferris, Ph.D.**

Center Director, Texas A&M University  
tferris@tamu.edu

### **Bitia A. Kash, Ph.D., M.B.A., FACHE**

Center Co-Director, Texas A&M University  
bakash@tamu.edu

### **Lauren Irlinger, M.H.A.**

Managing Director, Texas A&M University  
lirlinger@tamu.edu

### **Kenneth Cochran, Ph.D.**

Industry Advisory Board Chair  
kencochran@opelousasgeneral.com

## SITE DIRECTORS

### **Hui Yang, Ph.D., M.B.A.**

Site Director, Pennsylvania State University  
Huy25@psu.edu

### **Robert Weech-Maldonado, Ph.D., M.B.A.**

Site Director, University of Alabama at Birmingham  
Rweech@uab.edu

### **Nancy Borkowski, D.B.A.**

Site Co-Director, University of Alabama at Birmingham  
Nborkows@uab.edu

### **Christina Mastrangelo, Ph.D.**

Site Director, University of Washington  
Mastr@uw.edu

### **Joseph Heim, Ph.D.**

Site Co-Director, University of Washington  
Jheim@uw.edu

### **Christopher E. Johnson, Ph.D.**

Site Director, University of Louisville  
Christopher-e.johnson@louisville.edu

### **J'Aime C. Jennings, Ph.D.**

Site Co-Director, University of Louisville  
Jaime.jennings@louisville.edu

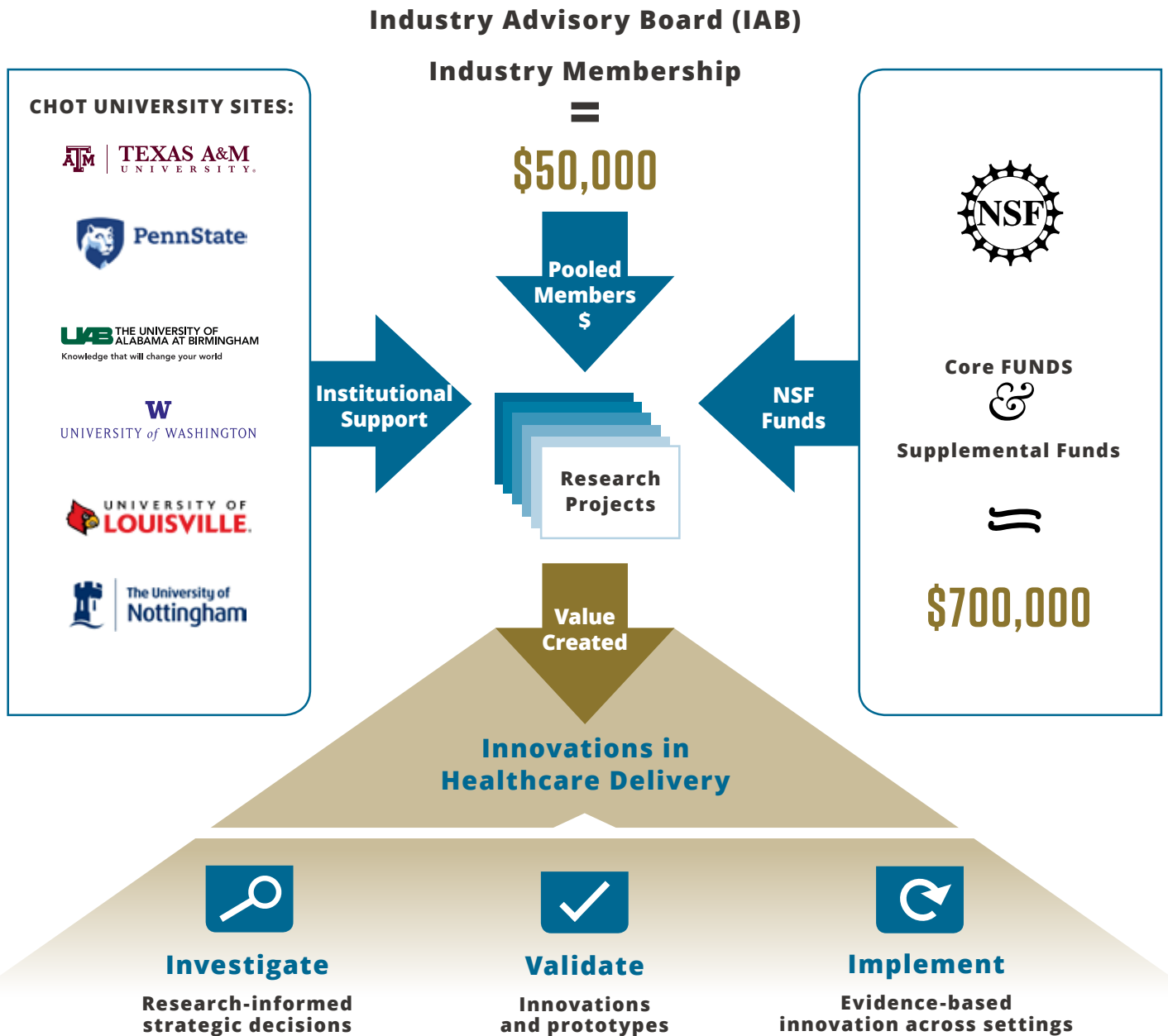
### **Stephen Timmons, Ph.D.**

Site Director, University of Nottingham  
Stephen.timmons@nottingham.ac.uk

# National Science Foundation I/UCRC Model

As a National Science Foundation industry-university cooperative research center (I/UCRC), CHOT follows a model of an industry-academic partnership that benefits industry-focused research across more than 50 disciplines. Of the 70 I/UCRCs within the United States, CHOT is the only one focused on innovations in healthcare delivery. CHOT researchers work alongside the Industry Advisory Board (IAB) to conduct research that supports the implementation of evidence-based transformational strategies within the healthcare sector. CHOT creates a safe, mutually beneficial, cooperative environment where leading healthcare industry members can come together to collaborate and to innovate.

Our research model relies on the knowledge and experience of healthcare leaders to guide academic research. This cooperative model ensures that the research is both meaningful and applicable to the healthcare industry and provides immediate decision support.



CHOT's research model relies on the knowledge and experience of healthcare leaders to guide academic research to ensure that it is meaningful and applicable to the healthcare industry and provides immediate decision support.

# CHOT INSIGHTS

Proposed business and franchising models for  
primary care in Kenya

The role of community engagement in building  
sustainable health-care delivery interventions for  
Kenya

Measuring team effectiveness in health care setting:  
An intervention of survey tools

Psychological distress and the use of clinical  
preventive services by community-dwelling  
older adults


Systematic review of merging models of cancer care:  
Implications for the health industry

The evolution of measuring patient  
satisfaction


Quantifying the Mismatch Between Course Content  
and Students' Dialogue in Online Learning  
Environments

# Proposed business and franchising models for primary care in Kenya

**The main HEALTHCARE CONCERNS in Kenya are:**



how to best deliver healthcare services and



how to finance healthcare services in a way that makes them effective, accessible and affordable

**Proposed solution – Retail clinic concept**

Each RCC will carry space for basic ambulatory capacity, a clinical examination room, a dispensing pharmacy, a clinical diagnostic laboratory and space for clinical trial research work.



**Models for practice:**

Kaiser  
Permanente

Texas A&M  
System

Cleveland  
Clinic


**Proposed business model – franchising**

- The formal definition of social franchising is the application of commercial franchising concepts to achieve socially beneficial ends, rather than profit
- Hybrid Value Chain (HVC) is a business model that leverages the capabilities of the business and citizen sectors to enable the delivery of needed goods and services to low-income populations in a cost effective way

**Proposed solutions and strategies:**

RECRUIT


physicians to address physician shortage:



It is in our recommendation to implement not only proven physician recruiting methods, but to implement incentives for physicians to stay in Kenya and work for the RCC.

Creation of a self-insured and vertically integrated

MEDICAL CITY



**Citation:** Davis, Elise Catherine, et al. "Proposed business and franchising models for primary care in Kenya." *European Journal of Training and Development* (2018).

**Describing words:** Kenya, Franchising, Patient engagement, Physician recruiting, Retail clinic, Social franchising



# The role of community engagement in building sustainable health-care delivery interventions for Kenya

**Research breaks healthcare seeking patterns in Kenya in three categories :**

1. Self-treatment, as a cost-saving strategy
2. Government clinics
3. Private clinics, which are more expensive but have trained health-care providers and higher availability of drugs

“  
The **poorest 40 percent of rural Kenya self-treat** using shop-bought drugs, which have the potential to be unreliable or tampered with, whereas 42 percent attempt visiting a health facility only to find they cannot afford treatment.  
”

## Barriers to community engagement in health-care utilization

### Cost of healthcare—

However, Kenya's GDP on health is increasing over 1 percent per year, as the total health expenditure in 2009/10 was 5.4 percent (Health Policy Project, 2016).

government health budget  **31%** 2012-2015

In addition, the government health budget grew 31 percent from 2012/13 to 2014/15, and increased 57 per cent from 2013/14 to 2014/15. Kenya is primarily dependent on donors for health spending, but is able to provide free maternity care and, in 2013, abolished all fees in public dispensaries and health centers

\$\$\$\$

### Health care in Kenya relies heavily on funding

from international programs such as the US Agency for International Development and United Nations Development Programme



### Kenyans may choose to forgo a trip to a health clinic

depending on their personal income, the user fees and their gender and education levels.



**Community engagement:**  
must define community and understand engagement

## The most effective forms of community engagement will be realized by:

- removing or mitigating barriers to care;
- empowering the communities;
- implementing and incentivizing preventive medicine;
- engaging the community through CHWs and mobile health care.

**Citation:** Davis, Elise Catherine, et al. "The role of community engagement in building sustainable health-care delivery interventions for Kenya." *European Journal of Training and Development* (2018).

**Describing words:** Kenya, Access, Quality of care, Community engagement, mHealth, Community health worker, Mobile clinic

# Measuring team effectiveness in health care setting: An intervention of survey tools



Previous research indicates that higher team effectiveness is associated with better health outcomes. The impact of high-functioning teams on quality of care, worker satisfaction, and cost of care can be substantial when it comes to surgical care, intensive care, ambulatory care, and primary care managing patient populations with chronic conditions.



## The Problem:

There are no consensus strategies to help health care organizations achieve optimal teamwork

### Health care teams have



more dynamic work conditions that change frequently



to change team membership in a short-term period



various specialized members



interprofessional and even multidisciplinary cultures

## The Study:

We conceptualized 3 relevant dimensions as search points



1. Survey instruments



2. Clinical setting



3. Team effectiveness

## The Goal:



Identify validated survey instruments by clinical settings.



Assist in the development of more specialized team member training and operational design interventions directed to the most appropriate team composition, team member tasks, and responsibilities by clinical settings.

## The Models:

We employed 2 conceptual models as frameworks for evaluating the contextual nature of team effectiveness across different settings—

1

The Donabedian model on quality of care

Donabedian contends that it is important to identify essential elements constituting quality of care based on structure, process, and outcome

2

The Command Team Effectiveness (CTEF) model

CTEF model to refine the framework of analysis to be more relevant to surgical teams, which have the unique attributes of action teams

## The Findings:



Developing accurate methods for measuring team effectiveness will be crucial to help drive quality improvement.



Regardless of the clinical setting, studies measuring team effectiveness using surveys should also include measures of the surveys' psychometric properties.

In addition, we found that surgical settings have distinctive conditions for measuring team effectiveness relative to other primary care or ambulatory care. As evidenced by programs such as Enhanced Recovery After Surgery (ERAS), the Perioperative Surgical Home (PSH), and Medicare's Comprehensive Care for Joint Replacement Model (CJR), the operating room has become a critical setting for team-based care delivery<sup>58-60</sup>; thus, more validated survey instruments focused on surgical action teams are needed

**Citation:** Kash, Bitu A., et al. "Measuring team effectiveness in the health care setting: an inventory of survey tools." *Health services insights* 11 (2018): 1178632918796230.

**Describing words:** Team effectiveness, surveys, systematic review, health care quality assessment

# Psychological distress and the use of clinical preventive services by community-dwelling older adults

**The sample included respondents 65 years of age or older who participated in the Medical Expenditure Panel Survey (MEPS) in 2011;** The study included 3,658 older adults with valid responses.

Respondents were asked,



or similar questions for five preventive services, and the responses were re-coded into “within the recommended time period” or “not within the recommended time period.”

Five preventive care services included

1. **Breast cancer screening**  
using mammogram for women, 65 to 74 years;
2. **Colorectal cancer screening**  
using fecal occult blood test (FOBT), sigmoidoscopy, or colonoscopy, 65 to 74 years;
3. **Adult immunization**  
(influenza vaccination), ≥65 years;
4. **Blood pressure screening**  
≥65 years; and
5. **Blood cholesterol screening**  
≥65 years.

The primary independent variable in this study was the

**PRESENCE OF PSYCHOLOGICAL DISTRESS**



MCS focuses on participants’ feelings of depression and anxiety, social activities, amount accomplished, and carelessness

**NEGATIVE ASSOCIATION BETWEEN** **psychological distress + mammography**

**After adjusting for potential confounders, there was a statistically significant negative association between psychological distress and use of mammography for breast cancer screening** (Table 3).

Older women with psychological distress were less likely than older women without psychological distress to have biennial mammography for breast cancer screening.

## The pattern of lower uptake of mammogram screening among older women who experience psychological distress

is well described in the literature. Others have suggested that women with depressive symptoms are more likely to be self-negligent, have self-defeating attitudes, lack sense of control, and have feelings of hopelessness.

## The nonsignificant differences in the use of preventive services among older adults with and without psychological distress

can also be attributed to prevention-focus interventions over the past decade, such as Medicare managed care plans, ACOs, and PCHMs.

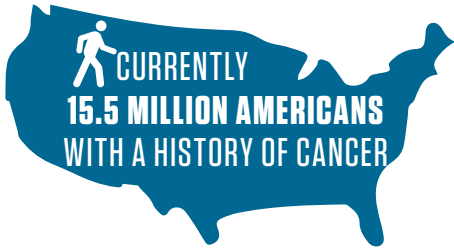
With the integration of **BEHAVIORAL CARE** in primary care settings or advanced health care practice models, such as PCMH and ACOs, health care providers should incorporate screening tools into routine visits to detect signs of mental health disorders and manage the symptoms following current treatment guidelines.

**INCREASED COLLABORATION** between primary care providers and specialties and the use of electronic reminder systems are also shown to be effective in disease prevention for older adults.

**Citation:** Lin, Szu-Hsuan, et al. “Psychological Distress and the Use of Clinical Preventive Services by Community-Dwelling Older Adults.” *Journal of Applied Gerontology* 38.5 (2019): 599-616.


**Describing words:** Preventative services, psychological distress, older adults

# Systematic review of merging models of cancer care: Implications for the health industry



ARE LIVING IN THE **UNITED STATES** [1], including both persons with ongoing diagnoses and in remission.

APPROXIMATELY  
**1.6 MILLION**  
NEW CANCER CASES  
are diagnosed annually  
with nearly  
**600,000**  
CANCER RELATED DEATHS

**CANCER IS THE**  
**2<sup>nd</sup>** most common  
cause of death  
**IN THE UNITED STATES**  
 **next to heart disease** [2]

Through the systematic review of literature focused on emerging models of cancer care, we identified five trends and models of care in cancer, which see to all facilitate a fully coordinated and patient centered care environment.



**1.** This model of cancer research can be directly translated to a hub and spoke model focused on providing access to appropriate cancer care to all populations including geographically isolated regions. NCORP is a nationally recognized network of investigators, cancer care providers, academic institutions, and other relevant organizations. NCORP consists of three major components

1. Research Bases
2. Community Sites
3. Minority/ Underserved Community Sites

**2.** Rapid Learning Cancer Care (RLCC) formulates a new learning healthcare system around three fundamental concepts.

1. It aims to generate and apply the evidence that is most relevant to each patient.
2. RLCC increases the scientific discovery as an outgrowing element of the patient care.
3. There is support for the quality, assessment, and improvement of patient safety, which maximizes healthcare value

**3.** Maximize value for patients through achieving great outcomes at the lowest cost. To accomplish this goal, Porter and Lee contend six steps that can prepare future cancer centers, all of which reinforce each other, that are outlined below.

1. Organize into Integrated Practice Units
2. Measure outcomes and costs for every patient
3. Move to bundled payments for care cycles
4. Integrate care delivery systems
5. Expand geographic reach
6. Build an enabling information technology platform

**4.** "A treatment planning approach in which a number of doctors who are experts in divergent specialties (disciplines) review and discuss the medical condition and treatment options of a patient. In cancer treatment, a tumor board review may include that of a medical oncologist (who provides cancer treatment with drugs), a surgical oncologist (who provides cancer treatment with surgery), and a radiation oncologist (who provides cancer treatment with radiation)"

**5.** Triaging cancer patients for psychosocial distress and matching their level of distress to the level of care. There are five levels to the model, where the first is generic care and the last is more specialized care

- Level 1:** universal care, is for any cancer patient or caregiver that has mild distress
- Level 2:** supportive care, is for those suffering with mild to moderate distress
- Level 3:** extended care, is for those with strictly moderate distress
- Level 4:** specialist care, is for those suffering with moderate to severe distress.
- Level 5:** acute care, is for those with strictly severe distress

**Citation:** Kash, B., et al. "Systematic Review of Emerging Models of Cancer Care: Implications for the Health Industry." *J Integr Oncol* 6.196 (2017): 2.

**Describing words:** Cancer care, Emerging models, Facility implications

# The evolution of measuring patient satisfaction

The history of the first patient satisfaction questionnaire (PSQ) goes back to 55 Likert-type items that measured attitudes toward characteristics of physicians and medical care services, such as interpersonal skills, waiting time, emergency care, cost of care, and other factors

Today, patient satisfaction encompasses several different dimensions including



 Interpersonal manner	 Technical quality	 Accessibility/ convenience	 Finances
 Efficacy/ Outcomes	 Continuity	 Physical Environment	 Availability

During this last decade, the concept of the **PATIENT EXPERIENCE** has gained importance as healthcare providers move beyond **achievable care quality and patient safety targets**



**IMPROVING THE PATIENT EXPERIENCE** requires the measurement of factors and characteristics, that are important and matter to the patient, throughout the care cycle.

**PATIENT PERCEPTIONS, EXPECTATIONS AND PATIENT SATISFACTION**

 <p><b>QUANTITATIVE METHODS</b> using structured questionnaires, would include patient-reported questions regarding health status, function, quality of life, and condition specific measures.</p>	<p><b>QUALITATIVE METHODS</b> are typically open-ended questions used for the patient to describe his/her experiences and can be conducted via interviews or focus groups.</p> 
---	--



The more time spent with the provider (usually a physician or physician extender, such as a physician assistant or nurse practitioner), the higher perceived service and patient satisfaction



When patients perceive the staff treat them as a whole person and not just a patient and nurses convey themselves in a professional and confident manner, satisfaction increases



Patients are more satisfied when they receive clear, detailed communication and easily understood instructions



The longer a patient waited, the lower their satisfaction




Customer-need knowledge, or understanding patient needs and their level of importance, can help create a more positive patient experience



One of the most important factors to control while managing the patient experience is the emotional aspects ranging from fear and anxiety to trust and hope

Patient experience can also be measured using ethnographic approaches, photo voice, and guided tours.

  
**Ethnographic**  
approaches include the use of shadowing and mystery shoppers to examine experiences to note potential improvements for care delivery

  
**Photo voice**  
provides patients with cameras to take pictures of their experience

  
**Guided tours**  
involve the patient leading the evaluator through his/her visit and discussing experiences (i.e. thoughts, feelings) throughout the care process

**Citation:** Kash, Bitu, and Molly McKahan. "The Evolution of Measuring Patient Satisfaction." *of 4* (2017): 2.

**Describing words:** Patient satisfaction, Patient experience, measuring satisfaction, expectations, perceptions

# Quantifying the Mismatch Between Course Content and Students' Dialogue in Online Learning Environments

The authors of this paper propose a topic modeling method, based on latent Dirichlet allocation (LDA), that quantifies the effects of divergence between course topics (mined from textual transcriptions) and student discussed topics (mined from discussion forums).

TO SUMMARIZE, THE NOVEL CONTRIBUTIONS OF THIS WORK ARE:



## QUANTIFICATION OF THE DIVERGENCE

(i.e., dissimilarity) between the contents of a course and the content expressed by students taking that course

## QUANTITATIVE ASSESSMENT

of how divergence impacts course performance metrics such as



(a) number of posts/comments made by students (i.e., an indication of students' engagement in the course),

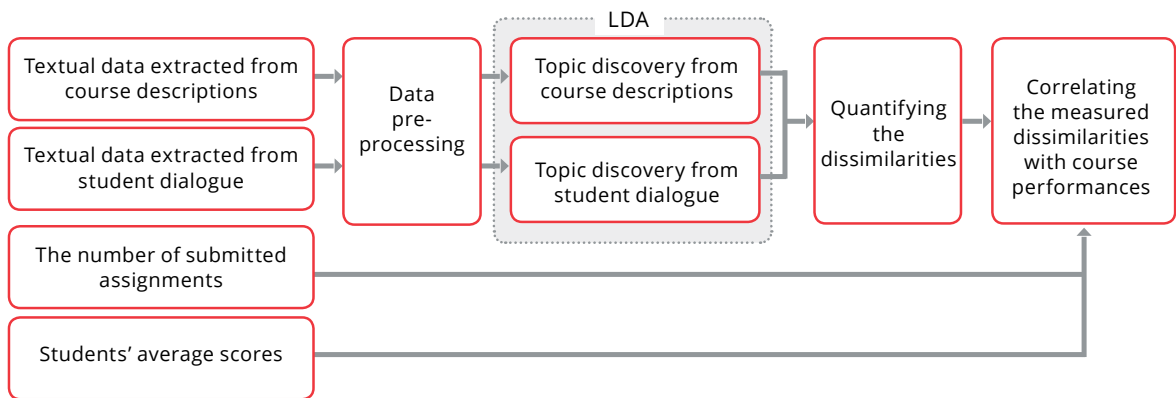


(b) number of assignments submitted by students, and

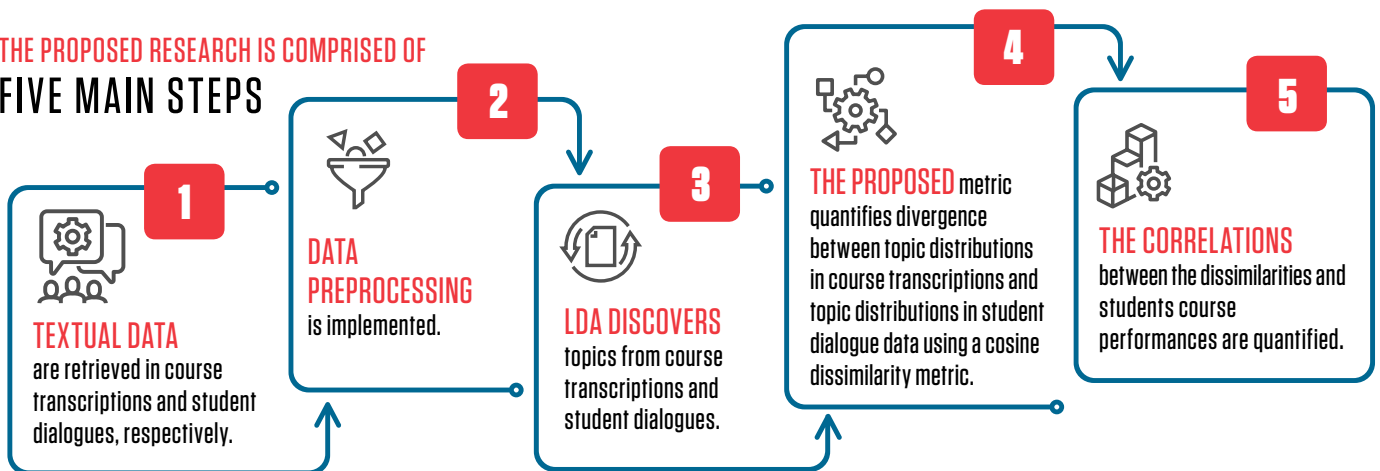


(c) the grade attained by students

### OVERVIEW OF THE PROPOSED RESEARCH



### THE PROPOSED RESEARCH IS COMPRISED OF FIVE MAIN STEPS



**Citation:** Lim, Sunghoon, et al. "Quantifying the mismatch between course content and students' dialogue in online learning environments." *ASME 2017 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference*. American Society of Mechanical Engineers Digital Collection, 2017.

**Describing words:** n/a

# CHOT PROJECTS

**POPULATION HEALTH**

**CARE COORDINATION**

**ANALYTICS & INNOVATIVE TECHNOLOGY**

**PATIENT EXPERIENCE**

**ACCESS TO CARE**



## 1

**ADVANCEMENTS IN SOCIAL DETERMINANTS OF HEALTH****Value Proposition**

- This project will help industry members understand the impact of their investments to improve population health and disseminate information about those investments to their partners, community stakeholders, and the healthcare industry and academic communities.

**Description**

Research has consistently shown that where and how people live is equally, if not more, influential than clinical care on individuals' lives. Therefore, it is vital to understand where research stands with regard to key social factors and the efficacy of related interventions. This project will review the literature around identified social determinants of health to uncover evidence-based best practices, assess population health base-line data, and conduct initial social network analyses in funded project communities.

**How is this different from related research?**

While numerous studies have examined the many social determinants of health, this project will systematically review the literature in areas of social connection, food security, asset security, and post-secondary success and sustainable employment. In addition, a social network analysis will be conducted within each of the Humana-foundation funded communities to understand existing inter-agency relationships that address one or more of the aforementioned social determinants of health.





## 2

## CULTURALLY-RESPONSIVE APPROACHES FOR CAREGIVING INNOVATION

### Value Proposition

- Understand the benefits of culturally-responsive approaches to employee engagement and employee health.
- Develop a flexible, strategic outline for franchise-wide approaches that could be implemented at a scale with opportunities identified for cross-sector application.

### Description

This project will seek insights into

- (1) what ways culturally-responsive approaches might strengthen psycho-social resources for employees;
- (2) how executives can teach their employees hope and build strategies that instill it in the organization;
- (3) incorporate culturally responsive communication around hope to build trust between management and employees; and
- (4) explore ways in which hope can become a strategic framework for business growth.

### How is this different from related

#### research?

Many studies have noted the advantages of positive psychology in the workplace, and researchers have developed measurement tools that assess levels of hope as well as agency and pathway thoughts. However, few studies have examined the explicit-development of culturally-responsive approaches to hope as a strategic business framework.



## 3

**SMOKETOWN HOPEBOX****Value Proposition**

- Advance knowledge of inclusive community development models using a co-innovation approach, grounded in culture.
- Advance knowledge of a university-wide anchor institution's approach to community engagement.

**Description**

This project is a socially and culturally responsive innovation comprised of a laundromat, compassion clinic (to provide training to University of Louisville medicine, nursing, and dental students), arts & culture program to celebrate Black heritage, digital learning lab, and business incubator for multiple employee-owned cooperatives and sole proprietorships. It will use the Center for Creative Placehealing's (CCP) cultural solutions method for health-related community development.

**How is this different from related research?**

Well-being is fundamentally influenced by the cultural contexts from which we make meaning. It is the interaction of the cultural relationships between the different levels of the social-ecological model that reveals new ways of understanding cultural assets/opportunities, and how they can be reimagined to support improved public health outcomes. This "re-imagining" is a culturally responsive process to innovation. Evidence shows that this innovation process itself, if well designed and understood, can yield health-protective factors.



## 4

## UTILIZE CULTURE/CREATIVE INDUSTRY TO IMPACT OBESITY PREVENTION A VALUE-BASED REIMBURSEMENT PERSPECTIVE

### Value Proposition

- Expands opportunities for investing in prevention science
- Makes cultural-impacts on health measurable
- Strengthens leadership
- Promotes cross-culture innovation
- Creates cultural markets for health

### Description

Engaging culture as a social determinant of health using the Center for Creative Placehealing's (CCP) cultural-solutions method for health-related community development supports the CDC funded obesity funded project (SPAN) in Kentucky by offering culturally-responsive innovation trainings in collaboration with IDEAS x Lab. The purpose of the training is to build capacity in state-level staff and stakeholders by improving the understanding on how culture intersects with health equity including how it applies to people in rural/urban settings.

### How is this different from related research?

- (1) Understand how culture intersects with health equity including how it applies to people in rural settings, those with disabilities, and other groups.
- (2) Combine principles and approaches rooted in health equity, hope and heritage in creating an innovative project design/community engagement strategy that goes beyond traditional methods that rely on predominantly on behavior change.
- (3) Think expansively about how to leverage the power of local arts, faith, and sports communities in trust building, qualitative data collection, and community participation.



## 5

**LINKING SOCIAL DETERMINANTS TO HEALTHCARE DELIVERY FOR AT-RISK PEDIATRIC POPULATIONS****Value Proposition**

Industry partners will be able to investigate anticipated changes in levels of demand when considering at-risk pediatric populations and trigger events. They will use simulation models to examine the complex interdependent consequences of new patient monitoring capabilities.

**Description**

Many factors contribute to health & health outcomes of patients including social and environmental determinants, such as economic stability, housing & physical environment, food access, community support, & available health-care systems. The degree of change as well as the emergent set of changes that might occur in concert can often have health consequences for at-risk populations. In this proposed study, we intend to investigate and quantify opportunities for improving pediatric population health, patient experience and costs—the Triple Aim—by aligning social determinant events with timely (rapid) healthcare delivery.

**How is this different from related research?**

This proposed research focuses on at-risk, asthmatic pediatric populations & examines the potential to improve the time-until-response for care & the reduction in total cost of care. Using simulation modeling, the research intends to demonstrate the value of responding to individual social determinant events as well as multiple events occurring within a defined time span. The research has the potential to impact other chronic respiratory diseases affected by environmental factors. This is phase one of a two-part research program. The second phase will demonstrate the practical application of social determinant response by developing the necessary databases, triggers, & event sources.



## 6

## OUR EMOTIONAL WELLBEING: ARTS &amp; YOUTH LEADERSHIP

### Value Proposition

- Expands opportunities for investing in prevention science
- Makes cultural-impacts on health measurable
- Strengthens leadership
- Promotes cross culture innovation
- Creates cultural markets for health

### Description

This project is aimed to support, guide, and evaluate an arts-based process in Louisville's smoke town neighborhood designed by IDEAS x Lab to cultivate youth (AA, LGBT, diverse) leadership, hope, and emotional well-being. The multiphase initiative will culminate in 2020 with a "Youth Wellbeing Summit" and launch of a toolkit/curriculum. This project will use the Center for Creative Placehealing's (CCP) cultural solutions method for health-related community development.

### How is this different from related research?

Well-being is fundamentally influenced by the cultural contexts from which we make meaning. It is the interaction of the cultural relationships between the different levels of the socio-ecological model that reveals new ways of understanding cultural assets/opportunities, and how they can be reimagined to support improved public health outcomes. This "re-imagining" is a culturally-responsive process to innovation. Evidence shows that this innovation process, itself, if well designed and understood, can yield health-protective factors. system design and human-device interaction technologies to offer real-time decision support providers.

**7****PROFESSIONAL HEALTHCARE CHAPLAINCY CERTIFICATION****Value Proposition**

- Improve standards for healthcare chaplaincy education and certification

**Description**

Recent developments in healthcare and chaplaincy provide a rationale to take a careful look at professional chaplaincy education and certification processes to ensure they are continuing to serve the profession and industry as well as possible. The purpose of this study is to understand the strengths of current chaplaincy certification processes as well as to identify concerns and questions about the processes involved in professional spiritual care certification.

**How is this different from related research?**

No one has undertaken a formal examination of the healthcare chaplaincy certification process. More specifically, research methodologies in healthcare chaplaincy are more frequently used to inform the quality of spiritual care provided.



## 8

## EVALUATION AND OPTIMIZATION OF INTER-UNIT EFFICIENCY AND WORKFLOW WITHIN DEPARTMENTS/SYSTEMS

### Value Proposition

CHOT IAB members will benefit by the broad sharing of challenges (to work on with collaborative research) and best practices (that are implementable) in maintaining efficiencies across measures of value to the member operations (patient flow, resource utilization, etc.)

### Description

Magnetic Resonance Imaging (MRI) is an important diagnostic tool for the detection and monitoring of specific diseases and conditions. However, the equipment cost and maintenance and the specialty training of the technologists makes the examination expensive. This project will focus on the evaluation of work and patient flow inefficiencies between hospital departments of involved health systems and use this to determine common bottlenecks effecting efficiency in delivery of care, including the MRI imaging process. The researchers will use their findings to identify and realize areas of cost savings and a more timely delivery of care for involved IAB members.

### How is this different from related research?

Efficiency has been studied extensively in healthcare as a measure of quality in task performance and resource utilization. However, the studies tend to be isolated to particular healthcare processes, and there is a lack of general analyses that investigate efficiency improvement efforts across a broader platform. The identification of common bottlenecks can inform key areas of concern and potential improvement across the care industry. Additionally, related care and research has focused on teleradiology benefits and processes, cognitive load of reading radiologists, and scheduling improvements of MRI exams. There are opportunities to increase efficiency of administrative tasks.



## 9

## DEVELOPING A RISK PREDICTION MODEL FOR HOSPITAL ACQUIRED CLOSTRIDIUM DIFFICILE INFECTION (CDI)

### Value Proposition

Hospitals would be able to develop more targeted testing strategies for CDI and deploy patient-specific interventions through decision support systems.

### Description

Hospital Acquired Infections (HAI), infections acquired after admissions to the hospital, consume about \$25 to \$31 billion. Clostridium Difficile Infection (CDI) is the most common cause of infectious diarrhea occurring in hospitals. Treatment costs per patient is approximately \$8,911 to \$30,049. The goal of this research is to improve patient outcomes in CDI by testing our findings in earlier phases by using Cerner Health Facts data warehouse. There is a need for better predictive models that allow the development of patient-specific risk scoring.

### How is this different from related research?

Healthcare providers are vulnerable to penalties for Healthcare Associated Infections (such as CDI) by the payers. CDI risk prevention model is important for providers to develop more targeted prevention strategies. Patients would benefit from better informed clinical care through the CDI risk prevention model. CDI risk prevention models would lead to potential interventions such as

- (1) developing intervention strategies targeted at high-risk patients that may reduce the risk of contracting CDI,
- (2) diagnosing preexisting CDI resulting in quicker treatment for patient & prevent HAI penalty for hospitals, and
- (3) potentially reducing the length of stay thereby potentially reducing hospital costs. to formal healthcare providers.

For older adults with complex multiple chronic conditions and cognitive impairment, the individual who may be best able to assess baseline cognitive function is the family caregiver. A modification of CAM, FAM-CAM, allows family caregivers to report their observations of symptoms of delirium in a standardized method. The FAM-CAM shows potential to improve recognition, and therefore, management of delirium in the acute care setting.





10

## EVALUATION OF INTERVENTIONS RELATED TO WORKERS COMPENSATION INJURIES

### Value Proposition

- Our results will inform employer decisions about whether or not to purchase case management services for their employees.
- Similarly, our results may help refine current case management programs serving injured workers.

### Description

The goal of this project is to evaluate the effects of a set of case management services on outcomes of interest to workers' compensation insurers, employers, and injured employees. In particular, we will be looking at the outcomes claims cost and return to work time.

### How is this different from related research?

There is a large body of evidence examining the impact of case management in the context of health insurance and health care delivery. However, there is far less literature available to describe the effects of care management in the context of employment injury.



## 11

**DEVELOPING AN INPATIENT TO COMMUNITY TRANSITION OF CARE MODEL FOR SPINAL CORD INJURIES (SCI)****Value Proposition**

- A framework for a care integration model that is generalizable to other communities

**Description**

UAB investigators are collaborating with officials from Spain Rehabilitation Center to develop a hospital to community care transition model for individuals living with SCI. Key activities during the past year included conducting in-depth interviews with individuals living with SCI and healthcare providers to identify key components of the transition of care model. Activities for the upcoming year will involve identifying and describing organizational barriers to community integration.

**How is this different from related research?**

Health systems have developed transition of care models for patients with acute health conditions. Most of these models focus on the general population and do not address the specific and unique needs of individuals newly diagnosed with SCI. Earlier phases of this project focused on identifying key components of a transition model. This phase will focus explicitly on understanding the barriers organizations face in integrating individuals with disabilities into their operations.



## 12

## RISK AND PREDICTIVE MODELING FOR IMPROVING AND ADVANCING QUALITY OF CARE DELIVERY

### Value Proposition

- Facilitate early diagnosis and intervention
- Deliver cost-effective and timely treatment
- Perform critical and timely intervention to prevent avoidable death
- Facilitate better clinical decision and care delivery

### Description

Risk and predicative modeling can assist in early detection, assess and monitor disease progression, assess risk of patients in different disease settings and populations among participatory IAB organizations. Such models can help early diagnosis and intervention, cost-effective and timely treatment, and critical intervention to prevent avoidable death. It will facilitate better clinical decision and care delivery. This study will build upon foundations previously addressed in projects by the CHOT university sites.

### How is this different from related research?

Many attempts have been carried out to analyze risks. Not much has been performed by a diverse team with difference expertise mining over a diverse set of data from multiple sites and multiple diseases. Lack of understanding on how different models behave under different data source. Lack of return on investment analysis to support actual implementation. Opportunity for cross-disciplinary fertilization.



13

## BUILDING HETEROGENOUS HEALTH DATABANKS: COSTS, BENEFITS, LIMITATIONS, AND BEST PRACTICES

### Value Proposition

- IAB members benefit from the sharing of challenges and best practices that are implementable in the building/management of heterogeneous health data banks.
- Initial steps can be taken towards shared data banks that combine input across several entities/health data sources.

### Description

This effort will involve identifying challenges to creating and maintaining a successful database that includes expanded heterogeneous sources, as well as the benefits available to accessing such a database. Our work not only includes health data commonly stored in EHR systems, but also integrates new types (qualitative, descriptive) and sources (socioeconomic, demographic, mental health) of data. The researchers will analyze and compare costs and benefits for multiple populations, and provide foundation of best practices for integrating heterogeneous data for greater patient acuity and improved modeling of patient risk.

### How is this different from related research?

To the knowledge of CHOT workers, there does not exist any published work that documents and seeks to define patterns among challenges and best practices in healthcare database curation, integration, and providing access to health data at the point of care. Furthermore, this research attempts to integrate multi-site, multi-source, and multi-type medical data into a database that will be accessible to the healthcare industry. This effort will bring together perspectives on this process from several members of industry in healthcare systems that are varied in geographic location and population demographics.



## 14 DEVELOPING A GLOBALLY SCALABLE B-C-B DATA SHARING PLATFORM

### Value Proposition

- Advance knowledge of B-C-B data sharing methods
- Advance knowledge of potential strategies for organizing governance, financing and technology for an international “VISA-like” platform for B-C-B data sharing
- Advance knowledge of this approach for T2D use cases

### Description

Project participants will participate in research to design a novel, globally scalable business-to-consumer-to-business (B-C-B) data sharing platform design to support use cases for health, pharma, population health, personalized services, and other domains. The research will focus on designing collaborative governance, scalable financing, and a technical architecture for this effort. Research will include consideration of data needed for next generation research and care of people living with type 2 diabetes.

### How is this different from related research?

The CHIN project will continue research on a new paradigm of health information sharing in which consumers own and control their own data, gain access to it using new individual right of access laws, and authorize its sharing wherever they go for services, including non-traditional organizations such as grocery stores, community service agencies and retail stores. This is the so called “Business to Consumer to Business” (B-C-B) data sharing method.



15

## EFFECTIVE GENETIC TEST AUTHORIZATION AND COORDINATION FOR IMPROVED PATIENT CARE

### Value Proposition

Industry partners will have comprehensive system models identifying the common processes & activities undertaken to select, evaluate, authorize, and order genetic test for pediatric patients. The models will be used in subsequent research efforts to design industry standards.

### Description

Genetic testing is a laboratory method that detects changes in human deoxyribonucleic acid (DNA), chromosomes, genes, or gene products (e.g., proteins). DNA for genetic testing may be extracted from a variety of samples, including blood, tissue, buccal swabs, and saliva. There are many thousands of active genetic tests, and a continuous evolution of additions and replacements as genetics research and development is translated to clinical practice. Genetic testing is generally expensive, and so greater attention to the objectives of the proposed tests and their justification are required by the insurance providers, before they will authorize payments for the procedures.

### How is this different from related research?

This research focuses on improving the processes involved in insurance authorization & coordination of clinically appropriate genetic tests for pediatric patients. While much attention has been on the challenges confronting care providers in aligning tests & diagnoses, the financial aspects of genetic testing contribute to the complexity of the system of decisions: the constraints of the 3rd party payers should be acknowledged as potentially influencing the diagnosis & treatment of delivery processes. The complexity & dynamics of the system lead to delays in decisions about genetic testing that may waste resources, postpone patient care & create unnecessary stress for patients and families.



## 16 PREDICTION AND INTERVENTION MODELS FOR COMBATING THE OPIOID EPIDEMIC

### Value Proposition

- Decision support system that can be integrated into clinical workflows
- Insights into effective prevention and intervention treatments and strategies

### Description

Each day, more than 115 Americans die as a result of overdosing on opioids. The objective of this project is to develop a prediction, prevention, and intervention model that seeks to combat the opioid epidemic. This project seeks to connect the multiple facets of the opioid epidemic into a unifying decision support system that not only predicts the risks of opioid addiction, but also proposes reliable, safe, and effective prevention and mitigation strategies.

### How is this different from related research?

Current approaches to mitigating the effects of the opioid epidemic typically focus on population health perspectives and model the epidemic at a macro-level. However, these models often fail to prevent individual patients from succumbing to the harmful effects of opioid addiction. The proposed project seeks to develop individually-customized predictive models aimed at either preventing opioid addiction or intervening to mitigate the effects of opioid addiction.

