



Biomedical and Health Informatics Year in Review

Session: S20 November 7th, 2022 8:30-10:00AM

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Informatics Institute

University of Alabama at Birmingham Marnix E. Heersink School of Medicine,

@ciminoj

#AMIA2022



@ciminoj

#AMIA2022YIR

Disclosures

I and my spouse have no relevant relationships with commercial interests to disclose.

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Learning Objectives

After participating in this session you should be able to:

- have a sense of the full scope of informatics research
- think about which Working Groups match your interests
- be inspired to publish significant work

2022 Collen Winner - George Hripcsak

When in doubt, do good work
-Hripcsak's Hrule



- Workgroups asked to nominate papers
- I pick “interesting” ones to present
- I requested audiovisual materials from authors
- This talk is a guided tour of the slides and papers
- Trying to make sense of it all
- Process
- Acknowledgements and bibliography

Format: Working Group Name Here

First slide:

Title - Journal

First Author...Senior Author, Institution

Summary points

More Slides:

Interesting observations

Visual material provided by authors

Brief summaries of honorable mention papers from the WG

Education and Informatics

Education Context	Informatics	Ethanol
Teach about (Informatics Education)	Introduction to Informatics (2)	Biochemistry, Pharmacology, Addiction
Train to use (Informatics Education)	PubMed, BLAST, EHRs, i2b2, REDCap (2)	Mixology
Professional development (Informatics Education)	MS, PhD, Fellowship (4)	MS, PhD, Fellowship
Teach using (Education Informatics)	Simulation, Gamification (1)	Evening Seminars

Education (Professional Development)

Engaging Housestaff as Informatics Collaborators: Educational and Operational Opportunities – *Appl Clin Inform*

Jarend Shenson...Matthew Eisenberg– Stanford University

- Engage housestaff as active partners in system improvement
- Housestaff-led IT council for effective engagement in hospital informatics
- Five co-chairs, 50 members, 15 projects, touched 3000 staff members
- Projects:
 - EHR order set review and optimization
 - Tube feeding documentation on the MAR
 - Secure text messaging optimization
 - Mobile dictation integration
 - Housestaff onboarding and ongoing training
 - Multiple housestaff Web resources
 - Housestaff IT newsletter

Shenson et al.: Housestaff IT Council

Council Partnerships Across the Medical Center

INFORMATICS & IT OPERATIONS

- CMIO and CNIO leaders and their delegates
- Medical Informatics Directors
- CIS analysts
- Informatics educators
- Governance & working committees

NURSING, PHARMACY, & ALLIED HEALTH PROFESSIONS

- Nursing unit managers
- Nurse educators
- Pharmacists
- Dietitians

GRADUATE MEDICAL EDUCATION

- Director of GME
- Associate Dean for GME
- Clinical informatics fellowship

HOUSESTAFF PARTNERS

- Resident quality improvement and patient safety council
- Chief Residents' Council

HOUSESTAFF IT COUNCIL

- Co-Chairs
- Associate Chairs
- Resident & fellow members



Project title	Coordinating stakeholders	Impact assessment
EHR order set review and optimization	Hospital order set review committee; department faculty and housestaff; inpatient pharmacy	Provided timely housestaff input for the q3 year order set review; assisted with recruitment of specialty-specific representatives
Tube feeding documentation on the MAR	Pharmacy EHR analysts, nursing leadership	Aligned stakeholder goals for ordering and documenting tube feeding administration
Secure text messaging optimization	CMIO, CNIO, provider and nursing educators, housestaff QI council	Led data-informed revisions to policies and procedures, and prepared education for nurses and housestaff on best practices. Advocated for housestaff needs at a hospital-wide steering committee. Enhanced cross-platform integration with EHR
Mobile dictation integration	CMIO	Secured availability of mobile dictation software for all housestaff
Housestaff onboarding and ongoing training	Provider education, GME	Created and revised training materials tailored for housestaff on EHR, secure messaging platform, paging system, remote access, and other IT systems. Co-taught with IT educators the live onboarding sessions for new housestaff
Multiple housestaff Web resources	EHR analysts, provider educators, GME	Curated up-to-date quick reference COVID-19 guidelines; links to apps and internal web resources; and a password-protected set of EHR tips
Housestaff IT newsletter	CMIO, CNIO, provider educators, GME	Monthly email newsletter to share curated IT updates, tips, and tricks that are most relevant to housestaff

Shenson et al.: Housestaff IT Council

Software Change: make Epic treatment team relationship visible in Voalte

Treatment Team

Search for provider

+ Add

+ Add Me

Provider	ED	Relationship	Specialty	Start
Brosas, Peaches		Case Manager		1/25/2021 8:24 AM
Phone: 650-474-1011				
Fong, Yvonne, RD		Clinical Dietitian		1/25/2021 9:01 AM
Number not on file				
Wong, Tiffany, PHARM D		Clinical Pharmacist		1/25/2021 7:53 AM
Number not on file				
Lukato, Dylan, MD		Emergency Resident		1/22/2021 12:18 PM
Phone: (650)723-9215; Pager: 12124; Fax: 650-723-0121				
Garudadri, Suresh, MD		Primary Intern	Residency	1/23/2021 1:20 PM
Phone: (650)497-8000; Pager: 12208; Fax: 650-498-8992				
Ma, Cheng Cheng, MD		Covering Provider	Residency	1/23/2021 6:09 AM
Phone: (650)497-8000; Pager: 12704; Fax: 650-498-8992				
G1, Tt Med Univ Surge Team		Primary Team		1/23/2021 10:39 AM
Number not on file				

T-Mobile Wi-Fi 3:21 PM 71%

< Back B212A SHC B2

ROSEN [REDACTED], L [REDACTED]
F - DOB [REDACTED]
09507013

Care Team

Benaypal Bains
SHC RT Respiratory
Available

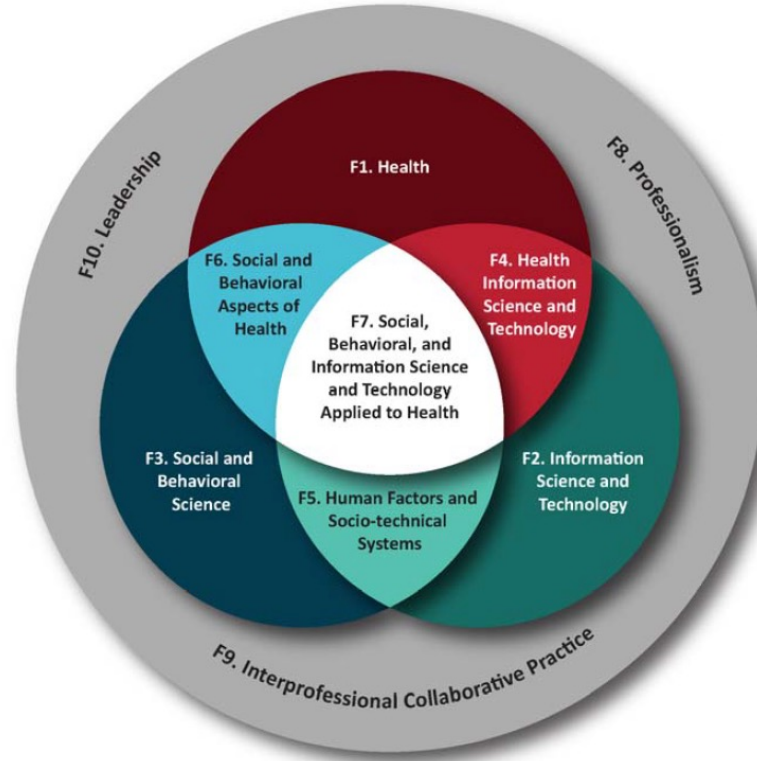
Cheng Cheng Ma
SHC Resident
Voalte Me

Darryl Gerlak
SHC Social Worker
Available

Dylan Lukato
Emergency Resident • SHC Resident
Available

Current state:

2017 - Accreditation for Health Informatics and Information Management Education (CAHIIM)



Education (Professional Development)

A Data-Driven Assessment of the US Health Informatics Programs and Job Market – *Applied Clinical Informatics*

Jay Patel...Huanmei Wu – Temple University

- Training information for the 238 U.S. universities (MS, PhD, or Postbac)
- Checked 200 jobs and their required skillsets and domain knowledge
- 94 universities offer HI programs: 92 MS, 43 doctoral, 54 certificate programs
- Only 58% offer courses in database management and analytics
- Generally lacks training in socio-technical systems, social-behavioral aspects of health, and interprofessional collaborative practice

Early Prediction of Student Learning Performance Through Data Mining: A Systematic Review – *Psicothema*

Javier López-Zambrano...Cristóbal Romero –Escuela Superior Politécnica Agropecuaria de Manabí, Madrid Open University, and University of Córdoba

- Can't count for 2022
- But they found 82 papers:
 - J48
 - Random Forrest
 - Support Vector Machines
 - Naïve Bayes Classification
 - Logistic Regression
 - Linear Regression

Education (Professional Development)

Humphreys BL, Logan RA, Miller RA, Siegel ER (eds.). *Transforming Biomedical Informatics and Health Information Access - Don Lindberg and the U.S. National Library of Medicine*. 2021. IOS Press, Amsterdam.

Don Lindberg's influence on future generations: The U.S. National Library of Medicine's biomedical informatics research training programs - *Information Services & Use*

Robert Greenes, Valerie Florance, Randy Miller - Arizona State , NLM, Vanderbilt

Education (Professional Development)

STUDIES IN

HEALTH TECHNOLOGY AND INFORMATICS

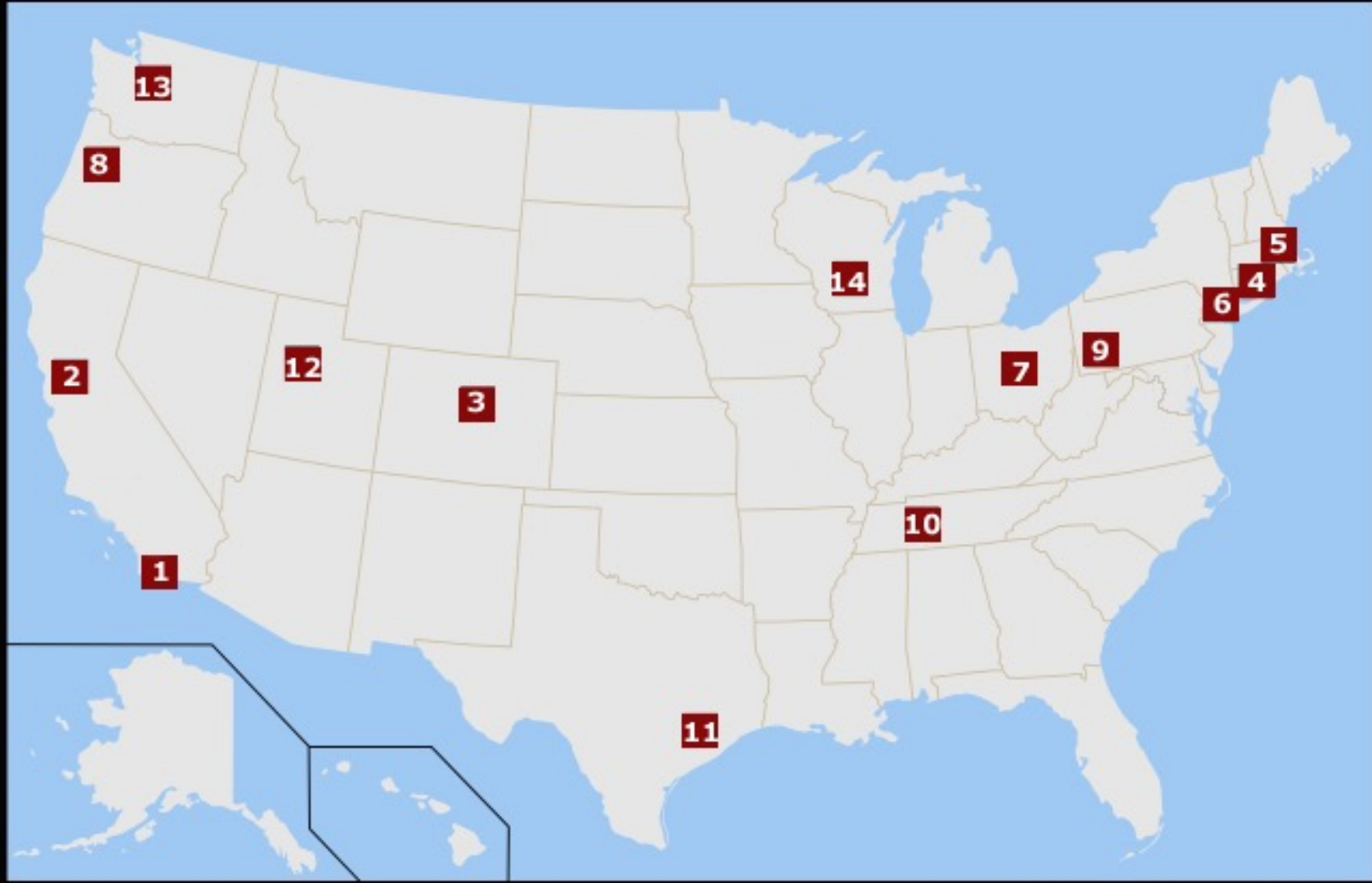
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Transforming Biomedical Informatics and Health Information Access

*Don Lindberg and the U.S. National
Library of Medicine*



Editors: Betsy L. Humphreys
Robert A. Logan
Randolph A. Miller
Elliot R. Siegel



Education (Professional Development)

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The biomedical informatics short course at Woods Hole/Georgia: Training to support institutional change - *Information Services & Use*

James Cimino – UAB

Education (Professional Development)

Marine Biological Laboratory, Woods Hole, MA



People & Organizational Issues - Evaluation

Risk factors associated with medication ordering errors - *JAMIA*

Joanna Abraham...Thomas Kannampallil - Washington University

- Reviewed “voided” orders as likely source of medication ordering errors
- 1074 voided > 842 errors > 190 to patient > 0 harm done
- 355 interviews (33% of all voided orders)
- System Engineering Initiative for Patient Safety

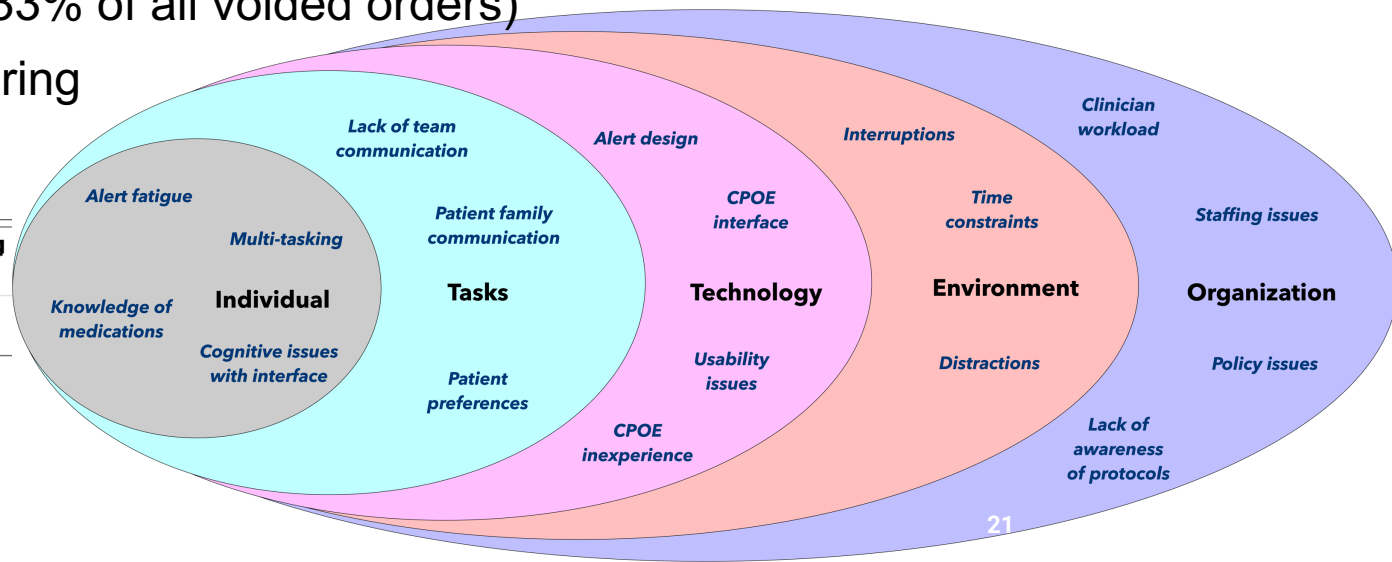
▼ Details for **lamoTRlgine (lamoTRlgine 150 mg)**

Details Order Comments Diagnoses

+

*Void Reason:

- Order on Wrong Encounter
- Wrong Patient
- Incorrect Ordering Physician
- Duplicate Order
- System Date Error
- Voiding Student Order
- Improperly Composed Order



Abraham et al.: Medication Errors

Contributing Factors	
Technology	<ul style="list-style-type: none"> • CPOE Usability (38%) • Ineffective CPOE interface design (16%) • Inadequate alert design (12%) • Inability to view all active medication lists on single page • Limited CPOE experience • Limited interoperability between eMAR and CPOE • Multiple opened charts
Cognitive	<ul style="list-style-type: none"> • Negligence (29%) • Multitasking (15%) • Alert fatigue (10%) • Limited drug knowledge (10%) • Misinterpretation of verbal order • Dose calculation mistake, • Decimal point inaccuracy • Similar patient names • Confusing patient MRNs • Fatigue • Mix-up of patient charts

Contributing Factors	
Social	<ul style="list-style-type: none"> • Limited communication between care team (53%) • Communication between clinicians and family/caregivers (47%) • Lack of order notification • Limited knowledge of drugs • Incorrect drug formulation/strength • Rule violations • Limited protocol awareness • Memory lapses
Environmental	<ul style="list-style-type: none"> • Interruptions (42%) • Distractions (30%) • Noise Lighting issues • Incorrect equipment programming
Organizational	<ul style="list-style-type: none"> • High clinician workload (61%) • Staffing issues • Error reporting culture

People – Honorable Mention

Inviting patients to identify diagnostic concerns through structured evaluation of their online visit notes - JAMIA

Traber Giardina...Hardeep Singh - Baylor College of Medicine

- Revised Safer Dx Instrument – “a medical record review tool developed to enable clinicians to determine the presence or absence of diagnostic error for a specific episode of care”
- Patients were more likely to report a concern if they
 - disagreed with “the care plan the provider developed for me addressed all my medical concerns”
 - disagreed with “I trust the provider that I saw during my visit”
 - agreed with “I did not have a good feeling about my visit”

The Safer Dx Instrument:

Items for Determining Presence or Absence of a Diagnostic Missed Opportunity

Rate the following items for the episode of care under review:

1—2—3—4—5—6—7

1= Strongly Disagree

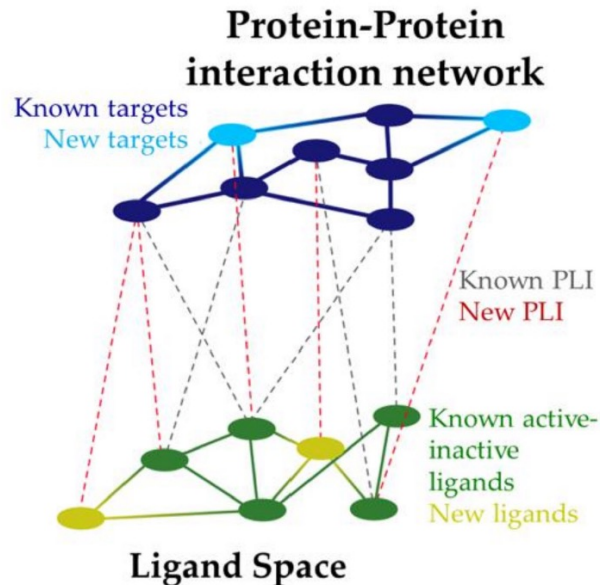
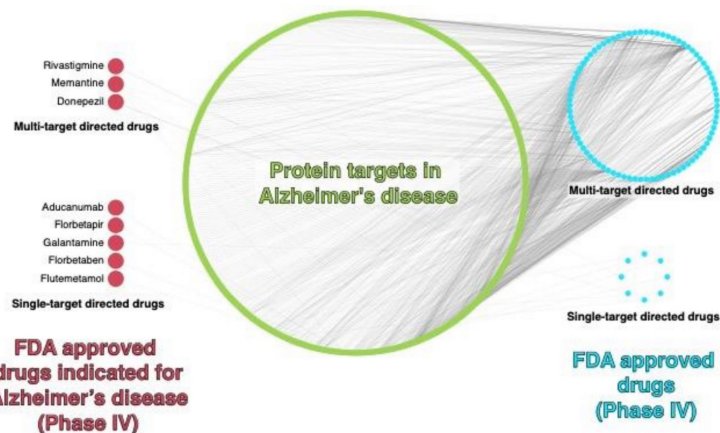
7 = Strongly Agree

Item	Score
1. The documented history was suggestive of an alternate diagnosis, which was not considered in the diagnostic process.	
2. The documented physical exam was suggestive of an alternate diagnosis, which was not considered in the diagnostic process.*	
3. Data gathering through history, physical exam, and review of prior documentation (including prior laboratory, radiology, pathology or other results) was incomplete, given the patient's medical history and clinical presentation.	
4. Alarm symptoms or "Red Flags" (i.e. features in the clinical presentation that are considered to predict serious disease) were not acted upon.	

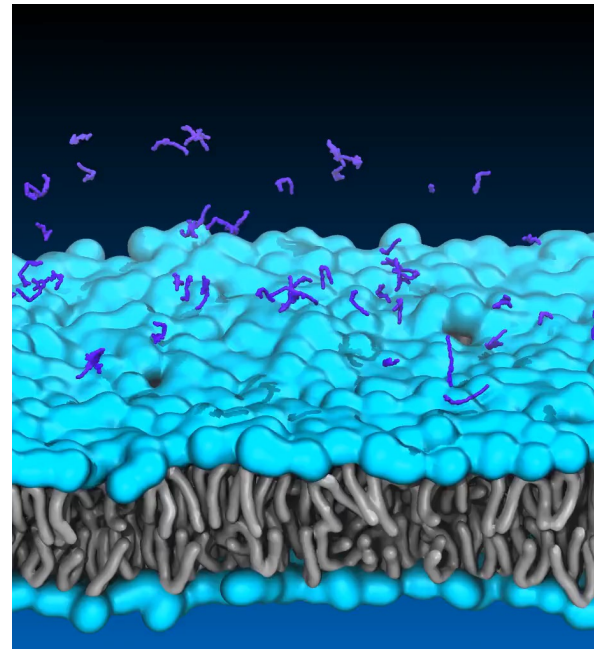
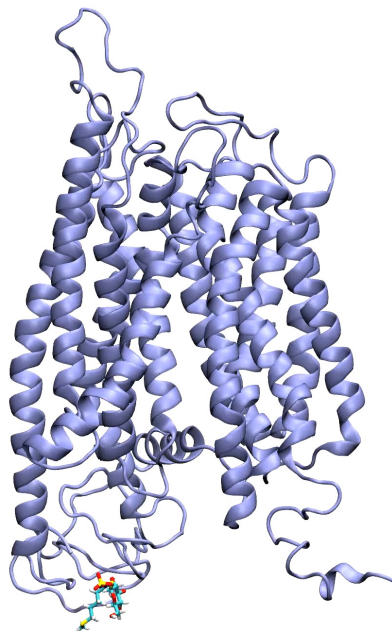
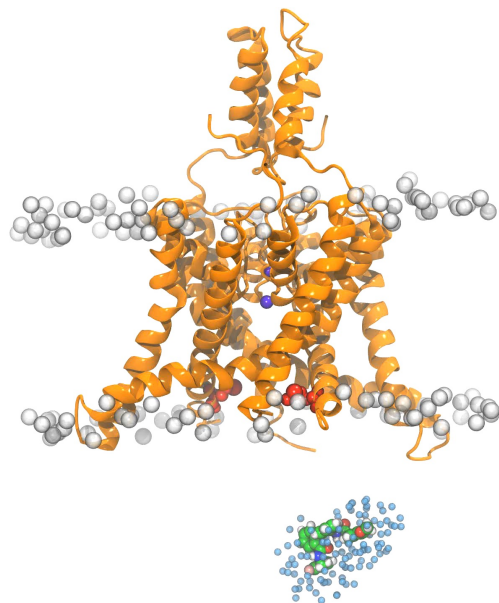
New Drug Design Avenues Targeting Alzheimer's Disease by Pharmacoinformatics-Aided Tools - *Pharmaceutics*

Lily Arrué...David Ramírez - Universidad Católica de Maule (Chile) and University of Limerick

- Drug repurposing
- Pharmacoinformatics tools



Arrué et al.: Drug Design



Pharmacoinformatics – Honorable Mention



Identification of potent inhibitors of SARS-CoV-2 infection by combined pharmacological evaluation and cellular network prioritization - *iScience*

JJ Patten...Robert Davey - Boston University

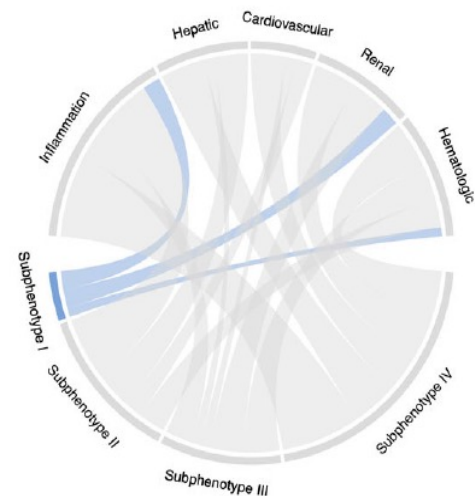
- Compounds with known biological targets were evaluated for inhibition of SARS-CoV-2 infection in cell and tissue models
- 6,710 compounds targeting 2,183 host proteins were evaluated
- Identified 389 SARS-CoV-2 inhibitors
- Lots of informatics; ultimately, cell cultures

Clinical subphenotypes in COVID-19: derivation, validation, prediction, temporal patterns, and interaction with social determinants of health - *NPJ Digital Medicine*

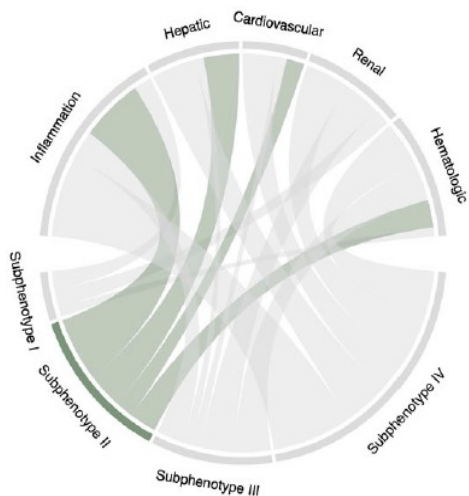
Chang Su...Fei Wang - Weill Cornell Medicine

- Machine learning and routinely collected data
- Four phenotypes
 - Different biomarkers and comorbidities
 - Distinct 60-day mortality
 - Temporal patterns noted
 - Mortality associated with social determinants

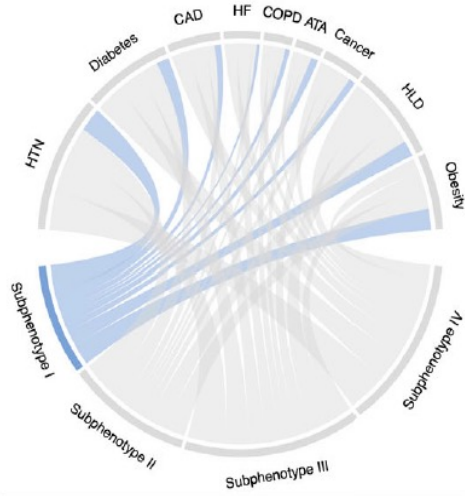
Abnormal biomarkers vs. Subphenotype I



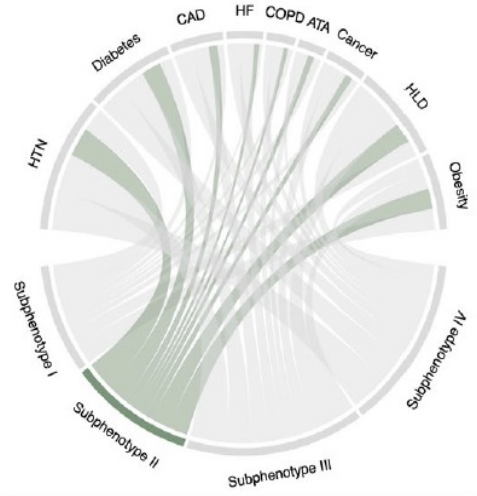
Abnormal biomarkers vs. Subphenotype II



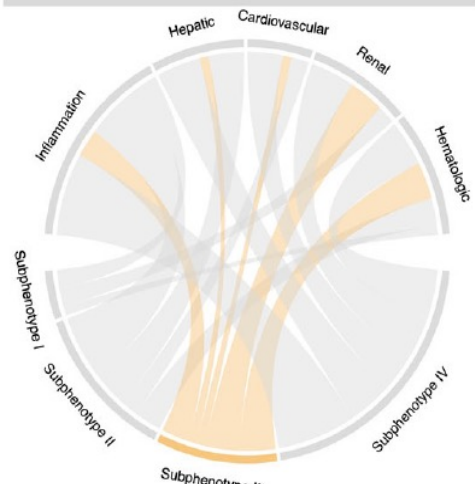
Comorbidity vs. Subphenotype I



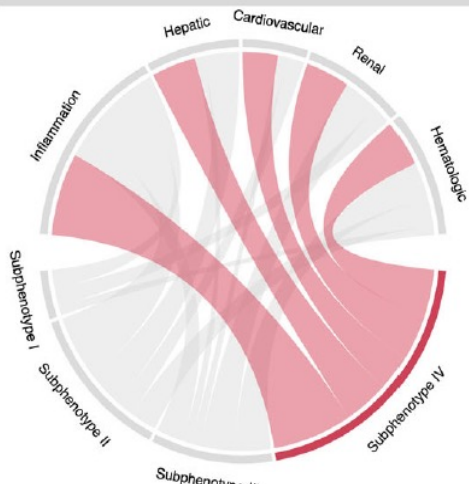
Comorbidity vs. Subphenotype II



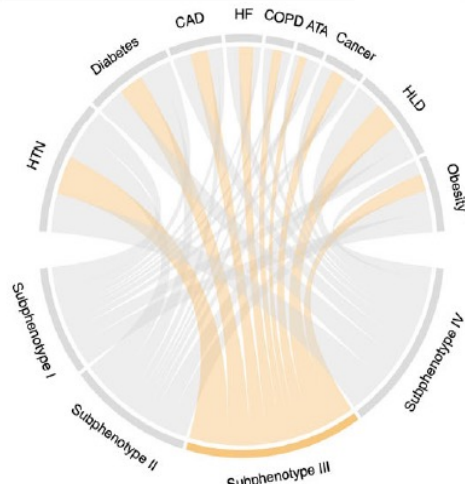
Abnormal biomarkers vs. Subphenotype III



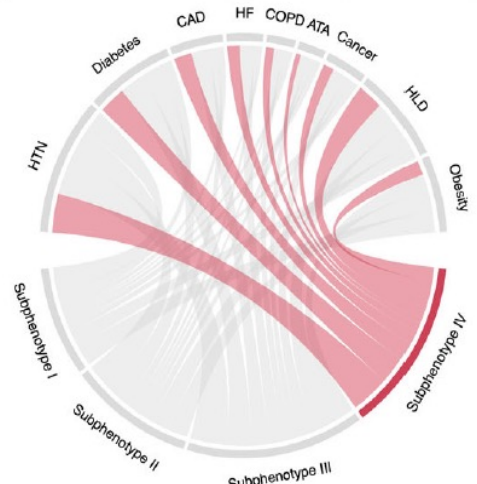
Abnormal biomarkers vs. Subphenotype IV

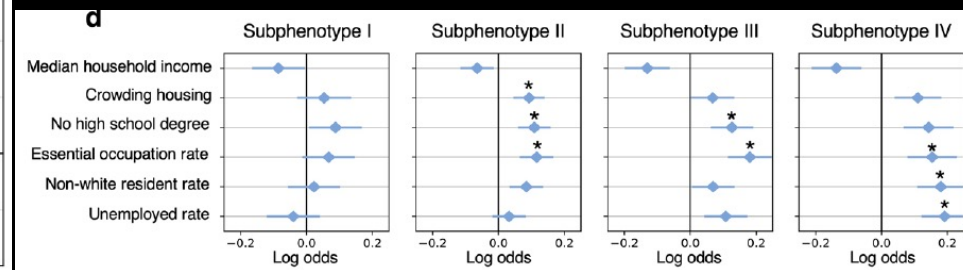
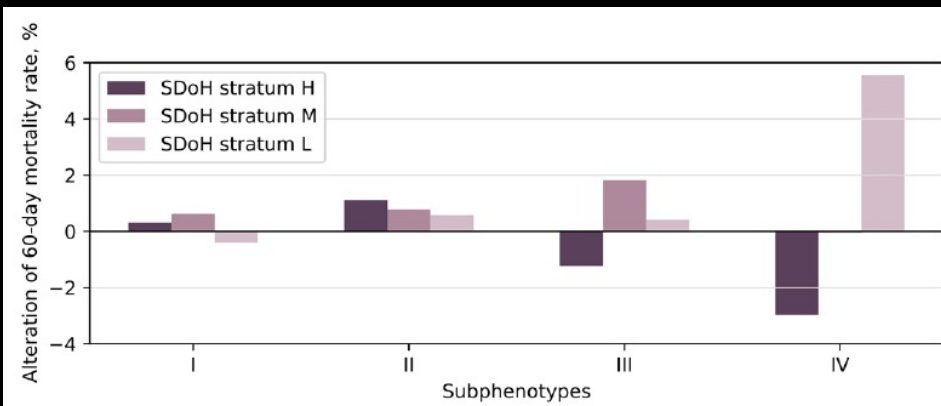
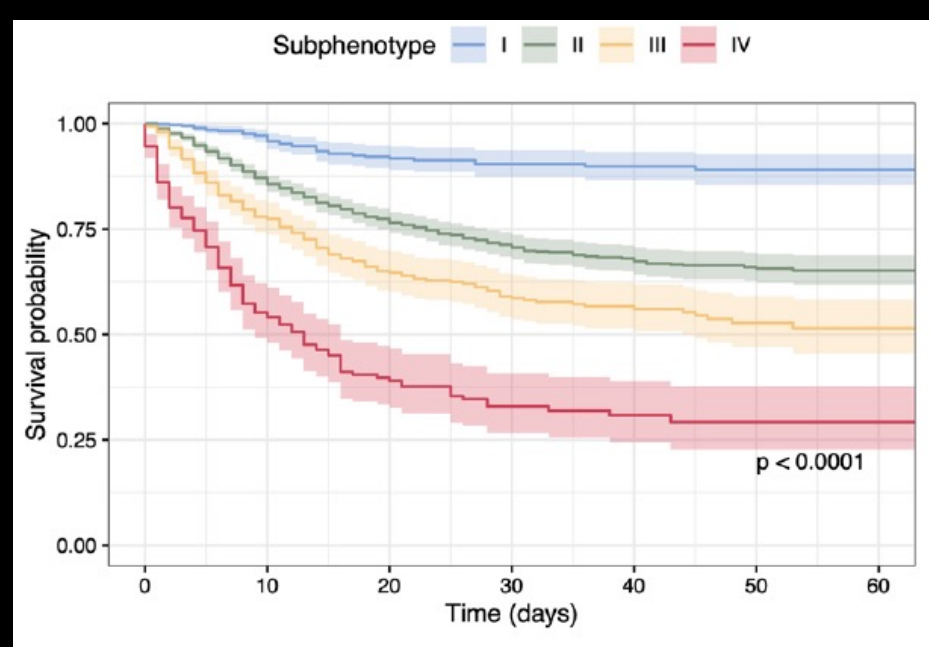
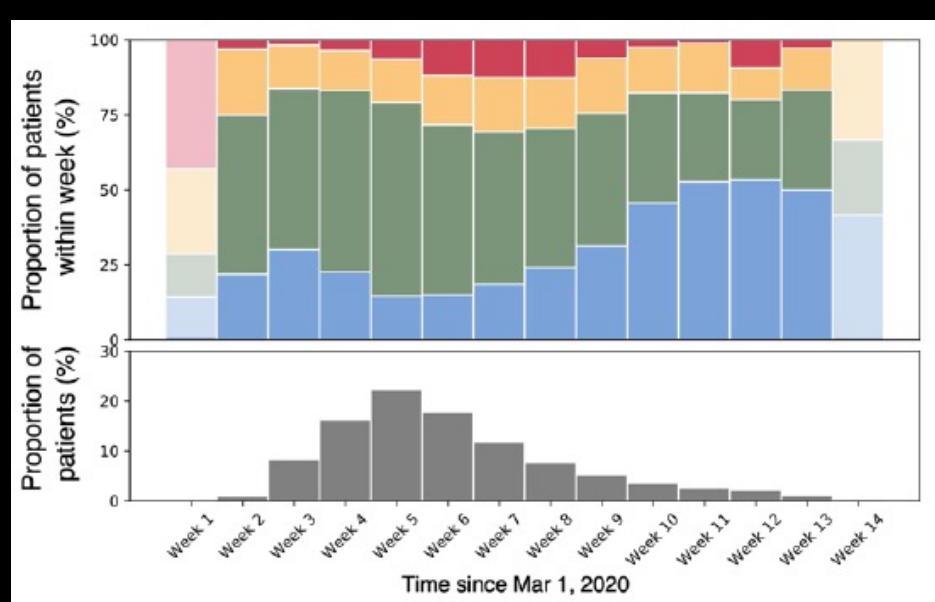


Comorbidity vs. Subphenotype III



Comorbidity vs. Subphenotype IV



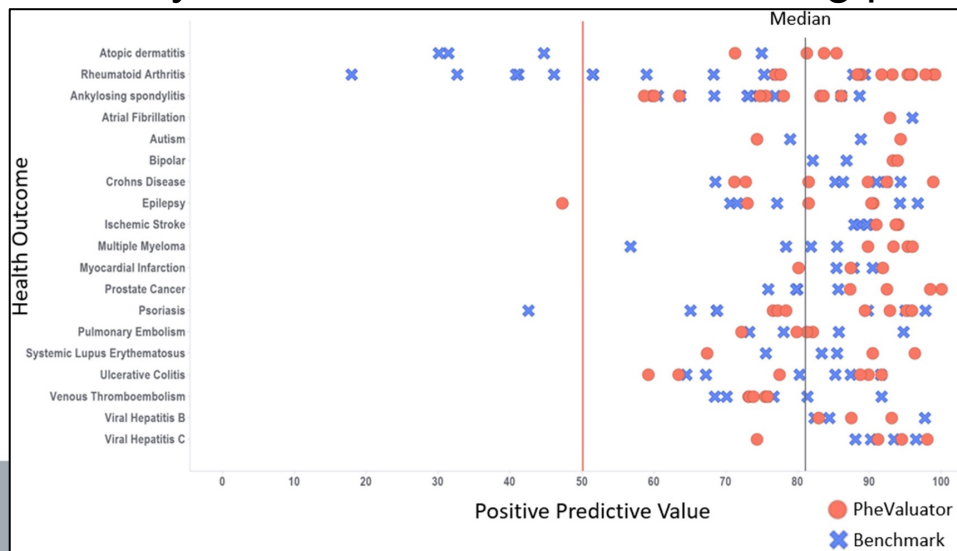


Clinical Research – Honorable Mention

PheValuator 2.0: Methodological improvements for the PheValuator approach to semi-automated phenotype algorithm evaluation - *JB*

Joel Swerdel...Patrick Ryan - Janssen Research and Development

- Improved OHDSI tool
- Compares favorably to manual review in estimating phenotype performance



Clinical Research – Honorable Mention

Enhancing the use of EHR systems for pragmatic embedded research: lessons from the NIH Health Care Systems Research Collaboratory - *JAMIA*

Rachel Richesson...Guilherme Del Fiol - NIH Health Care Systems research Collaboratory

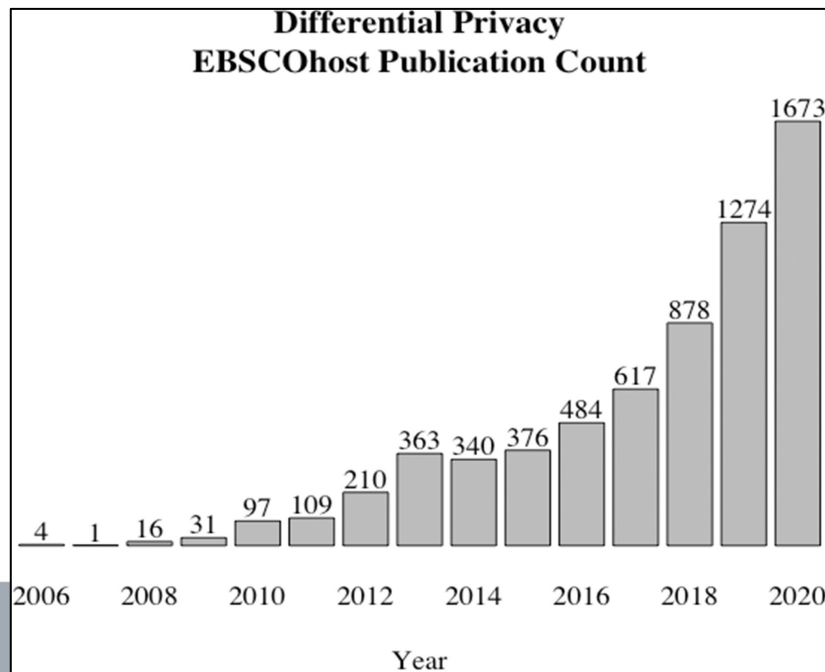
- Survey of 20 pragmatic trial projects
- Challenges:
 - Inadequate collection of patient-reported outcome data
 - Lack of structured data collection
 - Data standardization
 - Resources to support customization of EHRs
 - Difficulties aggregating data across sites
 - Accessing EHR data

Clinical Research – Honorable Mention

Differential privacy in health research: A scoping review - JAMIA

Joseph Ficek...Ellen Daley - University of South Florida

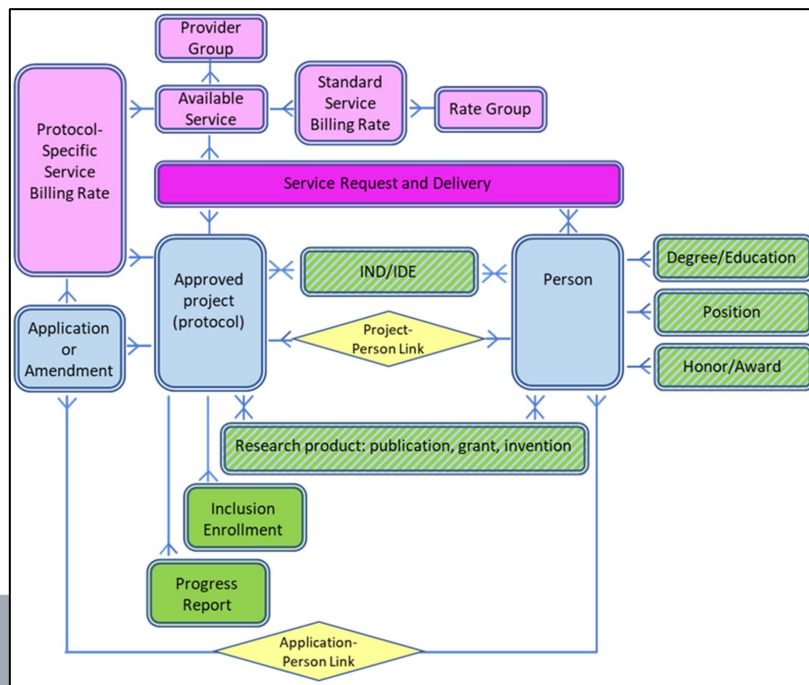
- Replacing statistical queries with comparable algorithms that add random noise



Clinical Research – Honorable Mention

Design and implementation of an integrated data model to support clinical and translational research administration - *JAMIA*

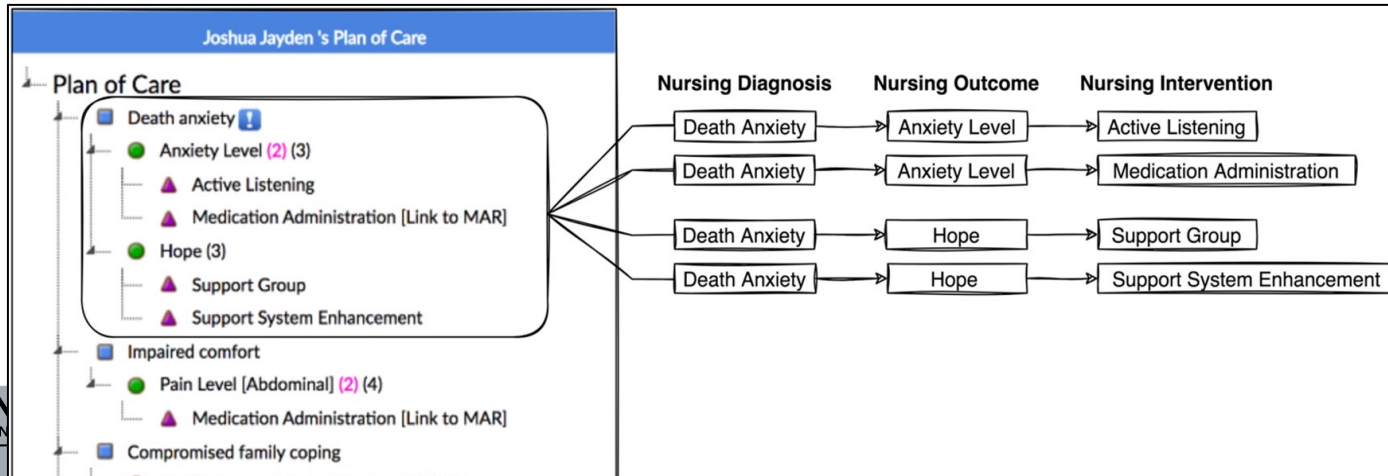
Elizabeth Wood and Thomas Campion, Jr - Weill Cornell Medical College



Use of machine learning to transform complex standardized nursing care plan data into meaningful research variables: a palliative care exemplar – *JAMIA*

Tamara Macieira...Gail Keenan – University of Florida College of Nursing

- Nursing care plans have diagnoses (NANDA; 3,460), outcomes (NOC; 7,852) and interventions (NIC; 12,180) – 331B permutations
- Mapping to research framework for palliative care



1 FAMILY (FA)

- Family processes and dynamics related to patient
- If "family" is referenced in any DIO label or definition, the linkage belongs to the the category FA

2 WELL-BEING (WB)

- Personal perceptions of quality of life indicators and principles (general beyond a single aspect of contentment): values, beliefs, decisions, communication/relationship (social), general satisfaction, dignity, spirituality, continuity, total acceptance, self-care assistance (no modifier)
- If the target of the intervention is not focused on a specific health problem, the intervention is WB

2 MENTAL COMFORT (MC)

- Related to symptoms of psychological suffering (e.g., conflict, anxiety, coping, power, hope, mood, loneliness, sleep)
- If DIO linkage indicates care is done as MC – slot as MC, even if intervention might otherwise be slotted as F or P (e.g., Anxiety, Anxiety Level, Respiratory Monitoring)

2 PHYSICAL COMFORT (PC)

- Related to symptoms and experience of physical suffering (e.g., pain, nausea)
- If DIO linkage indicates care is done as PC – slot as PC, even if intervention might otherwise be slotted as F or P (e.g., Acute Pain, Pain Level, Monitoring Skin)

2 MENTAL (M)

- Basic/foundational mental processes and patterns (e.g. cognition, thinking, dementia, confusion)
- If DIO linkage indicates care is done as M – slot as M, even if intervention might otherwise be slotted as F or P
- If any DIO label or combination indicate a cognition problem select M – all neurological labels don't always mean cognitive problem)

3 SAFETY (S)

- Risks/injury associated with environment (not physiological)
- MC, PC and M interventions can also be associated with safety issues, but should be priority over safety and classified as so

4 FUNCTIONAL (F)

- Basic functions, skills, behavior
- Assign F for care that will indirectly impact physiological problems or include patient behaviors (e.g. tube care, learning, teaching: preoperative, documentation, learning readiness, self-care assistance: bathing, monitoring)

4 PHYSIOLOGICAL (P)

- Anatomical structures and physiological processes (cellular, elimination, respiratory, nutritional or organ level phenomenon)
- Assign P when direct target of intervention is physiological (e.g., peripheral sensation, medication administration, electrolyte management, cardiac care: acute, total parenteral nutrition, tube insertion)

Friedman's Fundamental Theorem

Friedman CP. A "fundamental theorem" of biomedical informatics. JAMIA. 2009;16:169-170.



To err is human.

A computer is required to really screw things up.

Natural Language Processing (also CRI)

Combining human and machine intelligence for clinical trial eligibility querying – JAMIA

Yilu Fang...Chunhua Weng – Columbia University

- Criteria2Query 1.0 generates database queries from clinical trial protocols
- NLP can identify “difficult” and “impossible” eligibility criteria
- Criteria2Query 2.0 has a user interface that allows criteria modification

Criteria2Query

A system for automatically transforming clinical research eligibility criteria to OMOP Common Data Model-based executable cohort queries.

FeedBack

📄 Criteria Resource

Please input a NCTID:

Extract Criteria

✓ Inclusion Criteria

Tips: Please input criteria line by line

Age >= 50
AD confirmed by CSF biomarkers
CDR score=0.5
Speaking/understanding French
Presence of a caregiver

✗ Exclusion Criteria

Tips: Please input criteria line by line

Diabetes
Other neurological disease
Chronic inflammatory disease or anti-inflammatory medication (e.g. NSAID, corticosteroids)
Uncontrolled dyslipidemia
Malnutrition (BMI < 18; or weight loss > 5% in 1 month or 10% in 6 months; or MNA < 17)

Natural Language Processing (also CRI)

Combining human and machine intelligence for clinical trial eligibility querying – JAMIA

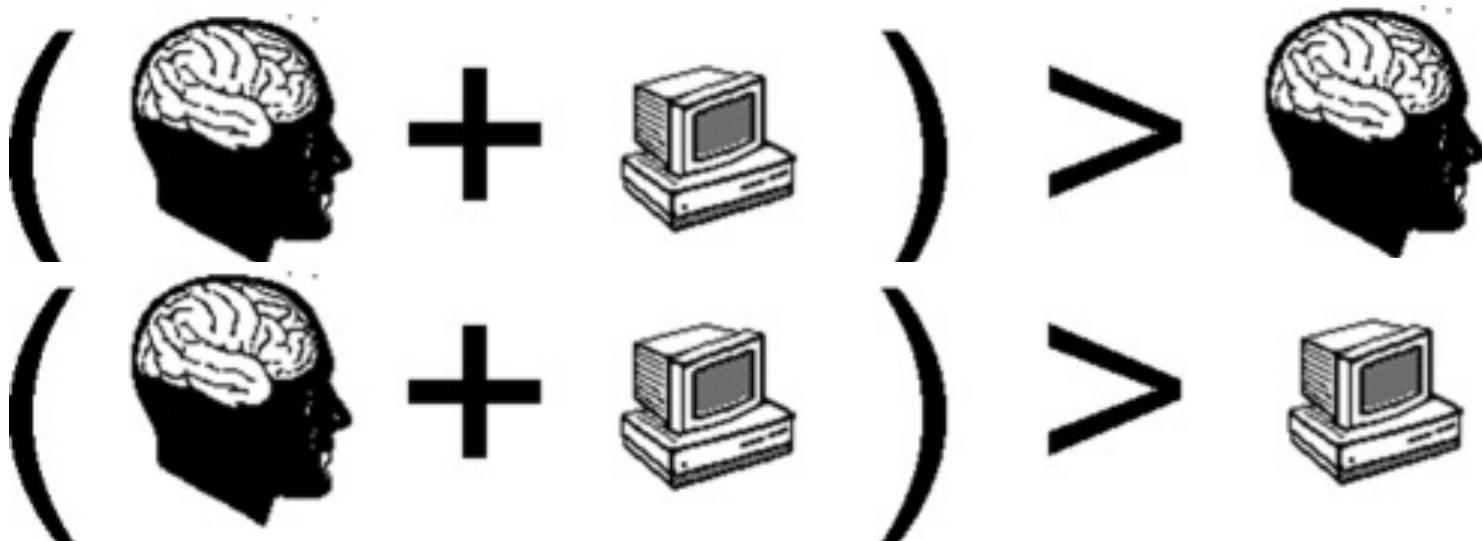
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- Criteria2Query 1.0 generates database queries from clinical trial protocols
- NLP can identify “difficult” and “impossible” eligibility criteria
- Criteria2Query 2.0 has a user interface that allows criteria modification

Evaluation task	Metric	C2Q 1.0	C2Q 2.0
Negation scope detection	Accuracy	0.776 [0.751, 0.798]	0.924 [0.907, 0.937]
	Precision	0.792 [0.758, 0.823]	0.963 [0.945, 0.977]
	Recall	0.759 [0.724, 0.791]	0.884 [0.857, 0.908]
	F1-score	0.775 [0.748, 0.800]	0.922 [0.905, 0.937]
Value normalization	Accuracy	0.601 [0.576, 0.624]	0.966 [0.955, 0.973]
Temporal normalization	Accuracy	0.554 [0.522, 0.584]	0.916 [0.896, 0.931]

Corollary to Friedman's Theorem

Friedman CP. A "fundamental theorem" of biomedical informatics. JAMIA. 2009;16:169-170.

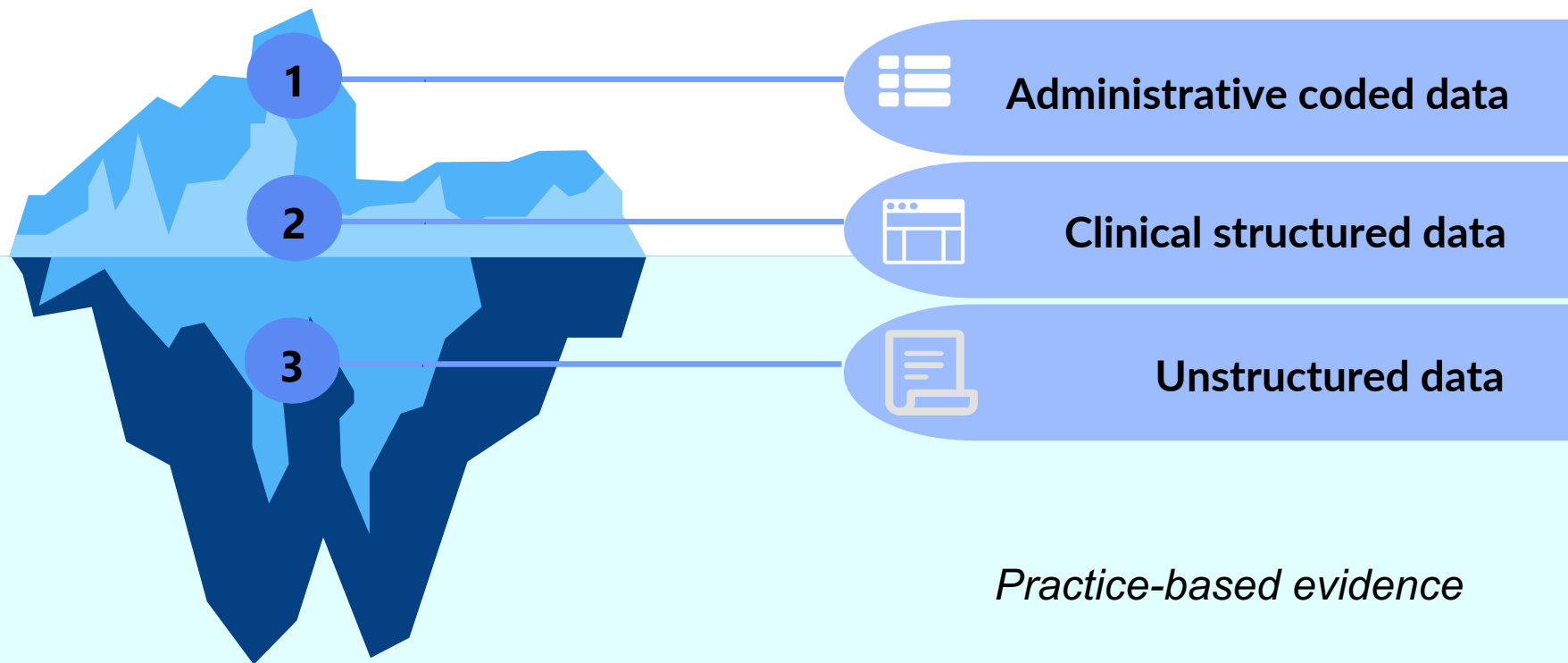


Natural Language Processing

Tasks as needs: reframing the paradigm of clinical natural language processing research for real-world decision support – *JAMIA*

Asher Lederman...Karin Verspoor – University of Melbourne

Lederman et al.: NLP Tasks as Needs



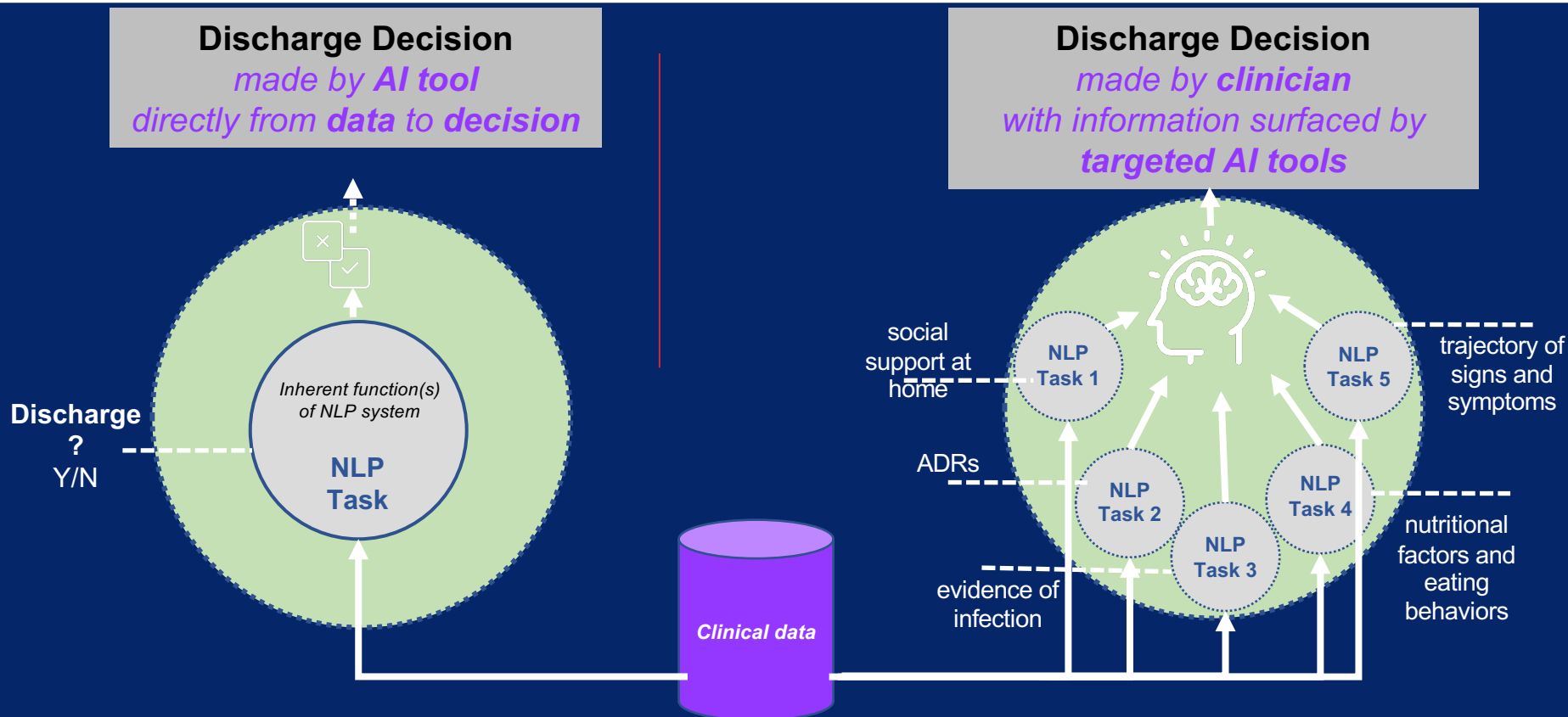
Natural Language Processing

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Asher Lederman...Karin Verspoor – University of Melbourne

- Clinical NLP under-performs on complex language processing tasks
- NLP tends to simplify problems into linear goal-task-solution models
- Explainability is difficult in complex language
- Propose shifting from “tasks as decisions” to “tasks as needs”

Lederman et al.: NLP Tasks as Needs



Natural Language Processing

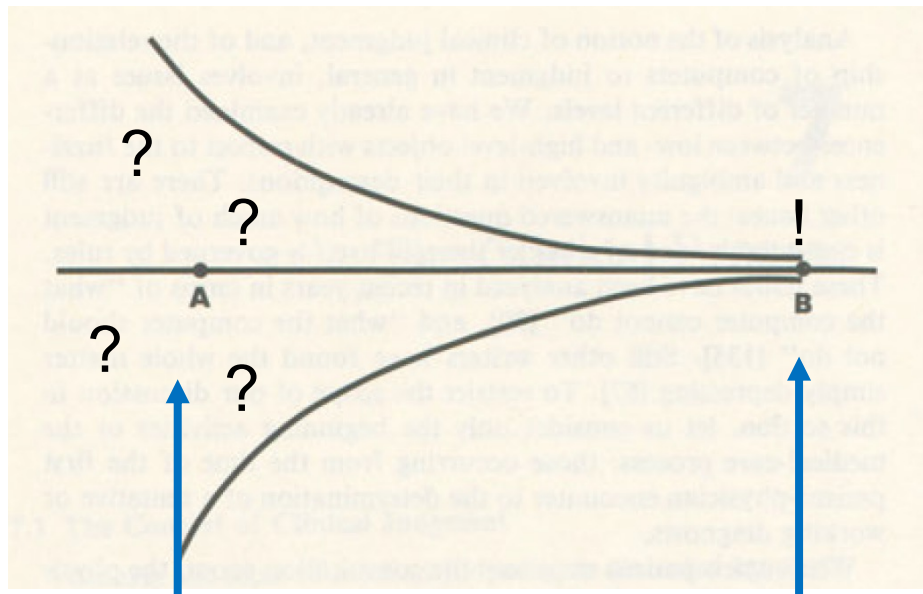
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- Clinical NLP under-performs on complex language processing tasks
- NLP tends to simplify problems into linear goal-task-solution models
- Explainability is difficult in complex language
- Propose shifting from “tasks as decisions” to “tasks as needs”
- Authors draw on Friedman’s Fundamental Theorem

Blois Funnel - 1984

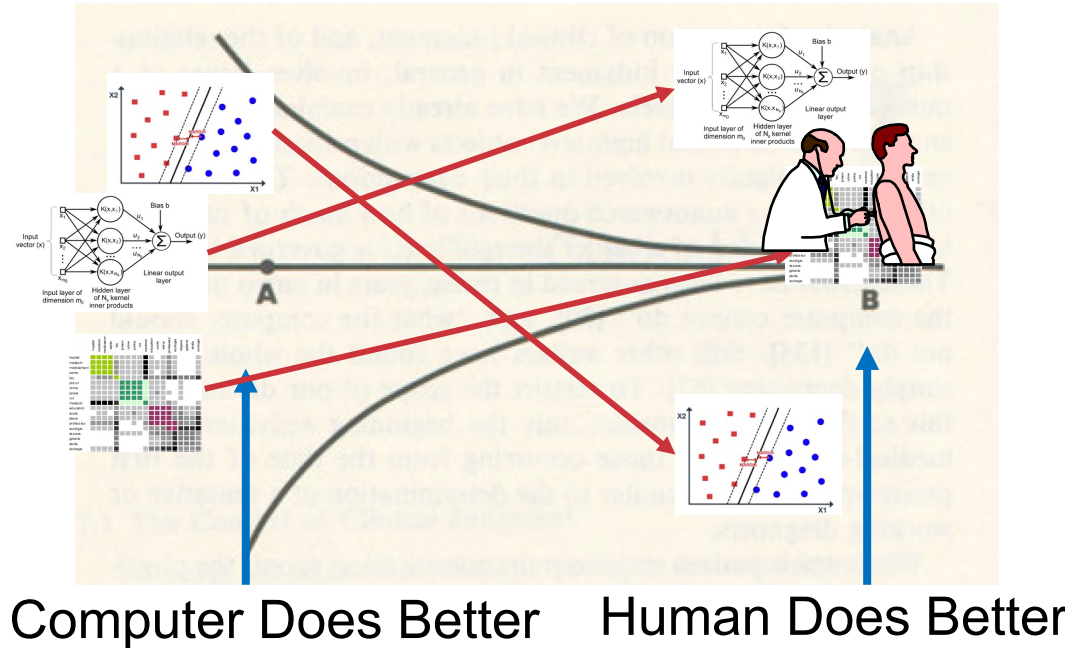
Blois MS. Information and Medicine: The Nature of Medical Descriptions.
University of California Press, Berkeley, CA. 1984.



Human Does Better

Computer Does Better

Blois Funnel - 2022

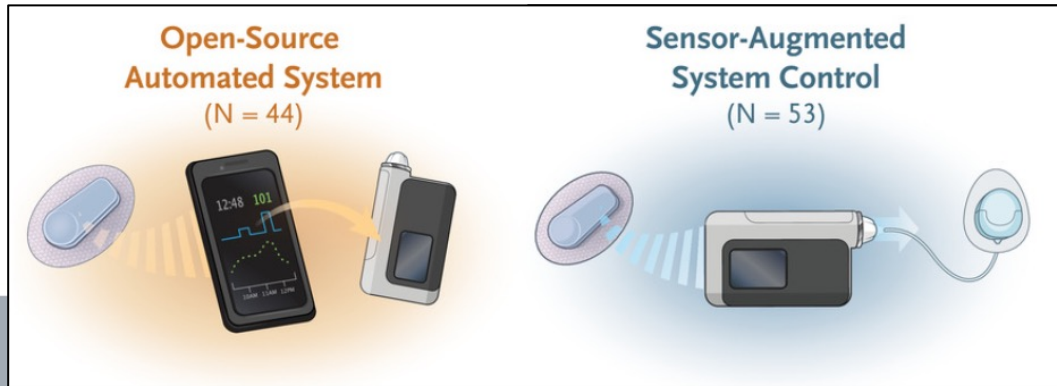


Computer Does Better Human Does Better

Open-Source Automated Insulin Delivery in Type 1 Diabetes – *New England Journal of Medicine*

Mercedes Burnside...martin de Bock – university of Otago, New Zealand

- Open-source insulin-delivery software is available but unregulated
- Controlled trial of continuous glucose monitors and insulin pumps comparing:
 - AndroidAPS – predicts low glucose and suspends insulin delivery
 - Manual pump management based on alarms from monitor



20:31



HOME SCREEN ACTIONS LOOP

LocalProfile0

4.5 (59')

8.7

3m ago

Δ : -0.3

15m Δ : -0.3

40m Δ : -0.1

Closed Loop



0.89U



0g

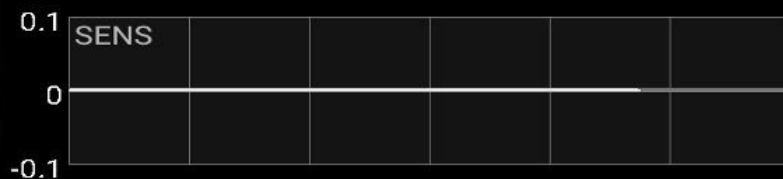
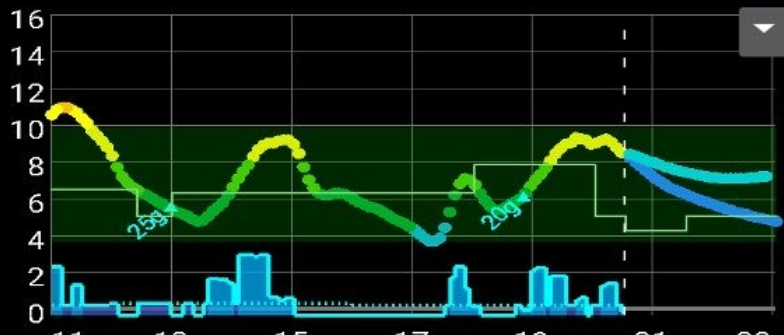


T:40%



100%

0d11h 0d11h 183U 9d7h - 75%



INSULIN



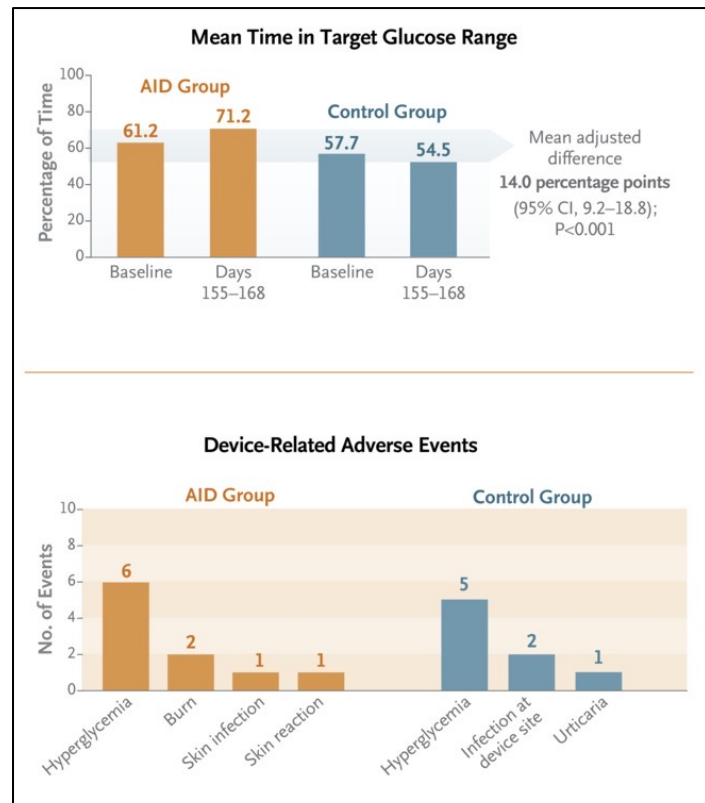
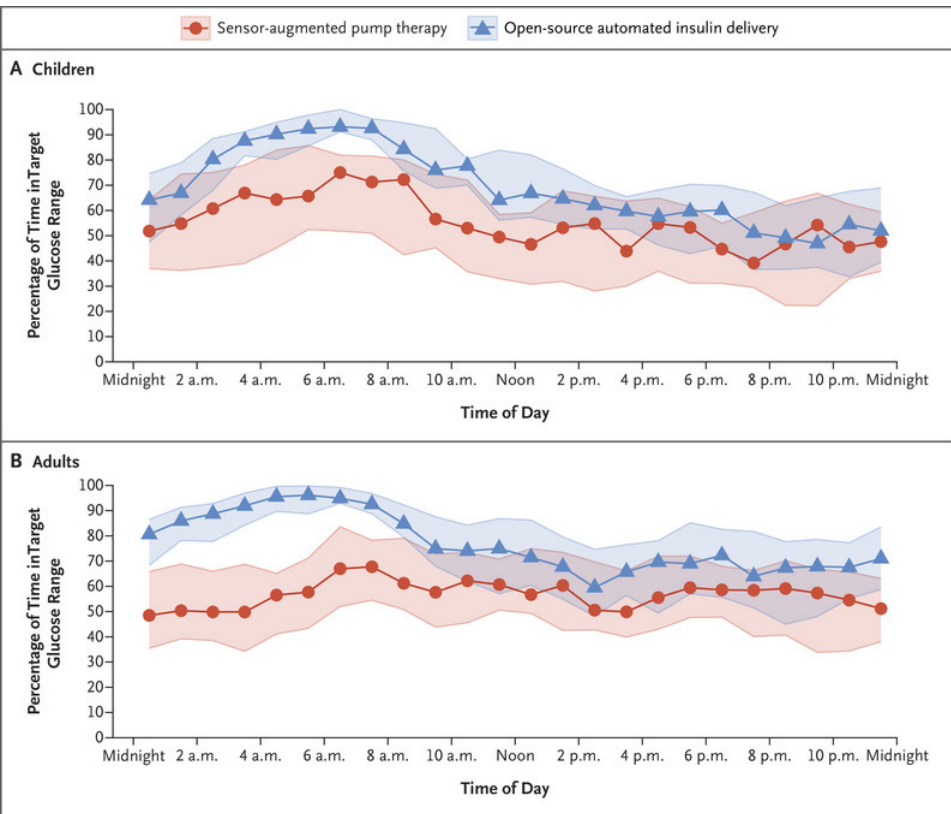
CARBS



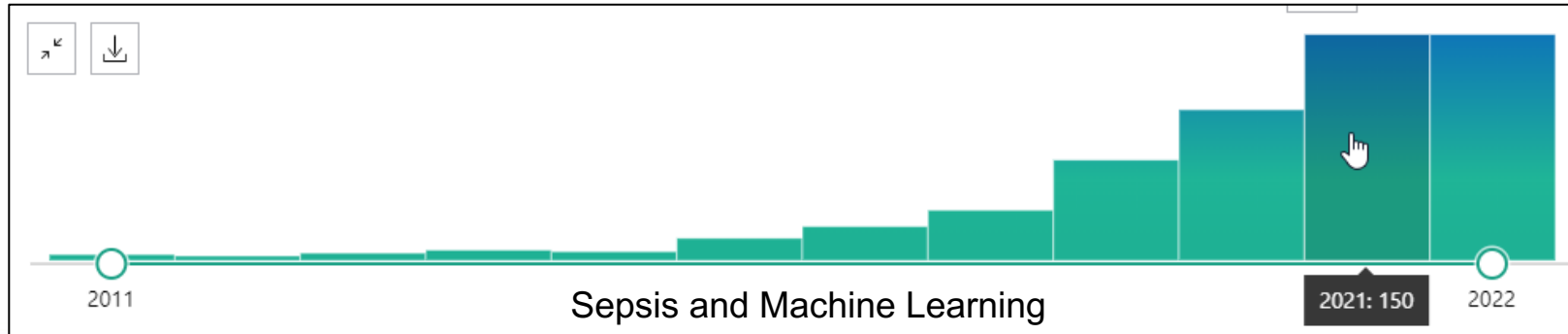
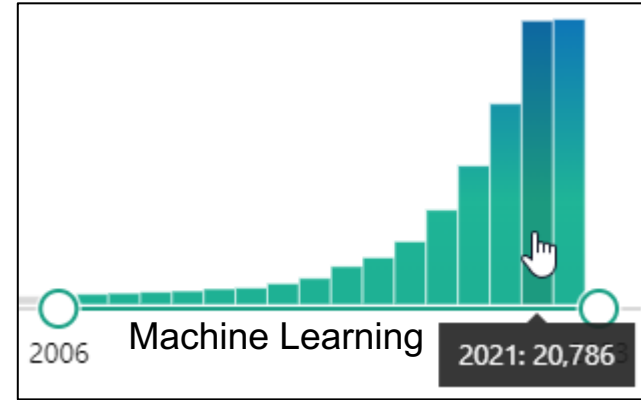
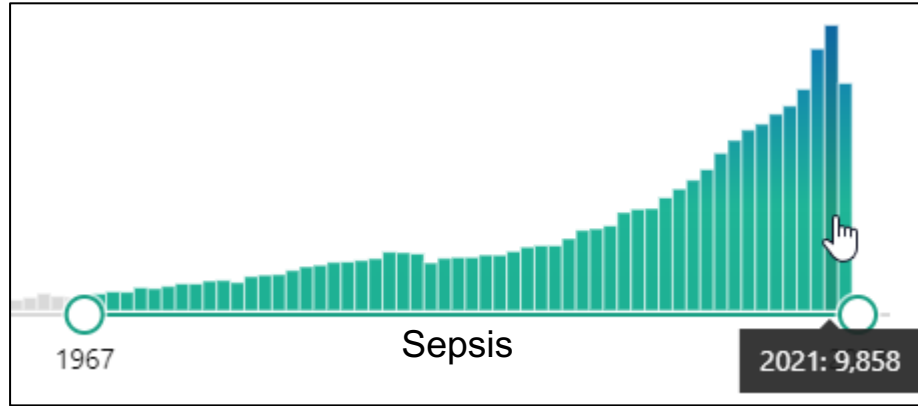
CALCULATOR



Burnside et al.: Open-Source Insulin Admin



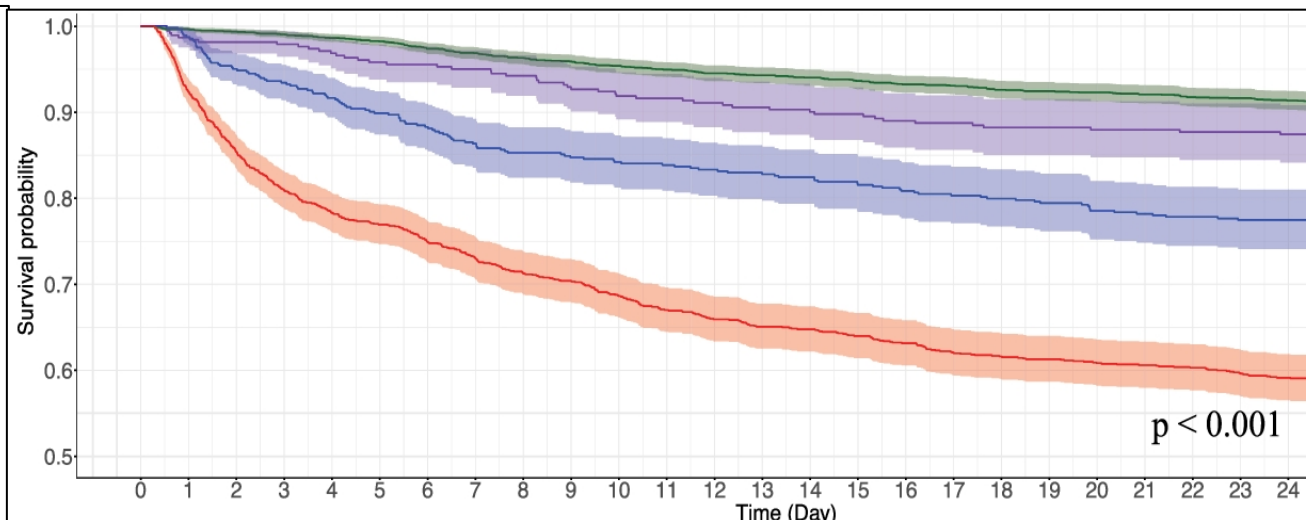
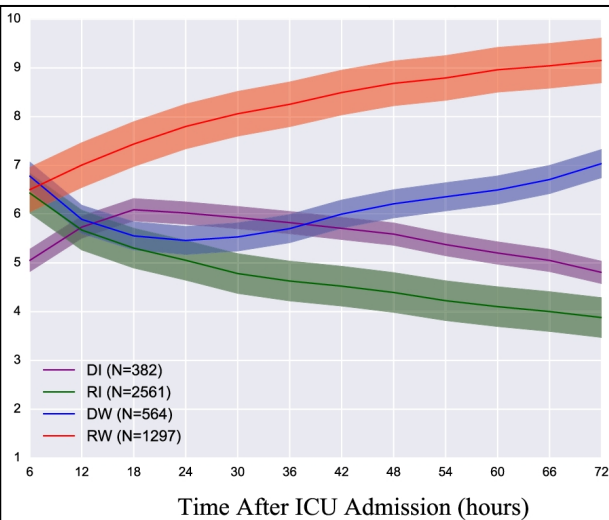
Sepsis and Machine Learning

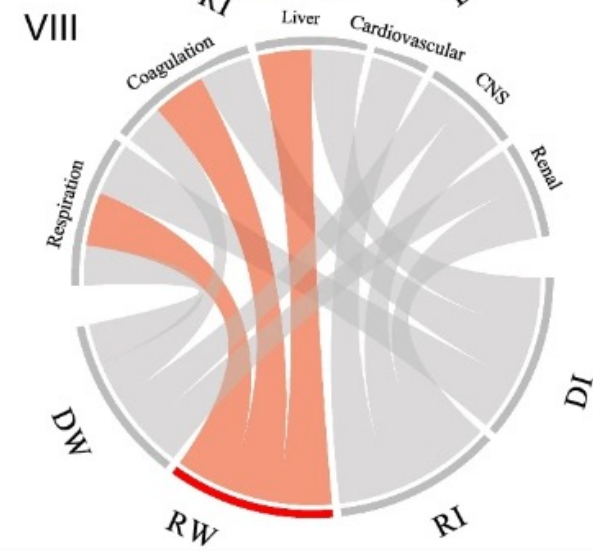
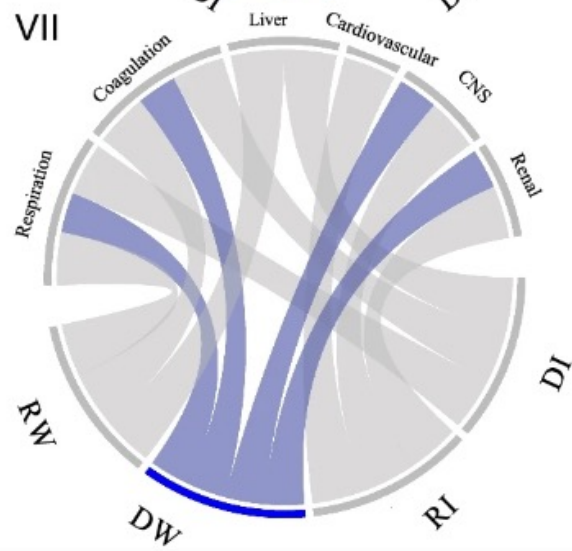
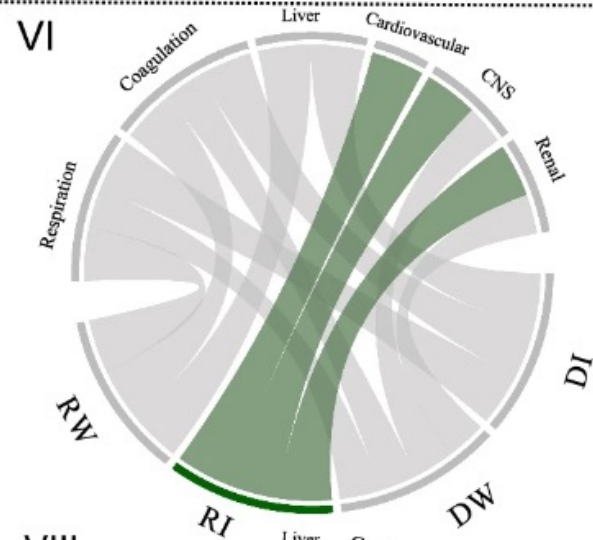
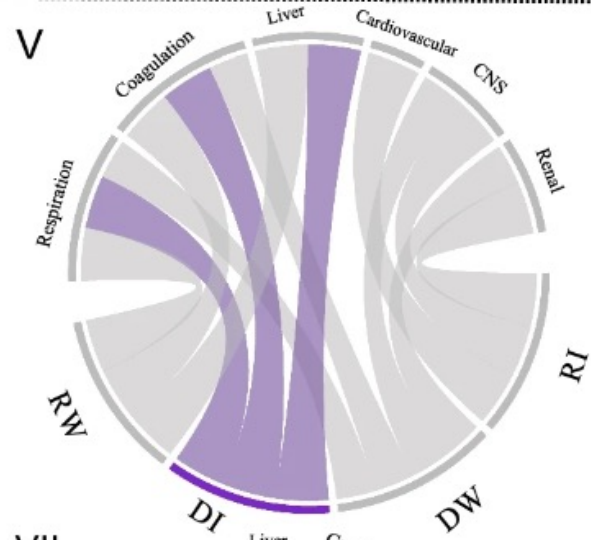


Sepsis subphenotyping based on organ dysfunction trajectory – *Critical Care*

Zhenxing Xu...Fei Wang – Weill Cornell Medicine

- Developed 72 Sequential Organ Failure Assessment (SOFA) scores
- Clustered scores based on trajectories





Prospective, multi-site study of patient outcomes after implementation of the TREWS machine learning-based early warning system for sepsis – *Nature Medicine*

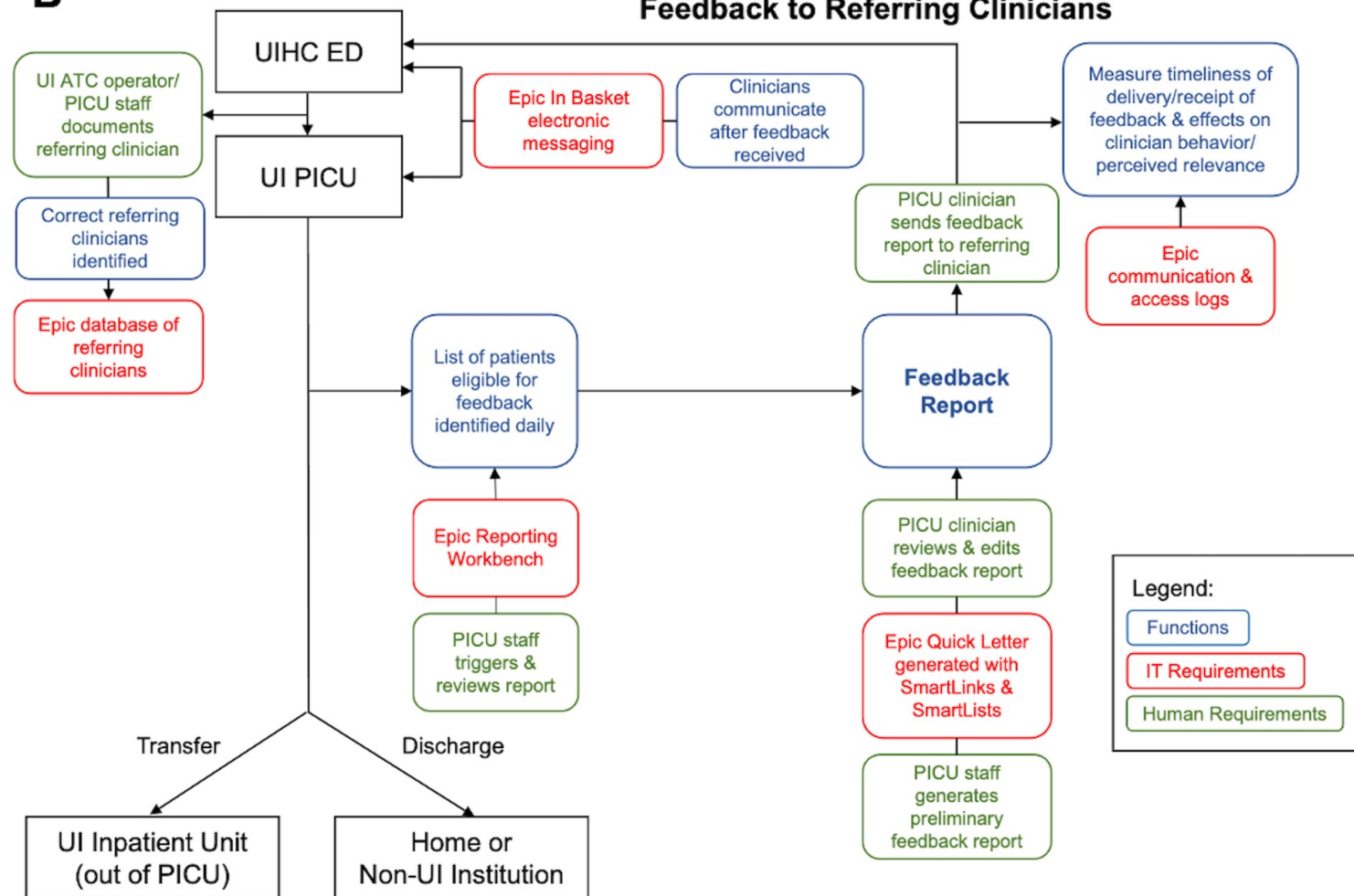
Roy Adams...Suchi Saria – Johns Hopkins University

- Targeted Real-Time Early Warning System (TREWS)
- 590,763 patients monitored, 6,877 identified with sepsis before antibiotic therapy
- Reduced in-hospital mortality 14.6% vs. 19.2% (3.3% absolute; 18.7% relative)

Reporting Outcomes of Pediatric Intensive Care Unit Patients to Referring Physicians via an Electronic Health Record-Based Feedback System – *Applied Clinical Informatics*

Christina Cifra...Hardeep Singh – University of Iowa College of Medicine, Baylor College of Medicine

- Critically ill children initially evaluated by front-line clinicians
- Semi-automated electronic outcome feedback system
- three cycles of implementation and evaluation
- Feasible with timely delivery and receipt of feedback reports
- Excellent Systems Usability Scale scores
- Process was well-integrated into their clinical workflows
- Minimal additional workload
- Receiving consistent feedback was relevant to their clinical practice.

B**Patient Flow****Generation, Delivery, & Tracking of Feedback to Referring Clinicians**



University of Iowa
Stead Family
Children's Hospital

Pediatric Intensive Care Unit

200 Hawkins Drive
Iowa City, Iowa 52242
319-356-4135 Tel
ulchildrens.org

July 23, 2020

██████████, MD
200 HAWKINS DRIVE
IOWA CITY IA 52242

Re: ██████████
Hosp. #: ██████████
Birth Date: ██████████
Age/Sex: ██████████ female
Admission date: ██████████

Dear ██████████ MD,

Our patient, ██████████, who was recently under your care, was admitted to the Pediatric Intensive Care Unit at University of Iowa Stead Family Children's Hospital on ██████████. We would like to provide you and your team with an update on ██████████

Current diagnosis: ██████████ female s/p MVA with bilateral pulmonary contusions, small subdural hematoma, mildly displaced L1 transverse process fracture, and possible retrosternal hematoma (ruled out by echocardiogram).

Patient Active Problem List

Diagnosis

- SDH (subdural hematoma) (HCC)
- Fall
- Closed fracture of left side of occipital bone (HCC)
- MVC (motor vehicle collision)
- Bilateral pulmonary contusion
- Closed nondisplaced fracture of left scapula

Urgent interventions during transfer and/or after PICU admission:

- Fluid Bolus
- Oxygen therapy - nasal cannula

Urgent surgical procedures:

No surgical procedures performed this encounter

Additional notes: Stable and transferred to the general floors ██████████

PICU disposition: Transferred out of PICU

We welcome opportunities to speak with you if you have questions regarding this patient.

Please contact us as follows:

- Call the PICU at 319-356-4135 and ask to be connected directly to me or the current attending pediatric intensivist or
- Send me a message directly via the Epic messaging function.

Thank you for allowing us to participate in this patient's care.

Regards,

██████████, DO
Associate Professor

Was this information helpful to you? Please let us know by answering 3 questions at the following web site:
redcap.link/TRUCK-PICU_report

Data pulled from Epic

Added by PICU clinician

Data pulled from Epic

From drop-down menu

Data pulled from Epic

Added by PICU clinician

From drop-down menu

Data pulled from Epic

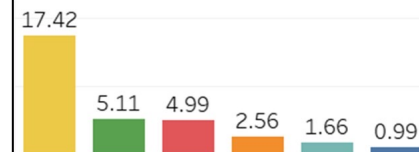
Clinical Information Systems

Alert burden in pediatric hospitals: a cross-sectional analysis of six academic pediatric health systems using novel metrics – *JAMIA*

Evan Orenstein...Eric Kirkendall – Emory University

- Why the discrepancies?
 - History of clinical informatics involvement in what alerts get built (orgs with more alerts had culture of just building what was requested for awhile)
 - Active alert monitoring/rationalization program (the two orgs with lowest rates had completed alert rationalization efforts in the years just prior/during our data collection period)

Alerts per 100 Orders



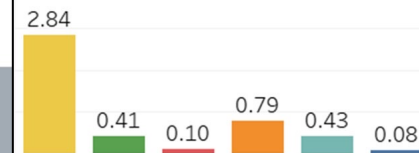
Alerts per Encounter



Alerts per IP Day



Alerts per Clinician Day



Cardiac Shunt FYI

This patient is **Cardiac Shunt Dependent**. They are fragile and at high risk for **Sudden Death**. Alert Cardiology for

❗ Refill Alert: See Problem List

✓ OK

Definition: A shunt dependent patient is one that requires a systemic to pulmonary shunt to provide pulmonary blood flow.

- Hyp
 - Con
 - Can
 - Con
- PAST CUT-OFF TIME. The cut-off time for this phlebotomy round has passed. Cutoff is 60 minutes before the 6AM round, 30 minutes before all other rounds. If you want to order this lab for TODAY at a later phlebotomy round, click "CANCEL" and change the Phlebotomy time. If you intended to order this test for a LATER DATE, please IGNORE this alert and click "ACCEPT." If someone other than phlebotomy will draw the specimen, change the order class to "Clinician to Collect."
- surgically placed systemic to pulmonary artery shunt (BT shunt).
 - PDA stent. ❗ This is an ACT patient.

*Please assure this

🔗 Click here to review Patient FYI information

[Information - shunt dependent patients](#)

[CACU cardiac shunt depe](#)

[Pre/post cath high risk ca](#)

[ED caregiver initiated protocol of his](#)

❗ In the future, please place this order using the Common Nephrology Orders order set

Open Order Set

Do Not Open

Nephrology Common Orders [Preview](#)

❗ This patient is being admitted for behavioral health services. Accept the following orders:

Order

Do Not Order

Acknowledge Reason

Previously ordered

⚠ Acknowledge Reason

Do not show this al

❗ Please request that the family collect 10 voided volumes and bring to their next visit.

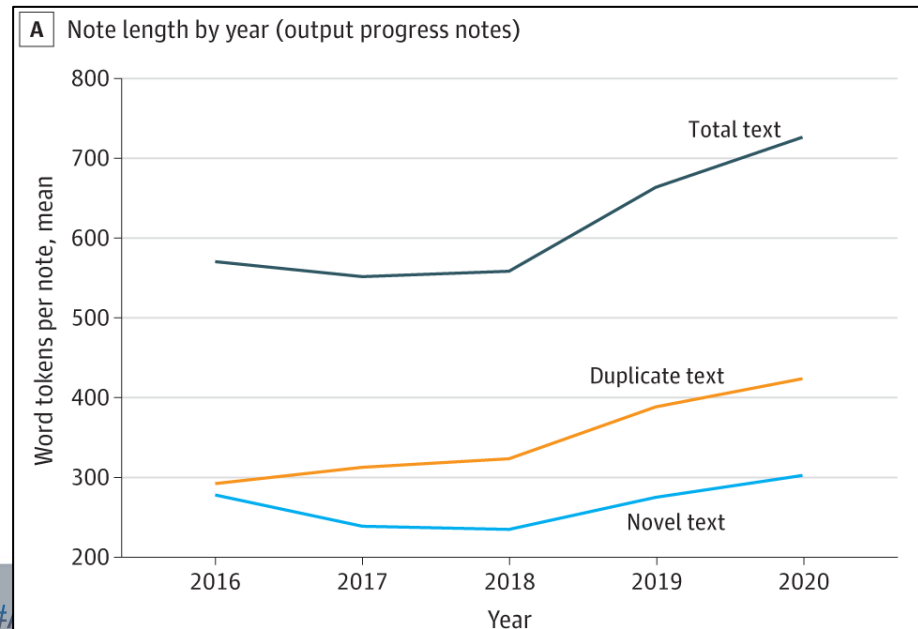
✓ OK



Prevalence and Sources of Duplicate Information in the Electronic Medical Record – *JAMA Network Open*

Jackson Steinkamp...Subha Airan-Javia – University of Pennsylvania

- Duplication from the same author and from different authors
- >100 million notes and >190 Billion characters (24B in Wikipedia)
- The median chart has about 4300 words (29K in Hamlet)A
- Average note length is 40 words (20 of the 40 words are directly copied from another page, but you dot know which 20)



Loon: Using Exemplars to Visualize Large-Scale Microscopy Data – *IEEE Transactions on Visualization and Computer Graphics*

Devin Lange...Alexander Lex – University of Utah

- Microscopic measurement of individual cancer cells treated with different drugs
- Developed a visualization tool for analyzing drug screening data based on quantitative phase microscopy imaging
- New approach for choosing and visualizing representative exemplar cells that retain a close connection to the low-level data
- Loon can be used for patient-specific drug selection

Motivation - Improve Cancer Treatment

Challenges:

- Cancer is heterogeneous
- Many treatment options exist

Goal:

- **Identify effective treatment option for individuals**

Quantitative Phase Microscope

Visual Analytics – Honorable Mention

VBridge: Connecting the Dots Between Features and Data to Explain Healthcare Models. IEEE Trans Vis Comput Graph – *IEEE Transactions on Visualization and Computer Graphics*

Furui Cheng...Kalyan Veeramachaneni – Hong Kong University and MIT

- Challenges to ML decision support: clinicians' unfamiliarity with ML features, lack of contextual information, and the need for cohort-level evidence
- Vbridge incorporates ML explanations into clinicians' decision-making workflow
- Hierarchical display of contribution-based feature explanations
- Connects the dots between ML features, explanations, and data

Patient's Profile

link ☐ off

Patient Info

Age : 2M 13D
Gender : M
Height (cm) : 58.0
Weight (kg) : 5.0
Admission department : CICU
Diagnosis : CHD
ICD10 CODE CN : Q24.900

Surgery Info

Surgery name : Norwood procedure+PDA closure
Surgery position : supine position
Surgical time (minutes) : 296
CPB time (minutes) : 134.0

1

Feature View

focus ☐ off

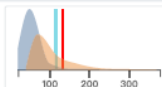
Name ↓

Value

Contribution ↓

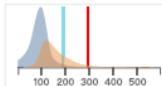
In-surgery

CPB time (minutes)



High → High

Surgical time (minutes)



High → High

Oxygen Saturation

mean

↓71.455

Lactate

mean

6.64↑

Pulse

Pre-surgery

pCO2

In-surgery

Pre-surgery

2

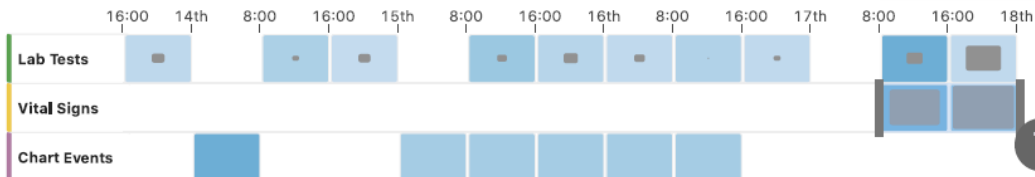
Timeline View

Less Abnormal Items

More Abnormal Items

Less Records

More Records



#Group: 869 (550)

0

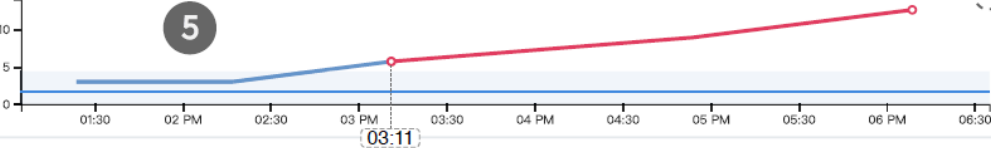
7

Temporal View

link ☐ on

Lab Tests

Lactate



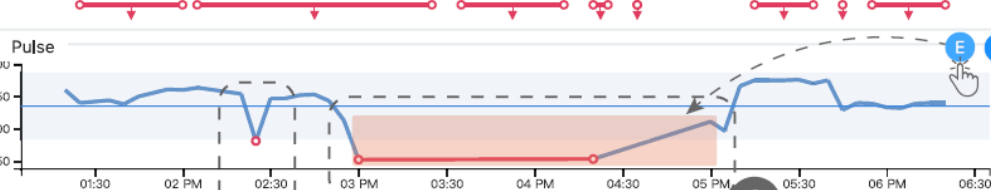
5

E2

E

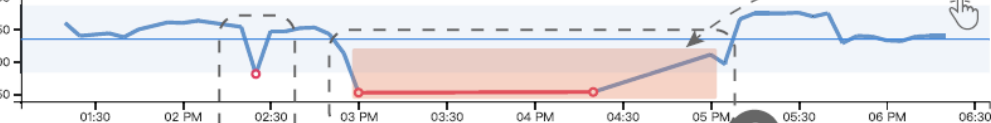
Vital Signs

Oxygen Saturation



6

Pulse



8

Systolic Blood Pressure

Diastolic Blood Pressure

9

Tracking Patient Problem Evolution

Barrows Jr RC, Johnson SB. A data model that captures clinical reasoning about patient problems. *Proc Annu Symp Comput Appl Med Care*. 1995. 402-5.

- Problem X:
 - “I have anemia”
 - *Anemia, Iron Deficiency, NOS*
 - “Resolved with FeS04”

Ceusters W, Smith B. Strategies for referent tracking in electronic health records. *J Biomed Inform*. 2006 Jun;39(3):362-78.

- Referent Tracking:
 - New versus previous lesion
 - Benign-to malignant transformation
 - Recrudescence versus recurrence

What about errors?

Visual Analytics – Honorable Mention

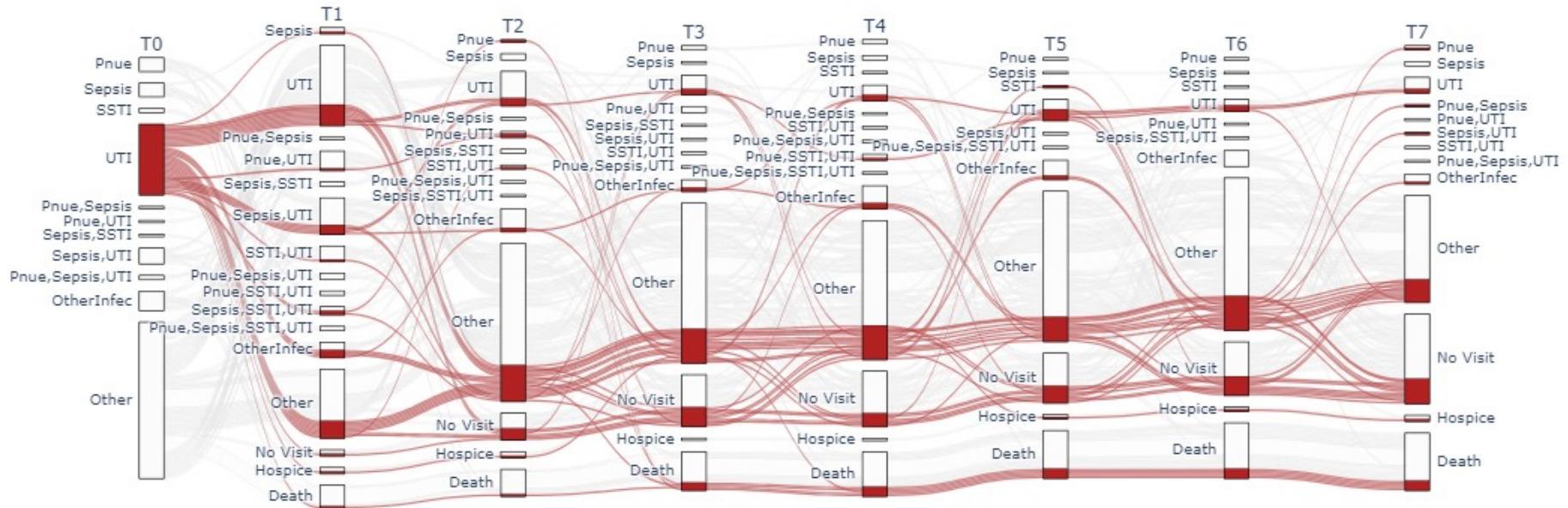
A flexible framework for visualizing and exploring patient misdiagnosis over time
– *JB*

Wathsala Widanagamaachchi...Mkoto Jones – University of Utah

- Tracking the diagnostic process - improving accuracy, reduce errors
- Framework for exploring the cohorts diagnoses over time
- View further details on the selected patient cohort

Widanagamaachchi et al.: Misdiagnosis Viz. AMIA

INFORMATICS PROFESSIONALS. LEADING THE WAY.



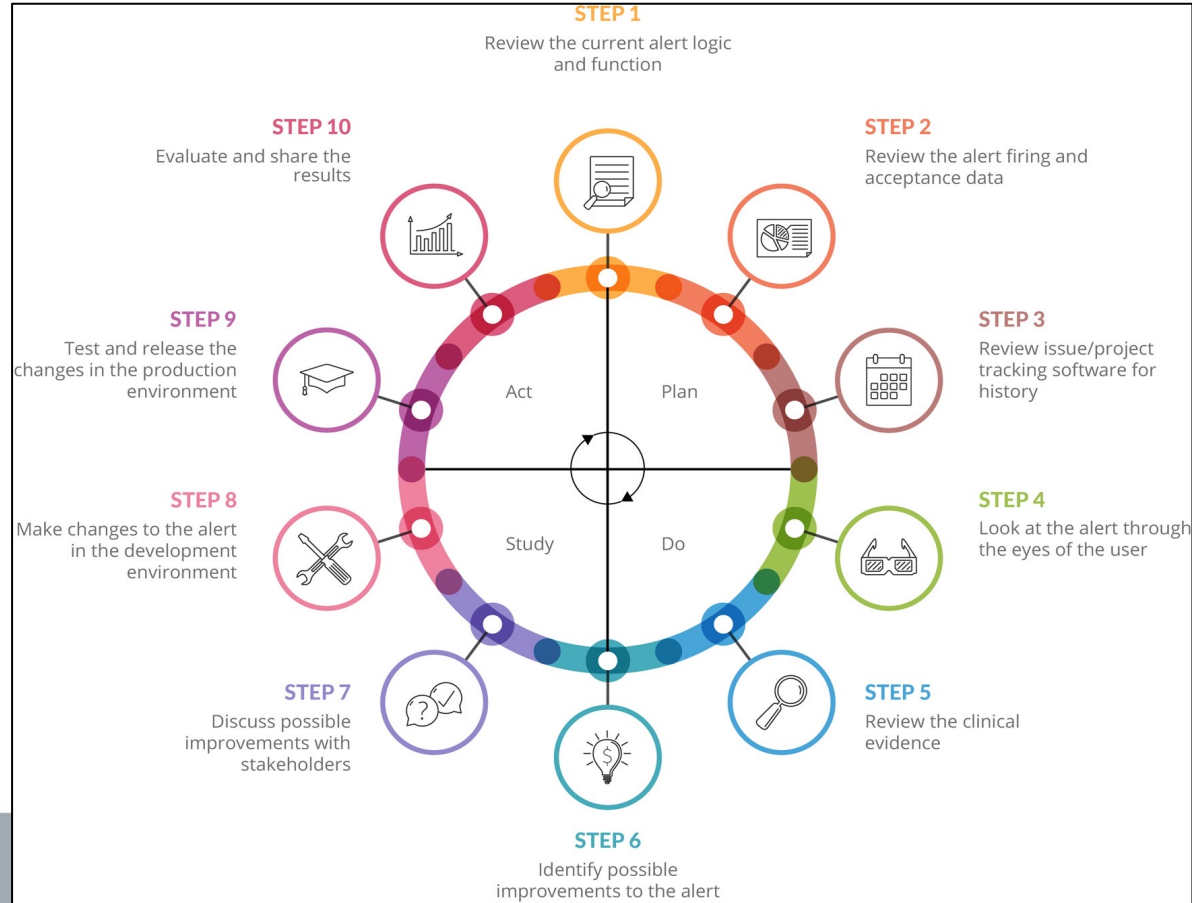
Clinical Decision Support

Clinician collaboration to improve clinical decision support: the Clickbusters initiative – *JAMIA*

Allison McCoy...Adam Wright – Vanderbilt University

- 10-step process for reviewing alerts to minimize unnecessary firing
- The first step is to admit you have a problem
- 488,425 alert firings per week

McCoy et al.: Clickbusters



Clinical Decision Support

Clinician collaboration to improve clinical decision support: the Clickbusters initiative – *JAMIA*

Allison McCoy...Adam Wright – Vanderbilt University

- 10-step process for reviewing alerts to minimize unnecessary firing
- The first step is to admit you have a problem
- 488,425 alert firings per week
- Two three-months rounds of review and revision (84 alerts)
- Reduced weekly firings by 70,000 (15.43%)
- Increased user engagement and involvement in CDS

Using big data and mobile health to manage diarrhoeal disease in children in low-income and middle-income countries: societal barriers and ethical implications – *Lancet infectious Diseases*

Karen Keddy...Iruka Okeke - South African Medical Research Council, University of Ibadan (Nigeria) and others

- Multi-national studies and big-data analytics are advancing understanding causes of diarrhea in children low-income and middle-income countries
- Mobile phones provide clinical decision support to health-care workers and communicating preventive measures to care-givers
- Authors propose a big data “umbrella” encompassing cloud-based centralised databases to interlink human, animal, agricultural, social, and climate data

Select top
Clusters

Select State

Search

Top 50% ▾

Ogun ▾

Menu

TB-LON - MATCH AI HOTSPOT MAPPING GEOPORTAL

Info

Search Bar for
Cluster name

► LGA

► Ward

▼ Thiessen

Borders

► Demographics

▼ Observed Screening

Screened Total

Evaluated Total

B+ Total

All Forms Total

▼ TB Predictions

Predicted B+ Total Rate

Predicted B+ Total NNS

Predicted All Forms Total Rate

Predicted All Forms Total NNS

► Predicted vs Observed

▼ Point Locations

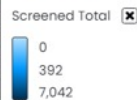
► Community Services



powered by EPONAI - EPIDEMIC CONTROL SYSTEMS

Areas already
screened

Top 50% high
burden areas

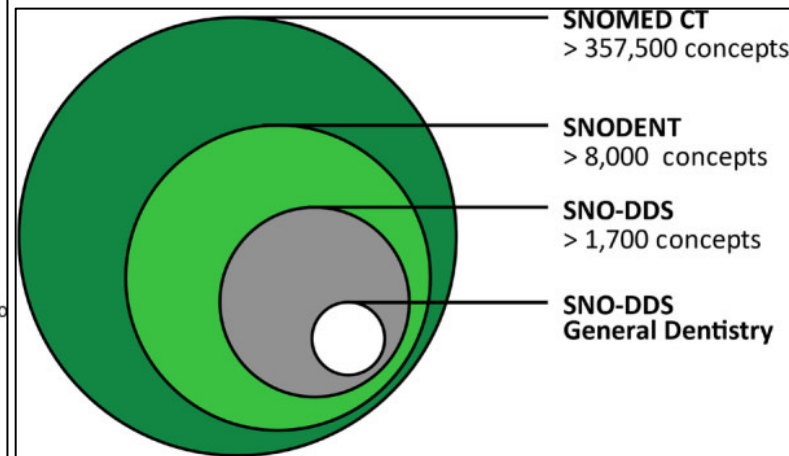
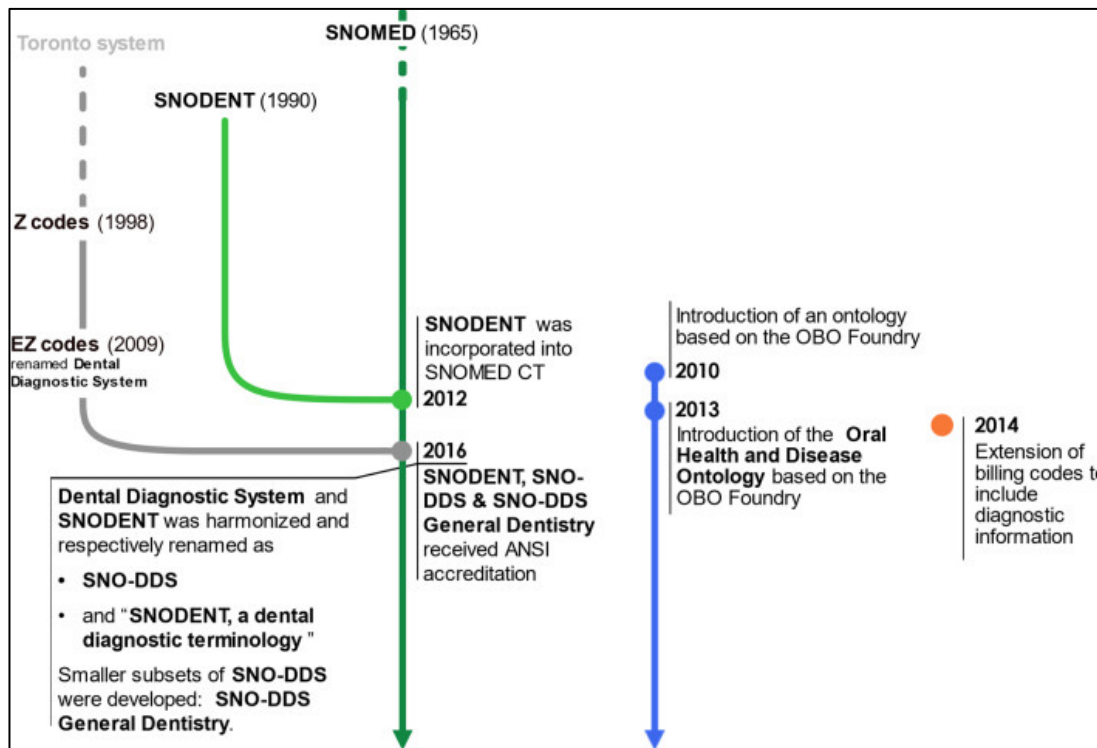


Current state of dental informatics in the field of health information systems: a scoping review – *BMC Oral Health*

Ballister Benoit...Dufour Jean-Charles - Assistance Publique des Hôpitaux de Marseille

- 50 years of dental clinical coding systems, data capture, and clinical data reuse
- PRISMA-ScR protocol - 44 articles identified
- Coding systems: design, development, evaluation, validation and adoption
- Data capture: data completeness, user interfaces and workflow integration
- Patient care: clinical decision support, health monitoring, and clinical research
- Most published in the US
- Clinical decision support systems that reuse EDR data have been little studied
- Few studies have examined the working environment of dental practitioners or the educational value of using health information systems in dentistry

Benoit et al.: Dental Informatics



A research agenda to support the development and implementation of genomics-based clinical informatics tools and resources – *JAMIA*

Ken Wiley...James Cimino...Marc Williams - National Human Genome Research institute

- 13th meeting: “Developing a Clinical Genomic Informatics Research Agenda”
- Invitees surveyed on genomic-based clinical informatics research strategy.
- Standards-based laboratory information systems-EHR interfaces
- Barriers to genomic data exchange systems
- Developing an implementation science framework,
- Promoting the use of relevant clinical workflows in research,
- Lowering related barriers to regulatory processes.
- Recognizing pervasive biases in data and information systems, algorithms, access, value, and knowledge repositories and identifying ways to resolve them

Genomic Medicine XIII: Developing a Clinical Genomic Informatics Research Agenda

Technical Desiderata elements

	GMVII Ranking, 2014	GMXIII Ranking, 2021	Ranking changes over 7 years
Maintain separation of primary molecular observations from the clinical interpretations of those data	11	3	+8
Maintain linkage of molecular observations to the laboratory methods used to generate them	7	2	+5
Support lossless data compression from primary molecular observations to clinically manageable subsets	12	6	+6
Leverage current and developing CDS and genomics standards	8	4	+4
Keep CDS knowledge separate from variant classification	13	11	+2
Support a large number of gene variants while simplifying the CDS knowledge to the extent possible	9	7	+2
CDS knowledge must have the potential to incorporate multiple genes and clinical information	1	1	=
CDS knowledge must have the capacity to support multiple EHR platforms with various data representations with minimal modification	5	5	=
Access and transmit only the genomics information necessary for CDS	14	14	=
Support a CDS knowledge base deployed at and developed by multiple independent organizations	4	12	-8
Simultaneously support human-viewable formats and machine-readable formats in order to facilitate implementation of decision support rules	3	10	-7
Support both individual clinical care and discovery science	2	8	-6
Support compact representation of clinically actionable subsets for optimal performance	6	9	-3
Anticipate fundamental changes in the understanding of human molecular variation	10	13	-3

Snake Venomics: Fundamentals, Recent Updates, and a Look to the Next Decade – *Toxins*

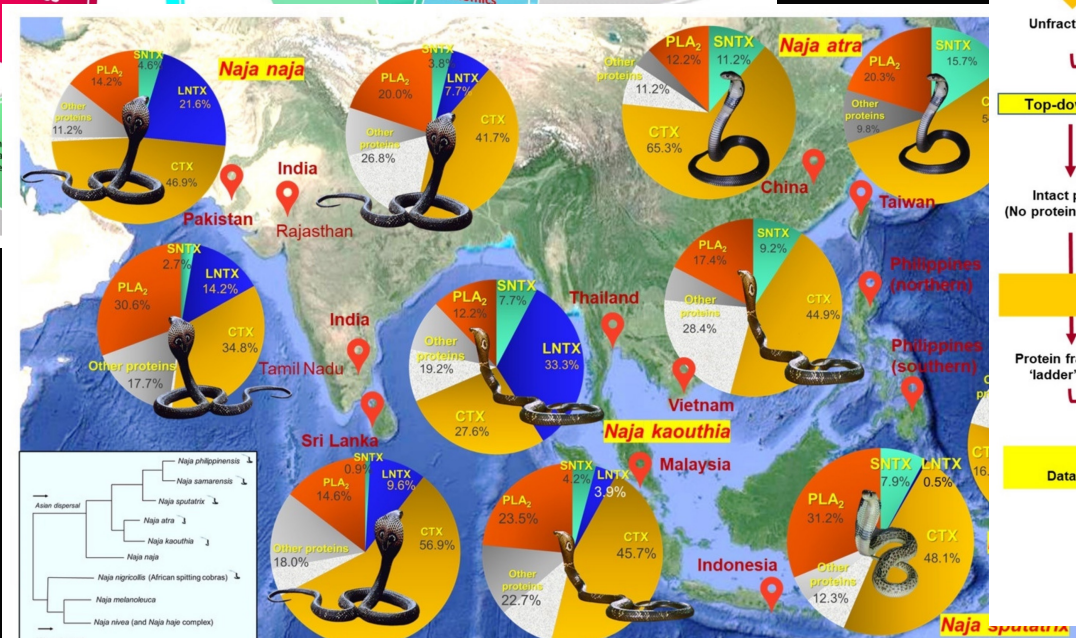
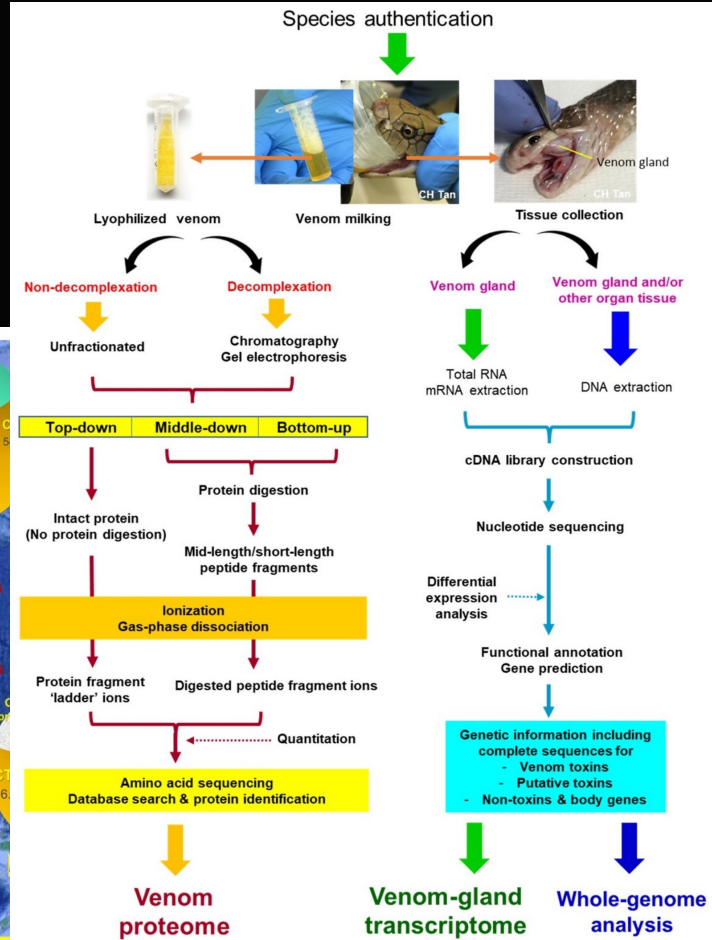
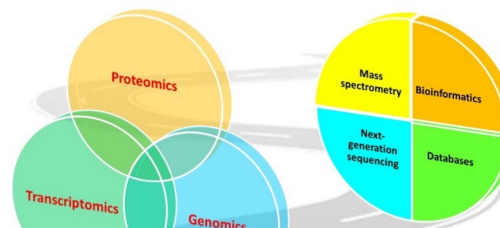
Choo Tan – University of Malaya

- “Venomics” – 84,400 hits in Google (435 hits for “venom informatics”)
- Mass spectrometry, proteomics, transcriptomics, and genomics (all toxins IDed)
- Challenges
 - Limited samples, non-standardized methods, biased -omics interpretation
 - Venomic tissue sampling is difficult due to strict regulations on wildlife use
 - Limited resources in less developed regions and neglected species
 - And, you know, snakes and spiders
- Collaboration between international researchers and improved distribution of research support, should be embraced

Venomics & Applications	Methodologies	Techniques
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Venomics & Applications	Methodologies	Techniques
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Venomics & Applications	Methodologies	Techniques
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LNTX ◀

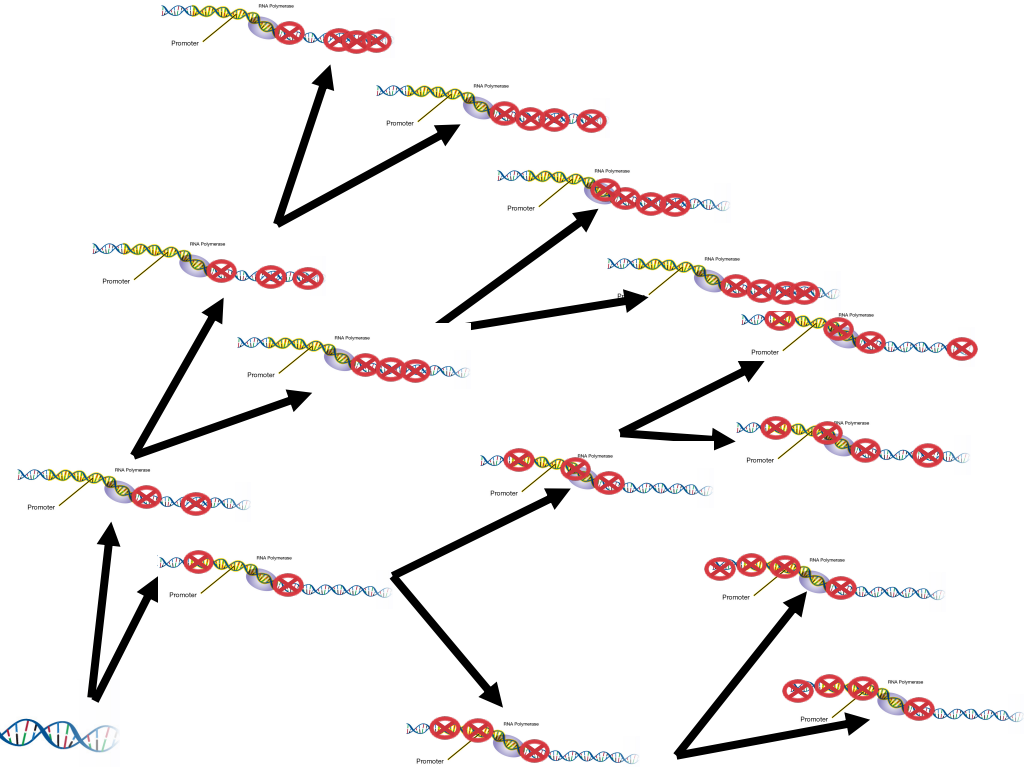
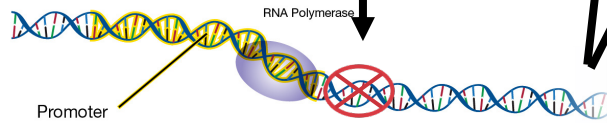
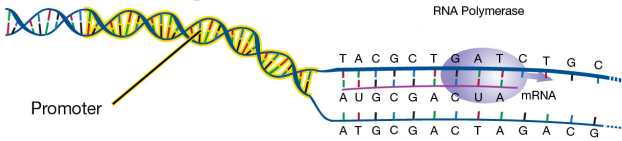
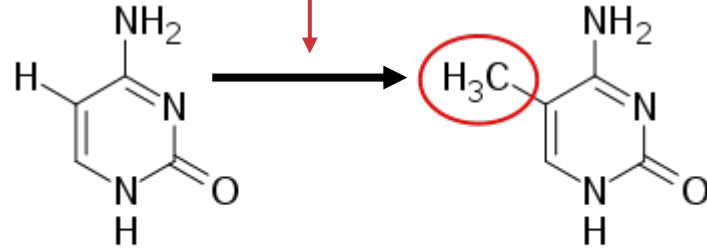


SNTX



DNA Methylation and Inherited Stress

Stress



DNA methylation signatures of childhood trauma predict psychiatric disorders and other adverse outcomes 17 years after exposure – *Molecular Psychiatry*

Charlie van den Oord...Edwin van den Oord – Virginia Commonwealth university

- Childhood trauma is linked to adverse outcomes persisting into adulthood
- Prospective longitudinal study to predict psychiatric disorders and other adverse outcomes from trauma-related methylation changes
- 673 assays from 489 participants aged 13.6 years (SD = 1.9) with outcomes measures collected and methylation data generated at age 30.4 (SD = 2.26)
- Scores predicted adult depression, externalizing problems, nicotine dependence, alcohol use disorder, serious medical problems, social problems and poverty
- Predictive power could not be explained by the reported trauma, demographic variables, or continuity of the predicted problems from childhood to adulthood
- A novel clinical biomarker for the assessment of trauma-related health risks?

The Challenge of Debunking Health Misinformation in Dynamic Social Media Conversations: Online Randomized Study of Public Masking During COVID-19 – *Journal of Medical Internet Research*

Mehdi Mourali and Carly Drake – University of Calgary

- Corrections can mitigate the impact of misinformation but little is known about the impact of correction in the context of prolonged social media debates
- Often, the social media user rebukes the critic and doubles down on the claim
- This study examined the impact of such extended back and forth between false claims and debunking attempts
- Tested predictions about the effect on people's attitudes toward masking
- 500 US residents assigned to one of four social media exposure conditions



u/citizen-health · Posted by u/citizen-health 43 minutes ago



Mask Mouth

"Mask Mouth" a new medical condition caused by wearing a masks all day. The bacteria in yr mouth along with the dampness causes the skin around your mouth to breakout in hives. Not to mention the oxygen deficiency due to the fact that you are breathing in your own carbon dioxide.

There is so much bacteria, yeast, virus & fungus that lives in the mouth that is expelled as you breath, but it is trapped around your mouth when wearing a mask all day. That along with the moisture from your breath creates the dampness that bacteria & fungus thrive in.

It's basically like wearing a soiled diaper all day. You will get a diaper rash.

Other mask mouth symptoms include tooth decay, bad breath & gum inflammation



The claims made by citizen-health are simply incorrect and unsupported. There is no evidence that wearing masks leads to bacterial overgrowth or causes infections. Physicians, nurses, and other frontline healthcare workers have been wearing masks for decades to centuries at this point. Some surgical procedures takes hours, sometimes 10, 12, or even 18 hours. Surgeons wear masks continuously during this period. There is no evidence that doing so increases risk of bacterial or fungal infection.

There is also no scientific basis for the claim that wearing masks causes dental problems like tooth decay, gum disease, or bad breath. Dentists themselves wear face masks for long periods of time without any impact on their oral health.

Also, face mask filters are small enough to keep out infectious droplets containing viruses, but gas molecules such as carbon dioxide and oxygen can still pass through freely. Healthcare workers who wear masks for long periods of time do not demonstrate significant impairment in work performance, as would be the case if masks did cause oxygen deficiency.

In some cases, prolonged wearing of face masks might cause skin irritation, but this can be prevented by selecting comfortable masks and following proper hygiene guidelines.

citizen-health • 15 minutes ago

Of course, a government shill like "Health_Scientist" would deny the existence of this new mouth mask. What else do you expect? Hey, they say "A picture is worth a thousand words" & this picture screams TRUTH 🙄 🤔 🙄

👉 TAKE YOUR NASTY GERM & BACTERIA INFESTED MASKS OFF! 🤢 🤮 🤧 🤨 🤩





citizen-health is resorting to imagery to provoke an emotional response. But, scientific evidence does not support the claim that wearing masks increases the risk of oral and skin infections or bacterial overgrowth.

Masks are an incredibly effective public health tool, and essential in stemming the spread of SARS-CoV-2, the virus that causes COVID-19. While initially there was a lack of scientific certainty about the level of protection that different masks conferred, it is now clear that masks are helpful. And not just "my mask protects you, your mask protects me" (if I wear a mask, and am infected, I breath out and spread less virus), but beyond that, wearing a mask means that if you come into contact with the virus, you are likely to be exposed to a lower amount of virus, and give your body and immune system a chance to respond better, with better outcomes.

It is important to pay attention to where your information is coming from, and what it's based on. The recommendation to wear masks is from doctors, infectious disease experts, epidemiologists, and those leading the efforts to curb the pandemic. Countries with widespread mask use have lower rates of infection, fewer infected patients, and better outcomes - and are able to get back closer to 'normal' life, with their economy doing better, and more places of business and schools able to open, and able to stay open.

Mourali et al.: Debunking Misinformation

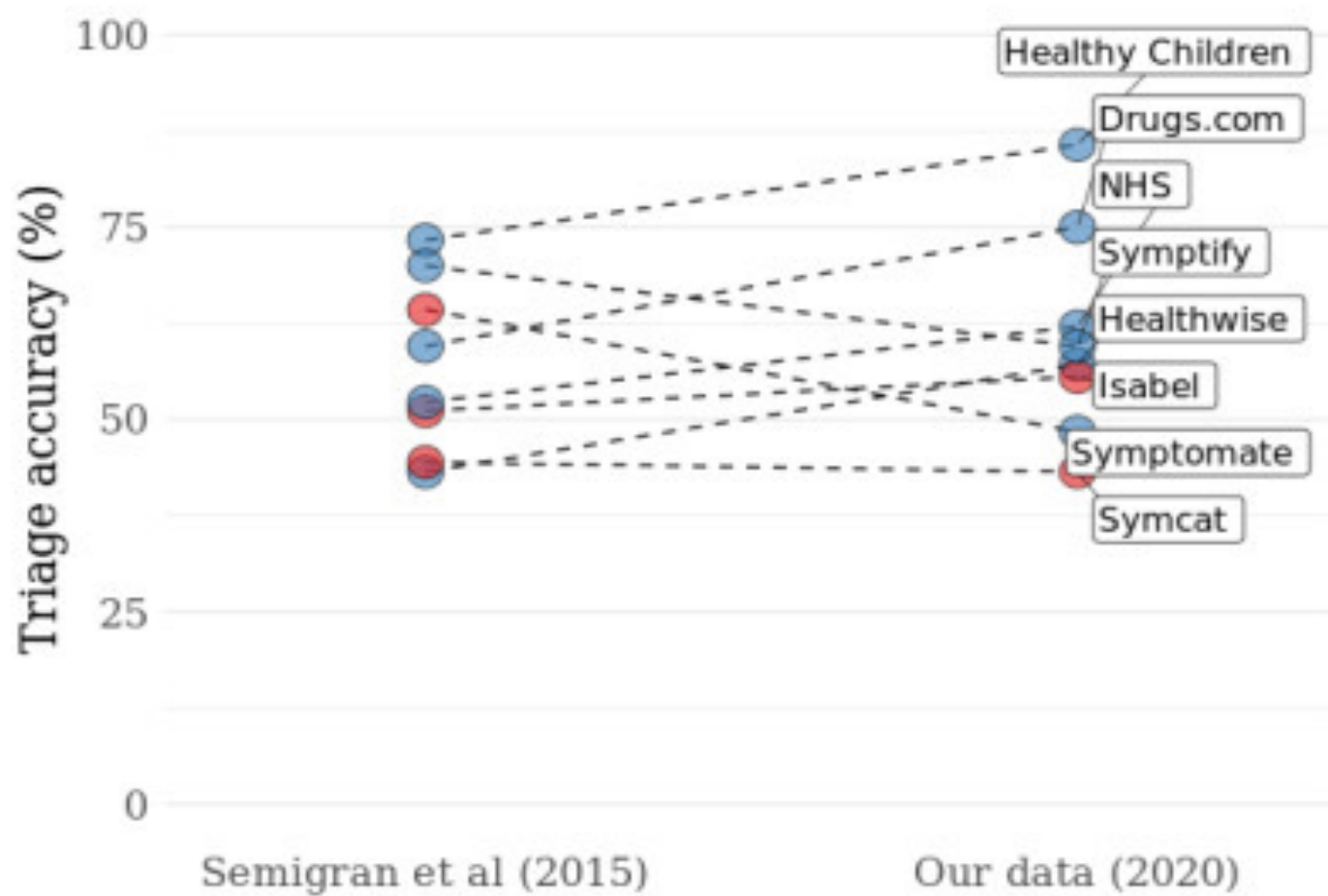
- Misinformation had a negative impact on attitudes and intentions
- Initial debunking of a generally improved attitudes and intentions
- Improvement was washed out by further exposure to false claims
- Extended exposure to false claims and debunking attempts appear to weaken the belief that there is an objectively correct answer
- Conclusions: Although engaging in extended debates with science deniers and other purveyors of bunk appears necessary, more research is needed to address the unintended consequences of such engagement.

Consumer Health – Honorable Mention

Triage Accuracy of Symptom Checker Apps: 5-Year Follow-up Evaluation –
Journal of Medical Internet Research

Malte Schmieding...Marcus Feufel - Universitätsmedizin Berlin

- 2015 (index) study looked at accuracy of 22 smartphone and web-based applications providing triage advice on 45 cases
- Current study replicates index study



App includes all 3 triage levels: ● No ● Yes

Triage Accuracy of Symptom Checker Apps: 5-Year Follow-up Evaluation – *Journal of Medical Internet Research*

Malte Schmieding...Marcus Feufel - Universitätsmedizin Berlin

- 2015 (index) study looked at accuracy of 22 smartphone and web-based applications providing triage advice on 45 cases
- Current study replicates index study
- Median triage accuracy : 59.1% in 2015, 55.8% in 2020
- 2020 apps were less risk averse (odds 1.11:1, ratio of overtriage to undertriage) than those in 2015 (odds 2.82:1); missed >40% of emergencies
- Few apps outperformed laypersons in either deciding whether emergency care was required or whether self-care was sufficient
- No apps outperformed the laypersons on both decisions.

Overlapping Themes – Documentation

Documentation



25x5 Task Force

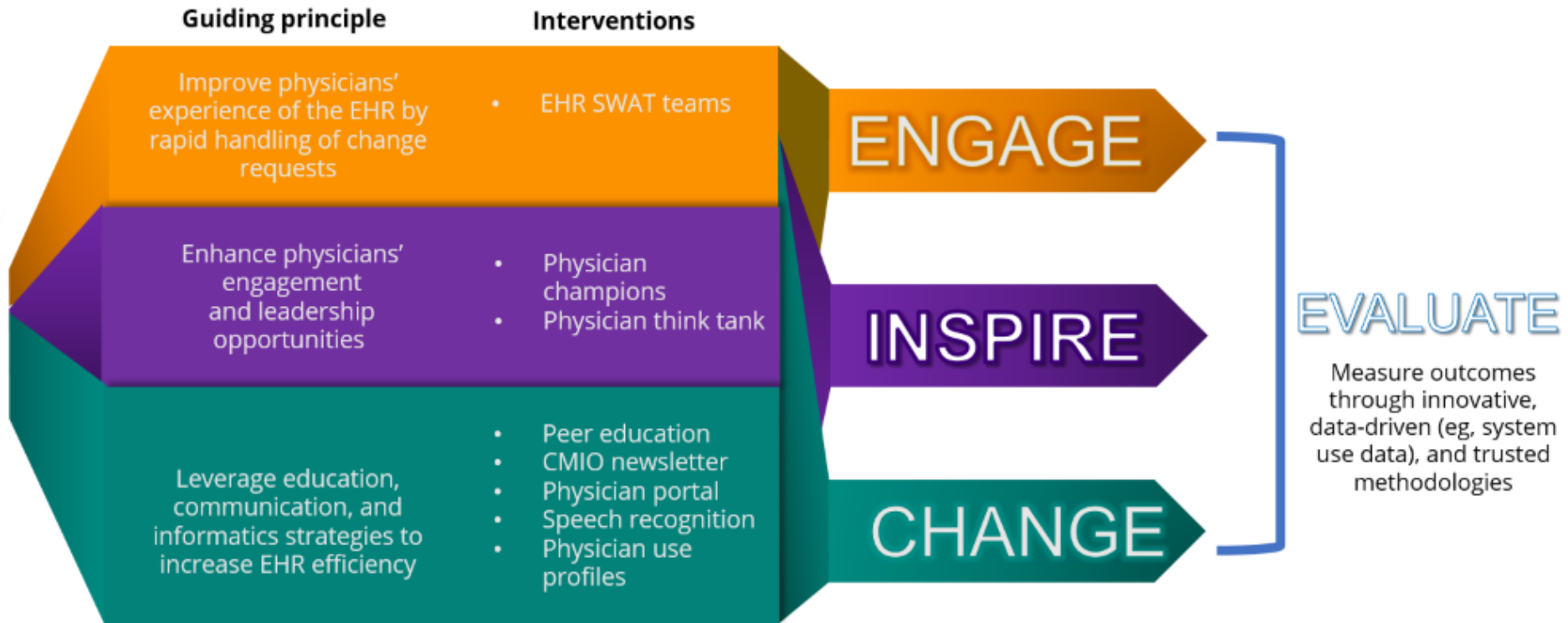
25 x 5 Task Force (Documentation)

Tackling the Burden of Electronic Health Record Use Among Physicians in a Mental Health Setting: Physician Engagement Strategy – *Journal of Medical Internet Research*

Tania Tajirian...Vicky Stergiopoulos – Centre for Addiction and Mental Health, Toronto and University of Toronto

- Electronic health record systems contributing to physician burnout
- Implemented a Physician Engagement Strategy focused burden reduction
- Collaboration with clinical leadership, IT leadership, and physicians
- Four components:
 - Engage
 - Inspire
 - Change
 - Measure

Tajirian et al.: Burden Reduction Engagement





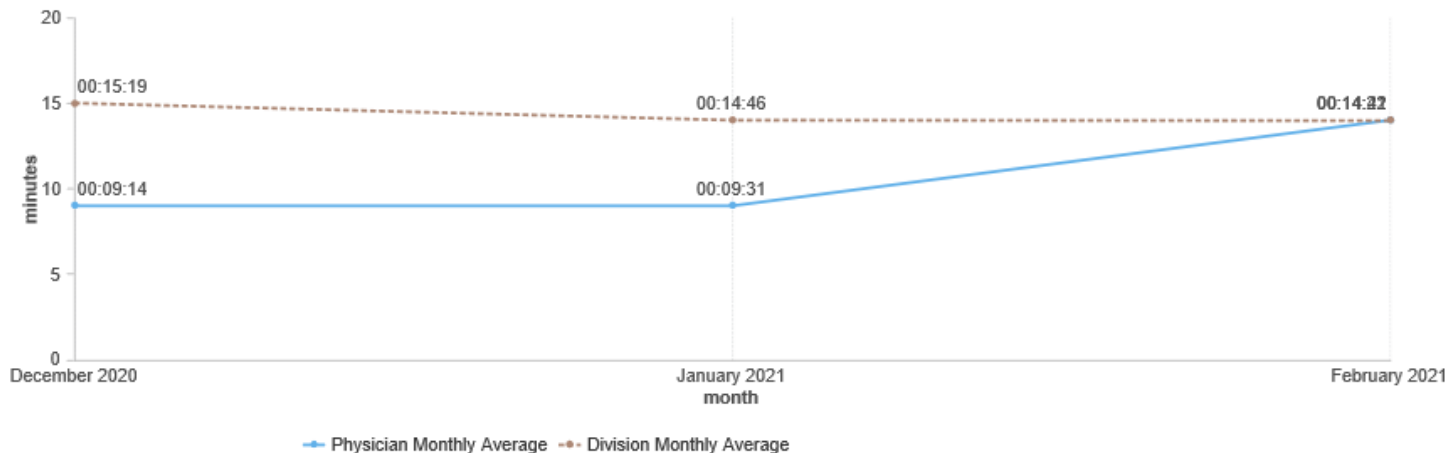
Division: Medicine in Psychiatry*

* Your name has been mapped to the Division above. If you find any discrepancies with the mapped Division, please send your proper Division to [Khaled Almilaji \(khaled.almilaji@camh.ca\)](mailto:Khaled.Almilaji@camh.ca). The changes to your Division area will be applied next month.

Time Spent in I-CARE per patient (in minutes) - Trends over the past 3 months

Average Time Spent In:

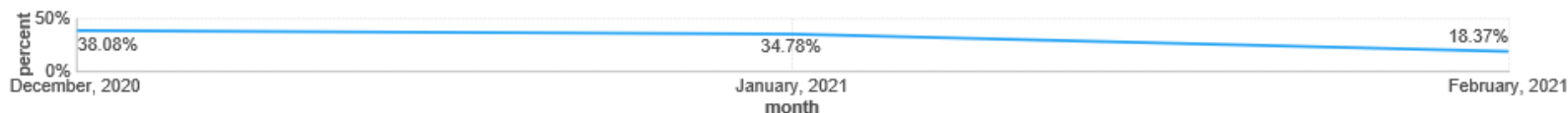
- ☒ I-CARE per patient
- ☐ Documentation per patient
- ☐ Chart Review per patient
- ☐ Orders per patient
- ☐ Others per patient
- ☒ Compare with my division



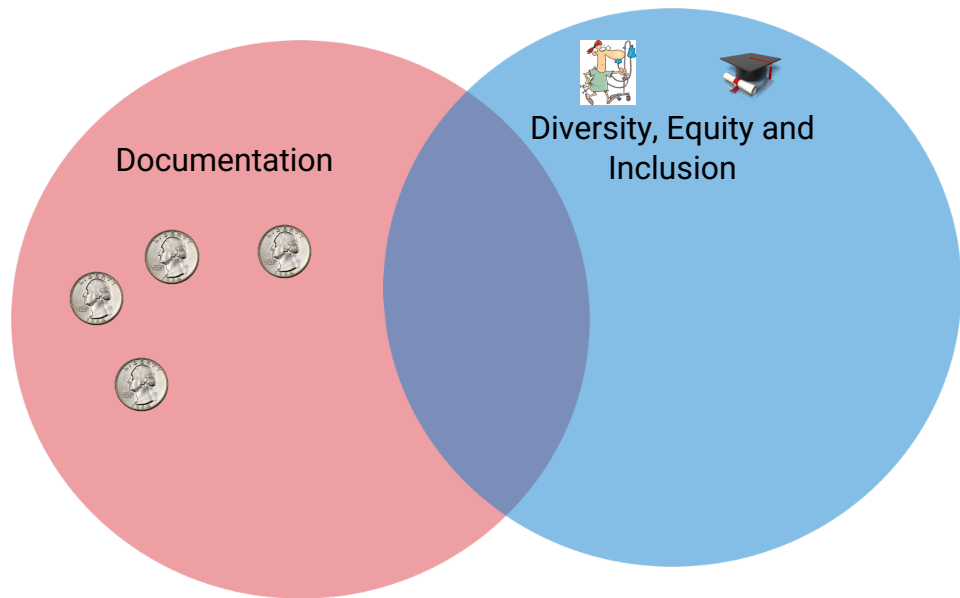
% of time spent After-Hours = Time You spent in EMR outside of core hours / total time you spent in EMR in the same month.
(February 2021 Percentage)

18.37 %

% of time spent After-Hours (6pm - 6am) - Trends over the past 3 months



Overlapping Themes – Education and DEI



25x5 Task Force



Consumer Informatics WG



Education WG

Education Working Group (DEI)

Nurturing diversity and inclusion in AI in Biomedicine through a virtual summer program for high school students – *PLoS Computational Biology*

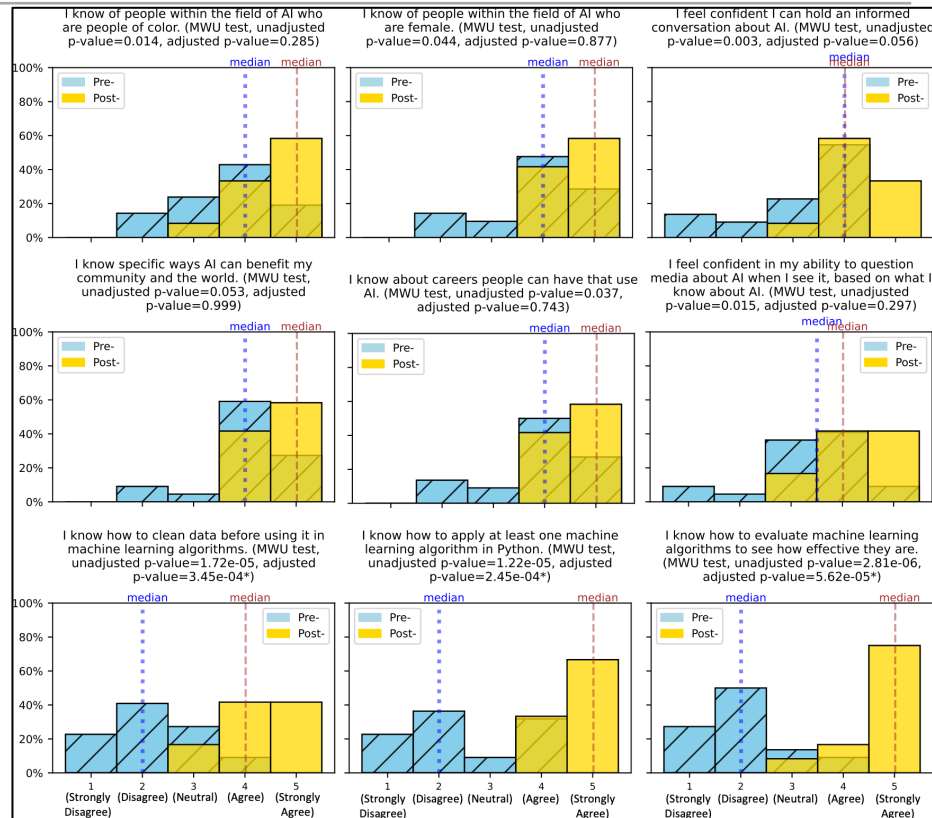
Tomiko Oskotsky...Marina Sirota – University of California at San Francisco

- UCSF AI4ALL program established in 2019 to increase diversity in AI
- Targets high school students from underrepresented backgrounds
- Students participated virtually (2020) to gain experience with AI, interact with diverse role models in AI, and learn about advancing health through AI
- Lectures in coding and AI
- In-depth research experience through hands-on projects exploring COVID-19
- Engaged in mentoring and personal development sessions with faculty, researchers, industry professionals, and undergraduate and graduate students

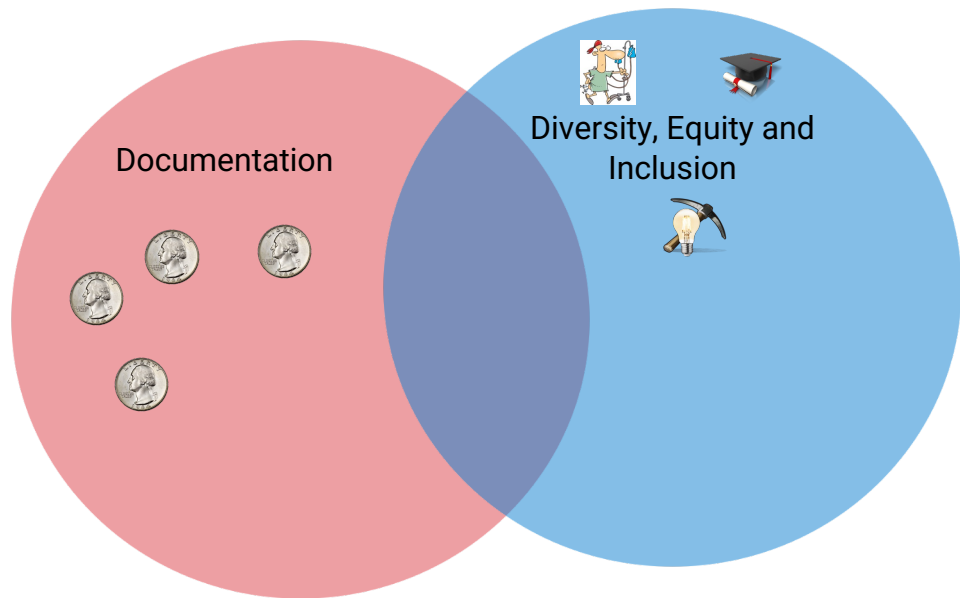
Osotsky et al.: Diversity and Inclusion in AI





Characteristic	# students (total accepted: 29)	% students
Gender		
She/Her	29	100%
He/Him	0	0%
They/Them	0	0%
Race * more than one category may be checked		
Asian (including Indian subcontinent and Philippines)	23	79.3%
Black or African American	0	0%
Native Hawaiian or Other Pacific Islander (Original Peoples)	1	3.4%
Hispanic or Latino (including Spain)	2	6.9%
White (including Middle Eastern)	0	0%
Decline To State	4	13.8%
Grade Level Next Year		
Senior / 12th grade student	10	34.4%
Junior / 11th grade student	13	44.8%
Sophomore / 10th grade student	6	20.7%
Freshman / 9th grade student	0	0%
School		
Public	23	79.3%
Private	6	20.7%
Charter	0	0
Qualify for Free Lunch at School		
Yes	4	13.8%
No	25	86.2%
1st Gen College Student		
Yes	6	20.7%
No	23	79.3%
Home State		
California	23	79.3%
Other	6	20.7%

<https://doi.org/10.1371/journal.pcbi.1009719.t001>



Overlapping Themes – Data Mining and DEI



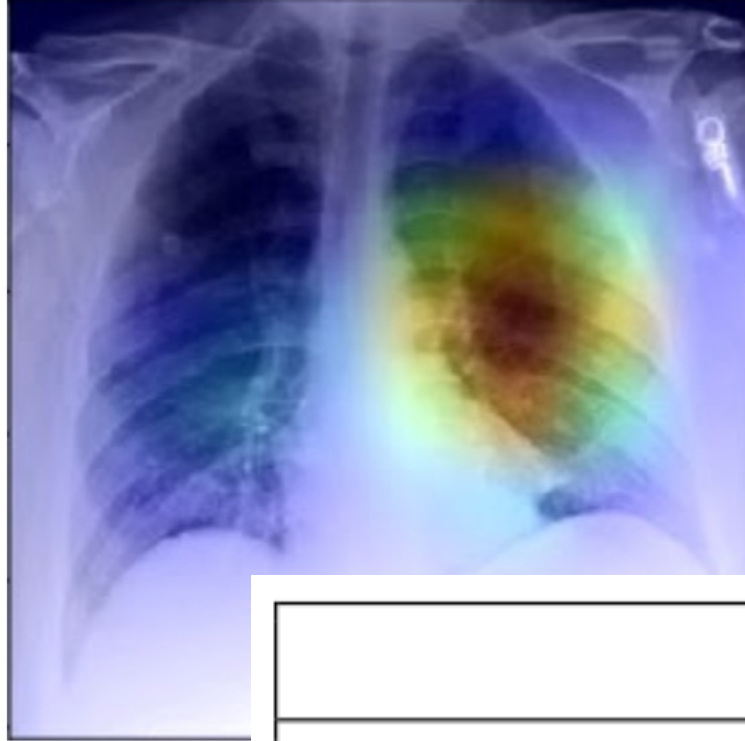
-  25x5 Task Force
-  Consumer Informatics WG
-  Education WG
-  Know. Disc. & Data Mining WG

AI recognition of patient race in medical imaging: a modelling study – *Lancet Digital Health*

Judy Gichoya...Hoaran Zhang – Emory University

- Previous studies have shown that AI can detect race from radiographic images
- Used a variety of methods to alter images and see where AI breaks down

Gichoya et al.: Race in Medical Imaging



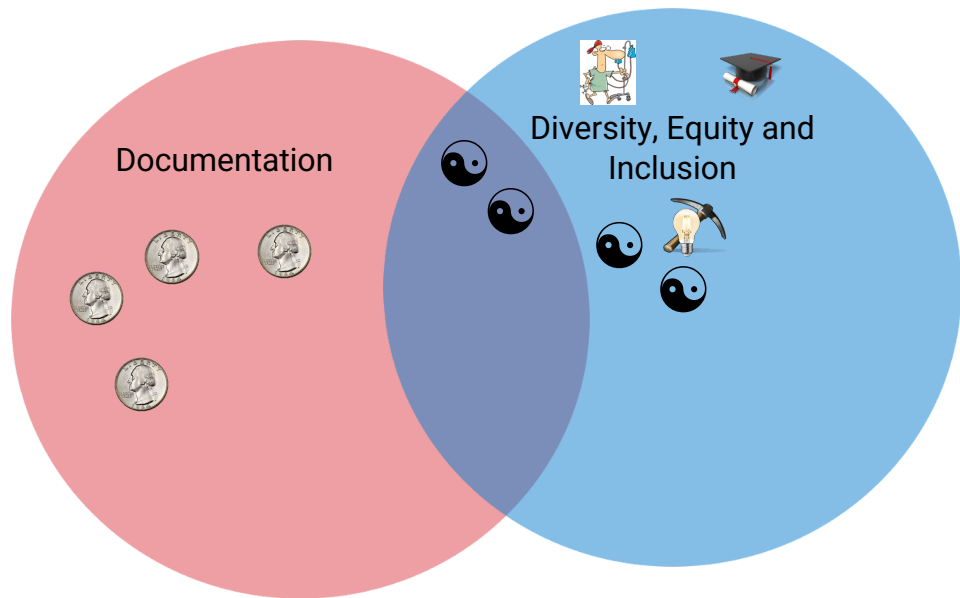
	Asian	Black	White
MXR Densenet121-Original	0.93	0.94	0.94
MXR Densenet121-Masked	0.88	0.79	0.79






AI recognition of patient race in medical imaging: a modelling study – *Lancet Digital Health*

Judy Gichoya...Hoaran Zhang – Emory University

- Previous studies have shown that AI can detect race from radiographic images
- Used a variety of methods to alter images and see where AI breaks down
- Not related to BMI, bone density, breast density or disease distribution
- Not related to anatomic region or frequency spectrums
- Eliminating behavior (when undesirable) will be difficult

Overlapping Themes – Documentation & DEI



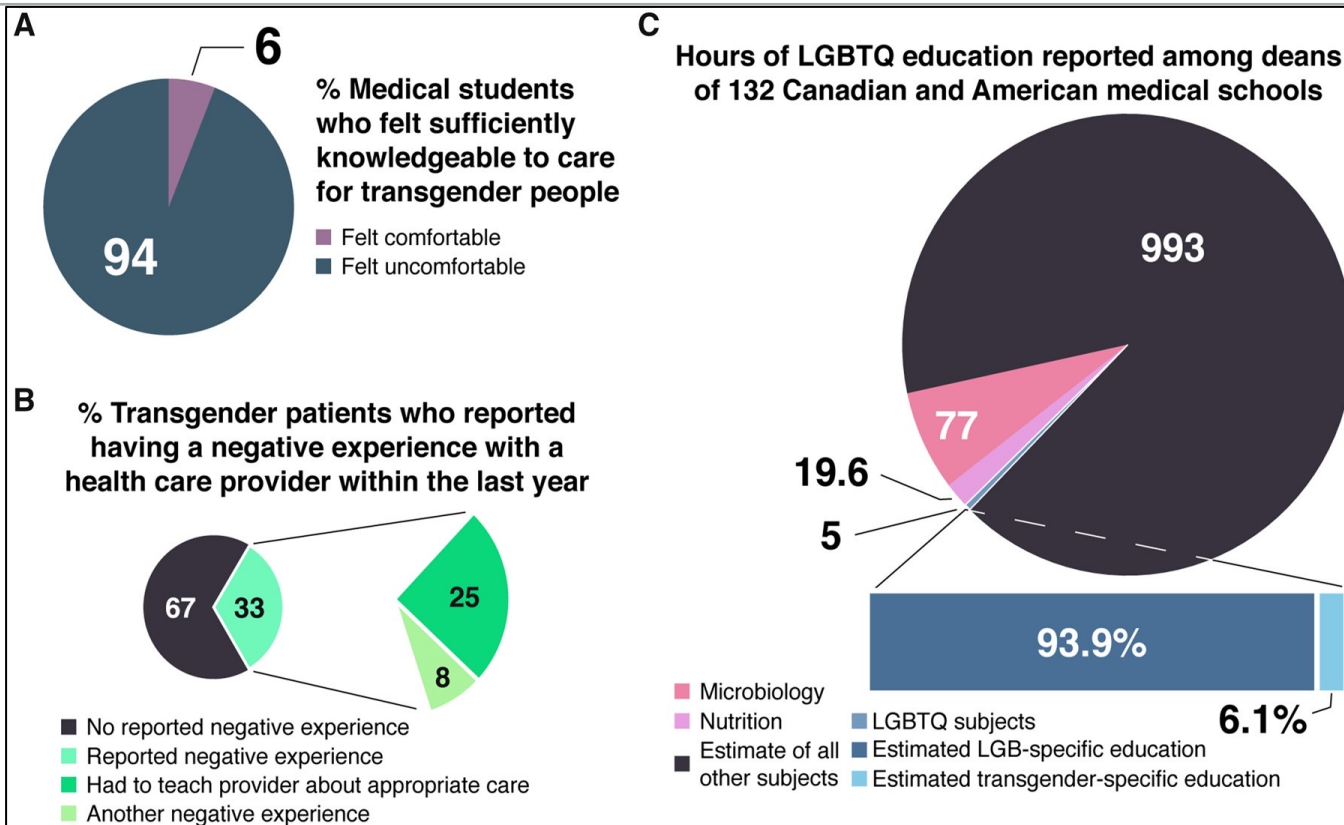
-  25x5 Task Force
-  Consumer Informatics WG
-  Education WG
-  Know. Disc. & Data Mining WG
-  Diversity, Equity & Inclusion Com.

Transgender data collection in the electronic health record: Current concepts and issues – *JAMIA*

Clair Kronk...Ryan Karnoski – Yale University

- Over 1 million transgender people living in the US
- 33% report negative experiences with a healthcare provider
- Data representation in electronic health records is often an issue
- Pitfalls and recommendations involving sex- and gender-related data collection

Kronk et al.: Transgender Documentation



Kronk et al.: Transgender Documentation

METHOD 1: ONE-STEP

Example A

Do you consider yourself transgender? Choose one.

- ☒ Yes
- ☐ No
- ☐ Unsure; Maybe; Questioning; Exploring
- ☐ Prefer not to respond; Prefer not to disclose
- ☐ Something else (please specify)

Example B

Does your gender identity match the gender you were assigned at birth? Choose one.

- ☐ Yes
- ☒ No
- ☐ Unsure; Maybe; Questioning; Exploring
- ☐ Prefer not to respond; Prefer not to disclose
- ☐ Something else (please specify)

METHOD 2: TWO-STEP

What is your gender identity? Choose all that apply. [note 1]

- ☒ Female; Woman; Girl
- ☒ Male; Man; Boy
- ☒ Nonbinary
- ☐ Questioning; Exploring
- ☐ Prefer not to respond; Prefer not to disclose
- ☒ Gender identity not listed (please specify)

What is your assigned gender at birth, meaning the gender marker which appears on your original birth certificate? Choose one. [note 2]

- ☐ Female ('F')
- ☐ Male ('M')
- ☐ X [note 3]
- ☐ Unsure
- ☒ Prefer not to respond; Prefer not to disclose
- ☐ Assigned gender at birth not listed (please specify)

The quality of social determinants data in the electronic health record: a systematic review – *JAMIA*

Lily Cook...Nicole Weiskopf – Oregon Health and Sciences University

- Five ways to increase data quality
 1. Avoid complete case analysis
 2. Impute data
 3. Rely on multiple sources
 4. Use validated software tools
 5. Select addresses thoughtfully

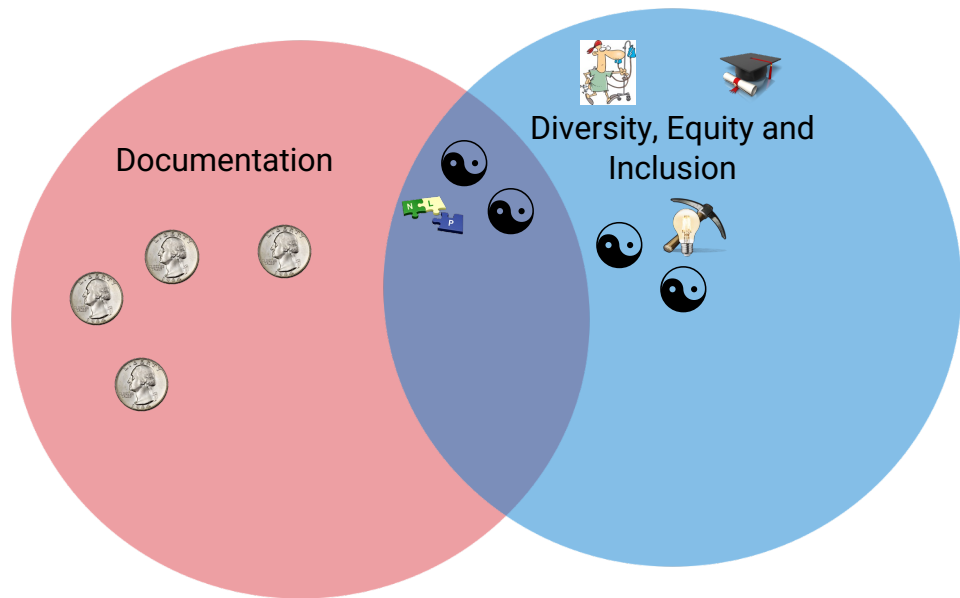
Cook et al.: Social Determinants in the EHR







BIAS	SOCIAL DETERMINANT	BIAS TYPE	% of literature reporting finding
Y e s	Race/ethnicity	misclassification	25.0%
		Differentially incomplete (MNAR)	11.8%
		Differentially implausible (INAR)	2.6%
		other	1.3%
	Insurance	MNAR	1.3%
	Occupation	Differentially incomplete (MNAR)	3.9%
	Community Level	Rural data is problematic	3.9%
		other	3.9%
	Environmental	misclassification	3.9%
	Nonspecific	Differentially incomplete (MNAR)	2.6%
N o	Did not evaluate for bias		32.9%
	Evaluated for bias and found none		6.6%

Usual source for these variables within the patient record:

administrative or demographic sources	patient address is geocoded to link community-level data	diagnosis codes
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Overlapping Themes – Document., DEI & NLP



-  25x5 Task Force
-  Consumer Informatics WG
-  Education WG
-  Know. Disc. & Data Mining WG
-  Diversity, Equity & Inclusion Com.
-  Natural Language Proc. WG

Assessing the Documentation of Social Determinants of Health for Lung Cancer Patients in Clinical Narratives – *Frontiers in Public Health*

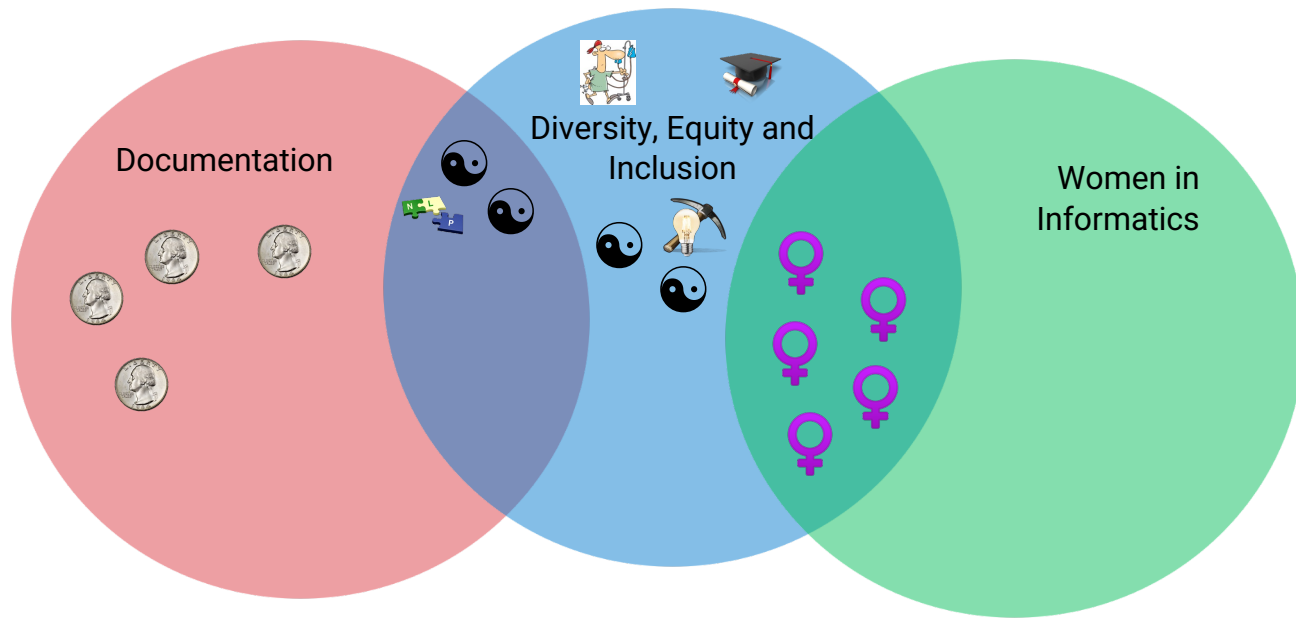
Zehao Yu...Yonghui Wu – University of Florida








- SDoH are important factors associated with cancer risk and treatment outcomes
- Most SDoH in EHRs are only captured in free-text clinical narratives
- Applied NLP to identify 15 categories of SDoH from records of 10,855 lung cancer patients

Yu et al.: Social Determinants in the EHR

SDoH category	Total number of concepts detected by NLP	Total number of patients has at least one SDoH	Percentage of patients has at least one SDoH for current category (%)
Gender	843,066	9,552	98.7
Alcohol use	223,214	9,195	95.0
Drug use	180,309	8,756	90.5
Marital status	167,457	8,655	89.5
Education	167,018	8,463	87.5
Occupation	142,306	8,345	86.3
Smoking	132,833	7,639	79.0
Race	144,980	7,376	76.2
Ethnicity	86,789	5,231	54.1
Language	83,539	5,173	53.5
Physical activity	55,842	3,092	32.0
Transportation	24,191	2,877	29.7
Financial constraint	113,220	2,766	28.6
Social cohesion	9,170	2,727	28.2
Employment status	843,066	2,110	21.8

Overlapping Themes – DEI and Women in AMIA



-  25x5 Task Force
-  Consumer Informatics WG
-  Education WG
-  Know. Disc. & Data Mining WG
-  Diversity, Equity & Inclusion Com.
-  Natural Language Proc. WG
-  Women in AMIA

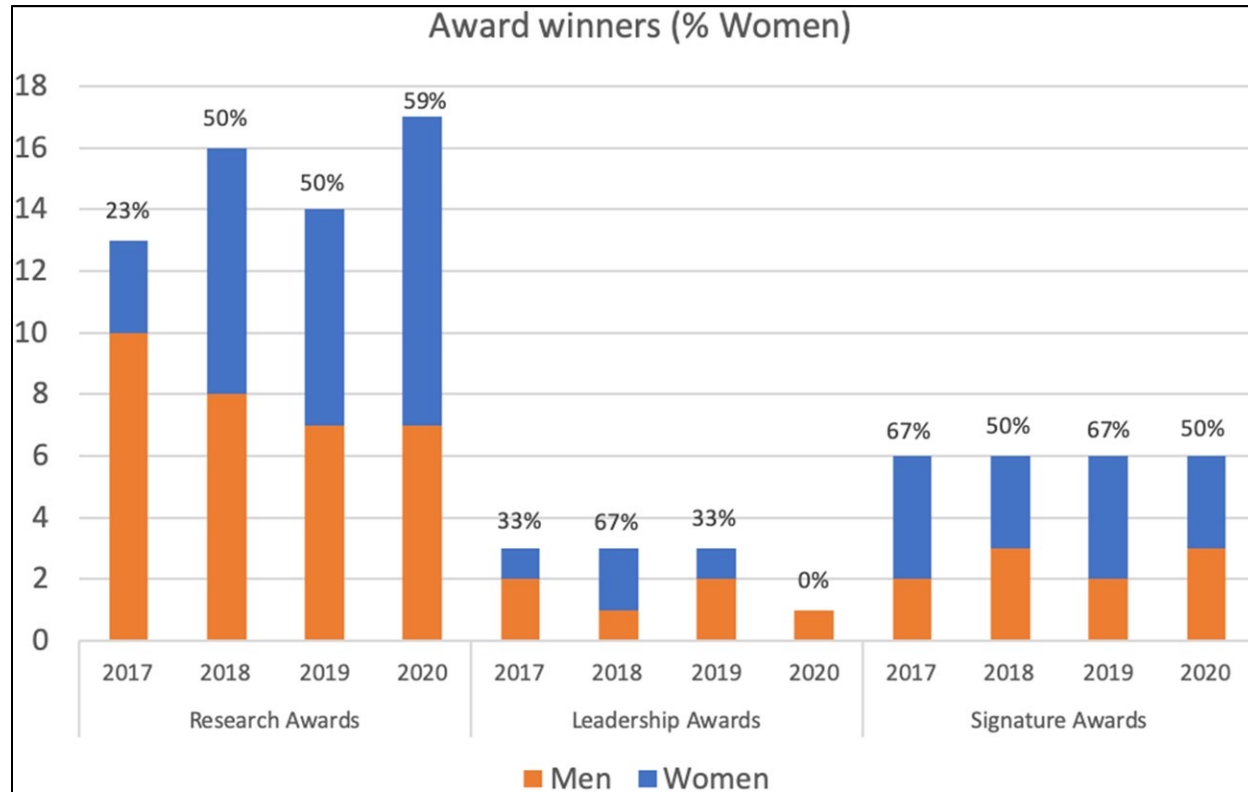
Women in AMIA (DEI)

Comparison of women and men in biomedical informatics scientific dissemination:
retrospective observational case study of the AMIA Annual Symposium: 2017-2020 –
JAMIA

Andrea Hartzler...Carole Stipelman - University of Washington and others

- Capstone project from the Women in AMIA (WIA) Leadership program
- Co-authors (except Jeff and Dasha) were scholars in the 1st year of the program
- Assigned gender using Genderize.io
- Analyzed 4687 submissions: acceptance rates, sentiment analysis of reviews
- Women first authors submissions increased from 38% (2017) to 43% (2020)
- Women first-author acceptance increased from 37% (60% overall) to 44% (50%)
- Sentiment the same for men/women authors/reviewers

Hartzler et al.: Gender in AMIA Symposium



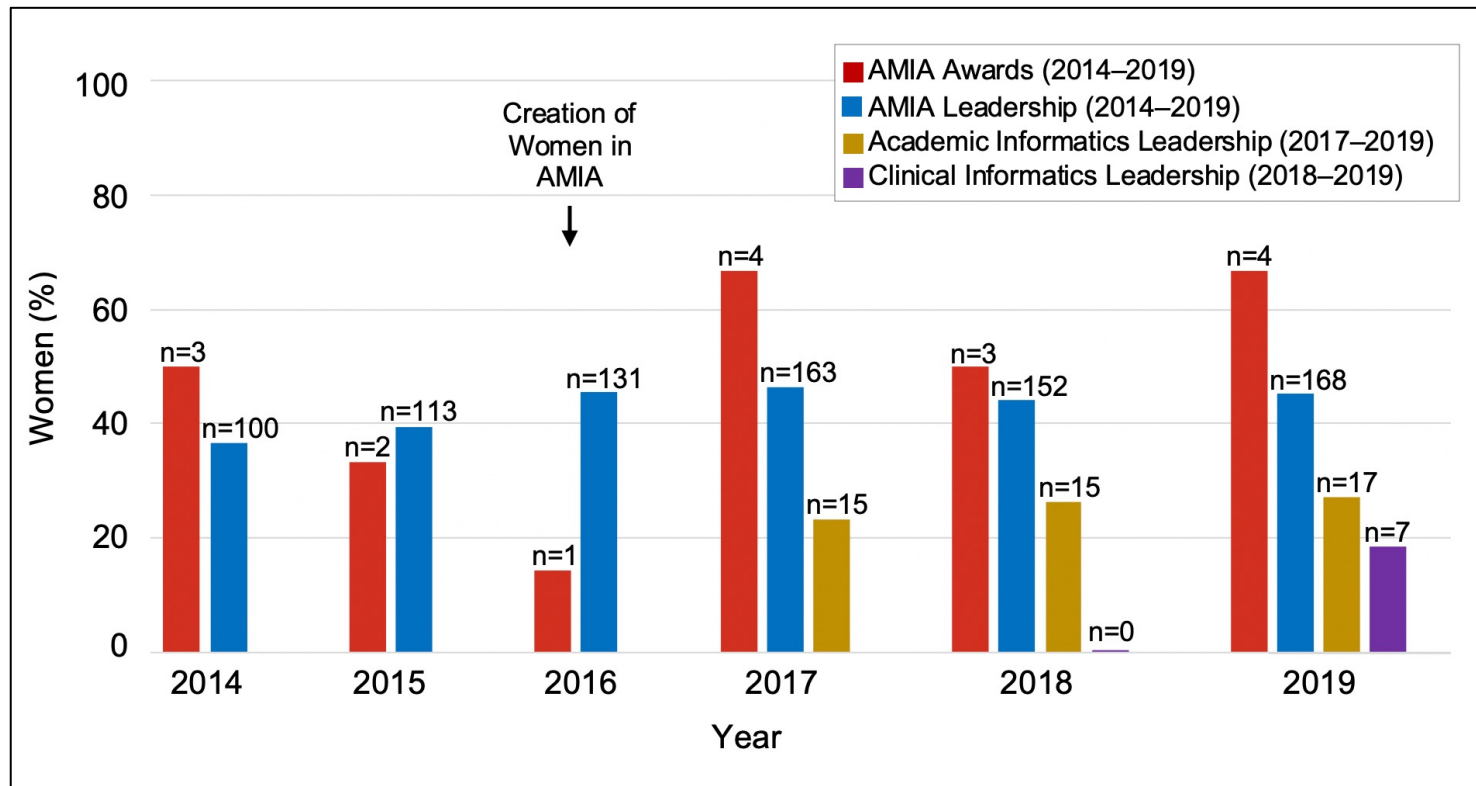
Women in AMIA (DEI)

Gender representation in U.S. biomedical informatics leadership and recognition
– JAMIA

Ashley Griffin...Arlene Chung - University of North Carolina

- Data collected from public web sites and AMIA
- 74.1% of academic informatics programs led by men
- 83.3% of clinical informatics fellowship programs led by men
- 56% of AMIA leadership roles held by men
- 64.1% of awards went to men

Griffin et al.: AMIA Leadership Disparities



Women in AMIA (DEI)

Gender representation in U.S. biomedical informatics leadership and recognition
– JAMIA

Ashley Griffin...Arlene Chung - University of North Carolina

- Data collected from public web sites and AMIA
- 74.1% of academic informatics programs led by men
- 83.3% of clinical informatics fellowship programs led by men
- 56% of AMIA leadership roles held by men
- 64.1% of awards went to men
- 100% of AMIA Informatics Year In Reviews presented by men

Women in AMIA (DEI)

What it means to be a woman in the field of biomedical informatics: exploring the lived experiences of women managers in the kingdom of Saudi Arabia - *JAMIA*

Rania Aldekhyyel...Shahad Aldekhyyel - King Saud University

- Semistructured interviews with 7 women managers in the BMI (LinkedIn)
- Used a feminist theoretical approach

Feminist Standpoint Theory

1. Knowledge is socially situated
2. Marginalized groups are socially situated in ways that make it more possible for them to be aware of things and ask questions than it is for the non-marginalized
3. Research, particularly that focused on power relations, should begin with the lives of the marginalized

Women in AMIA (DEI)

What it means to be a woman in the field of biomedical informatics: exploring the lived experiences of women managers in the kingdom of Saudi Arabia - *JAMIA*

Rania Aldekhyel...Shahad Aldekhyel - King Saud University

- Semistructured interviews with 7 women managers in the BMI (LinkedIn)
- Used a feminist theoretical approach
- Ten themes: e.g., career beginning, opportunities, achievements, gender-based experiences, meaning of BMI, overcoming challenges, future and hopes
- Early in their careers participants experienced limited opportunities and misperceptions in understanding what the field of informatics represents
- Main challenges were related to the field of BMI itself
- Did not feel that gender was an issue; felt empowered with the changes and the transformation that is happening in healthcare as part of the Saudi Vision 2030

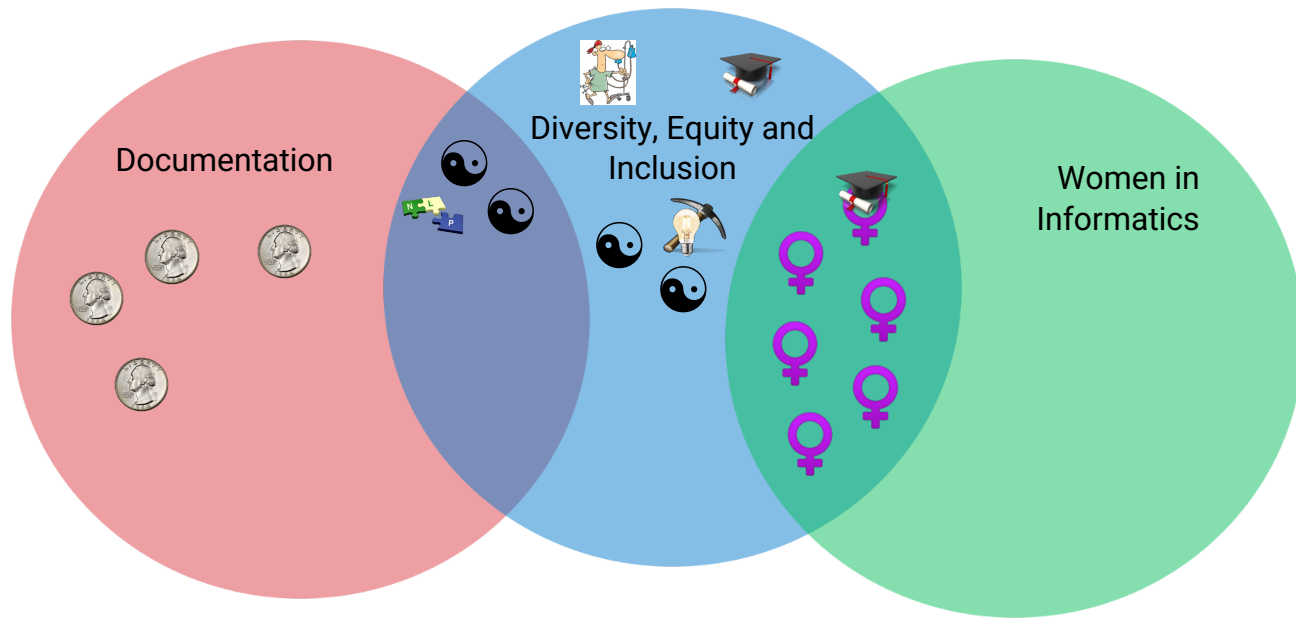
Women in AMIA (DEI)








Making the case for workforce diversity in biomedical informatics to help achieve equity-centered care: a look at the AMIA First Look Program – *JAMIA*

Tiffani Bright...Allison McCoy – IBM Watson Health and others

- AMIA established the First Look Program in 2017 to address workforce disparities among women, including those from marginalized communities
- Exposes to informatics, furnishes mentors, and provides career resources
- Introduced 87 undergraduate women, 41% from marginalized communities
- Interest in pursuing a career in informatics increased from 57% to 86%
- LinkedIn profile review found 50% of participants working in computer science or informatics, 4% pursuing informatics graduate degrees, and 32% having completed informatics internships

Overlapping Themes – DEI, Women, Education



-  25x5 Task Force
-  Consumer Informatics WG
-  Education WG
-  Know. Disc. & Data Mining WG
-  Diversity, Equity & Inclusion Com.
-  Natural Language Proc. WG
-  Women in AMIA

Women in AMIA – also Education (DEI)

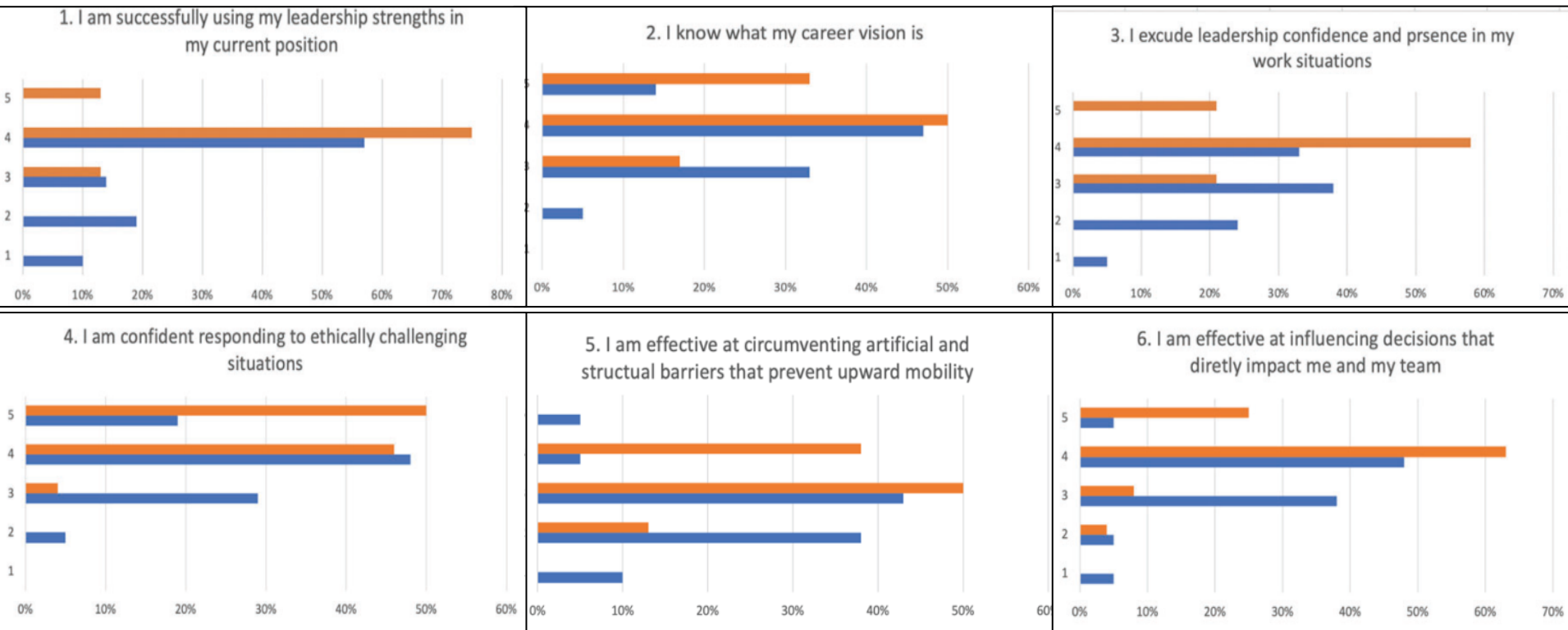
Design and evaluation of a Women in American Medical Informatics Association (AMIA) leadership program - *JAMIA*

Adela Grando...Wendy Chapman – Arizona State University and others

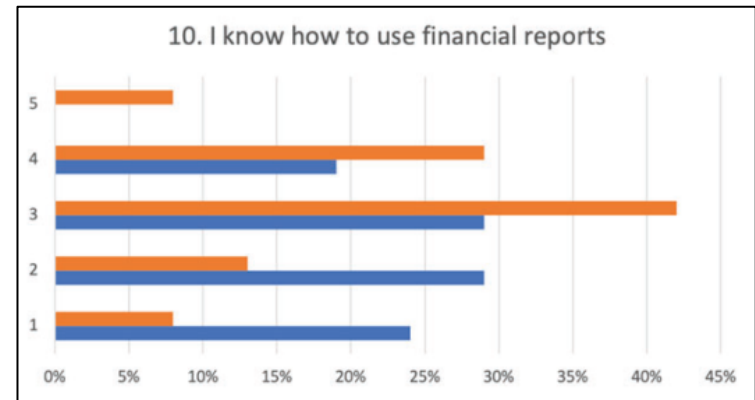
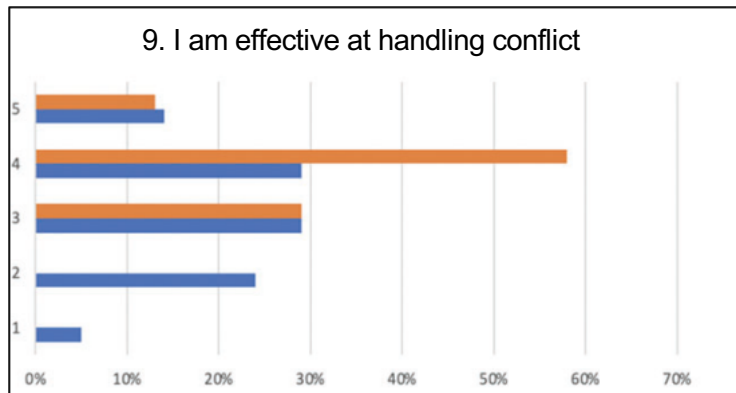
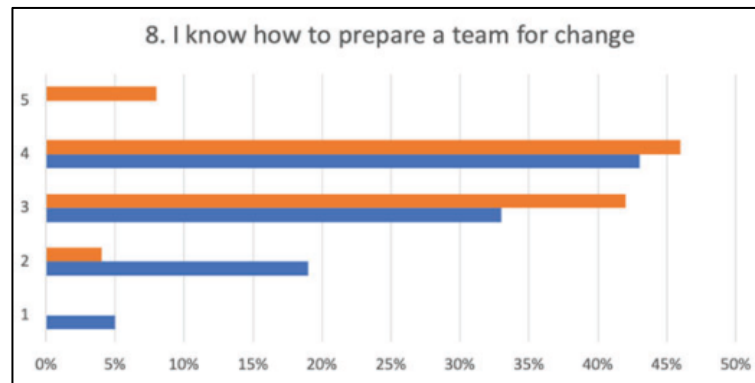
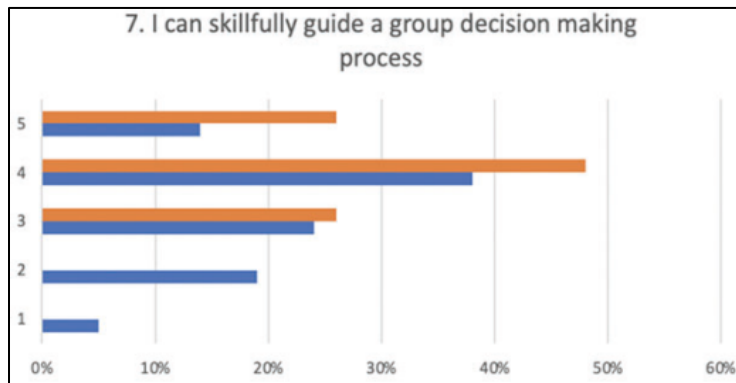
- Inaugural Women in AMIA (WIA) Leadership Program held 2019–2020



Grando et al.: Women in AMIA

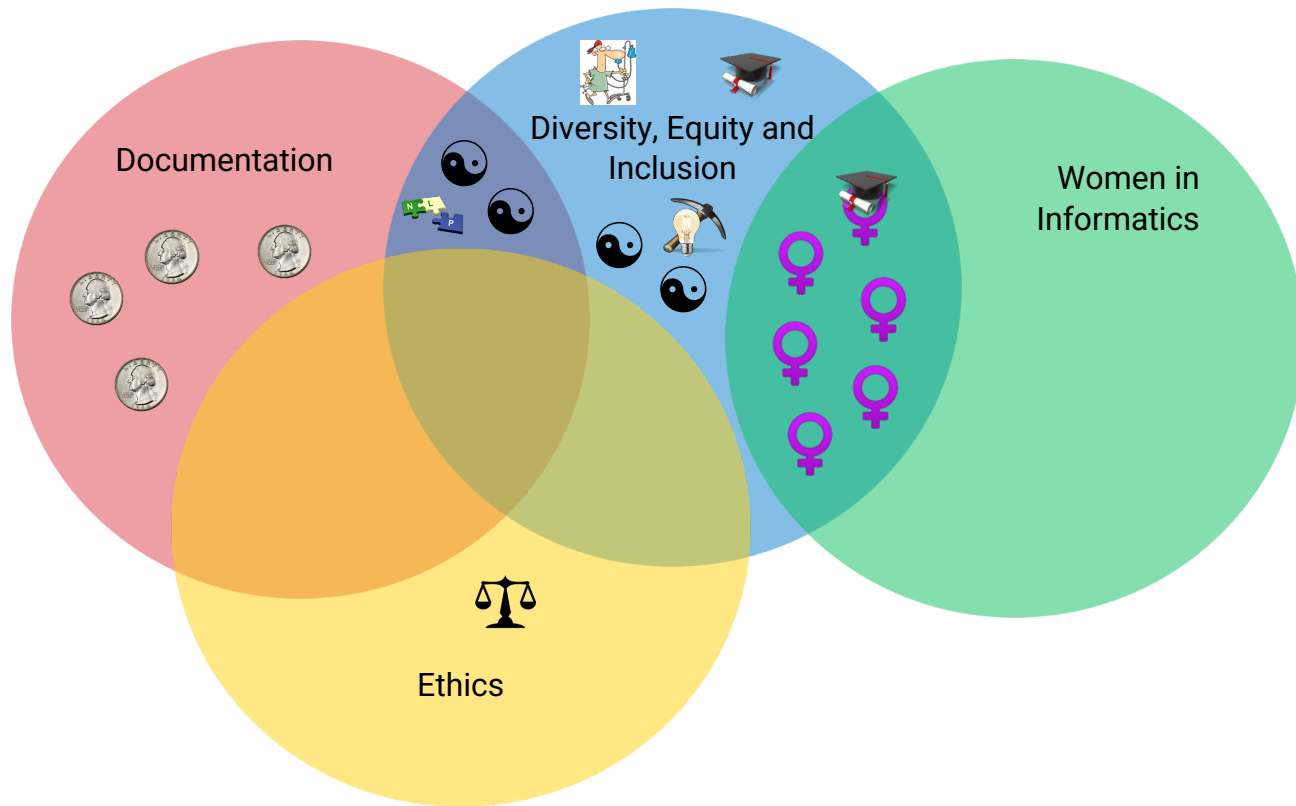










Grando et al.: Women in AMIA





Overlapping Themes – Ethics



-  25x5 Task Force
-  Consumer Informatics WG
-  Education WG
-  Know. Disc. & Data Mining WG
-  Diversity, Equity & Inclusion Com.
-  Natural Language Proc. WG
-  Women in AMIA
-  Ethics, Legal & Social Issues WG

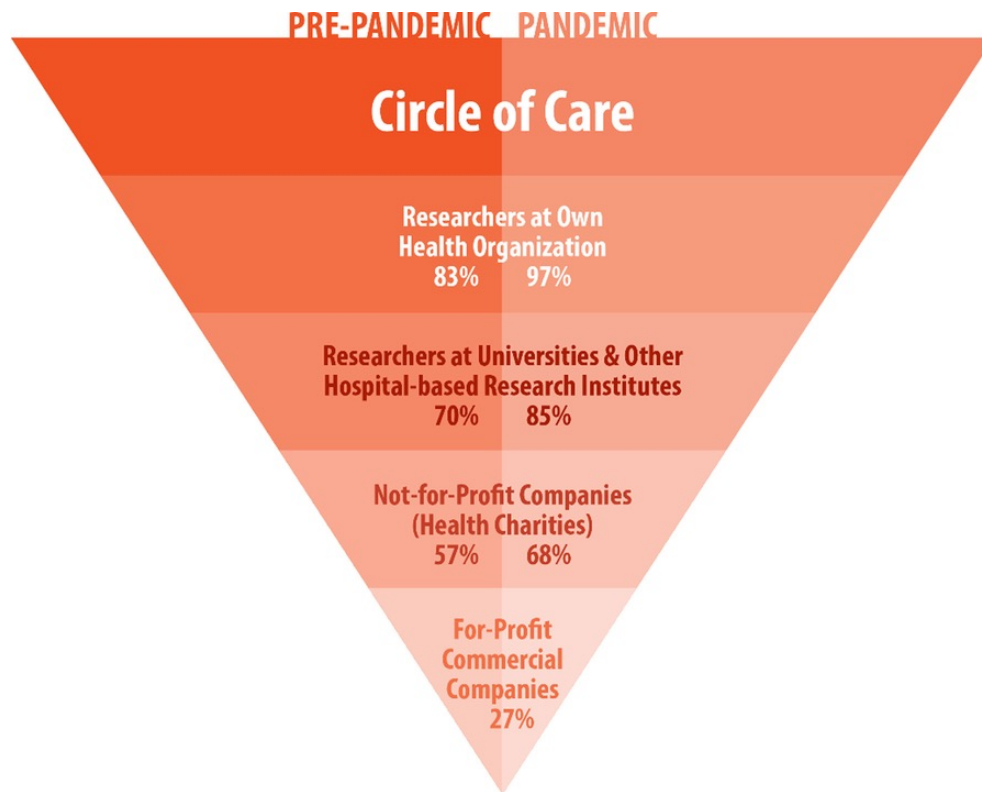
Ethical, Legal and Social Issues

Patient consent preferences on sharing personal health information during the COVID-19 pandemic: "the more informed we are, the more likely we are to help" – *BMC Medical Ethics*

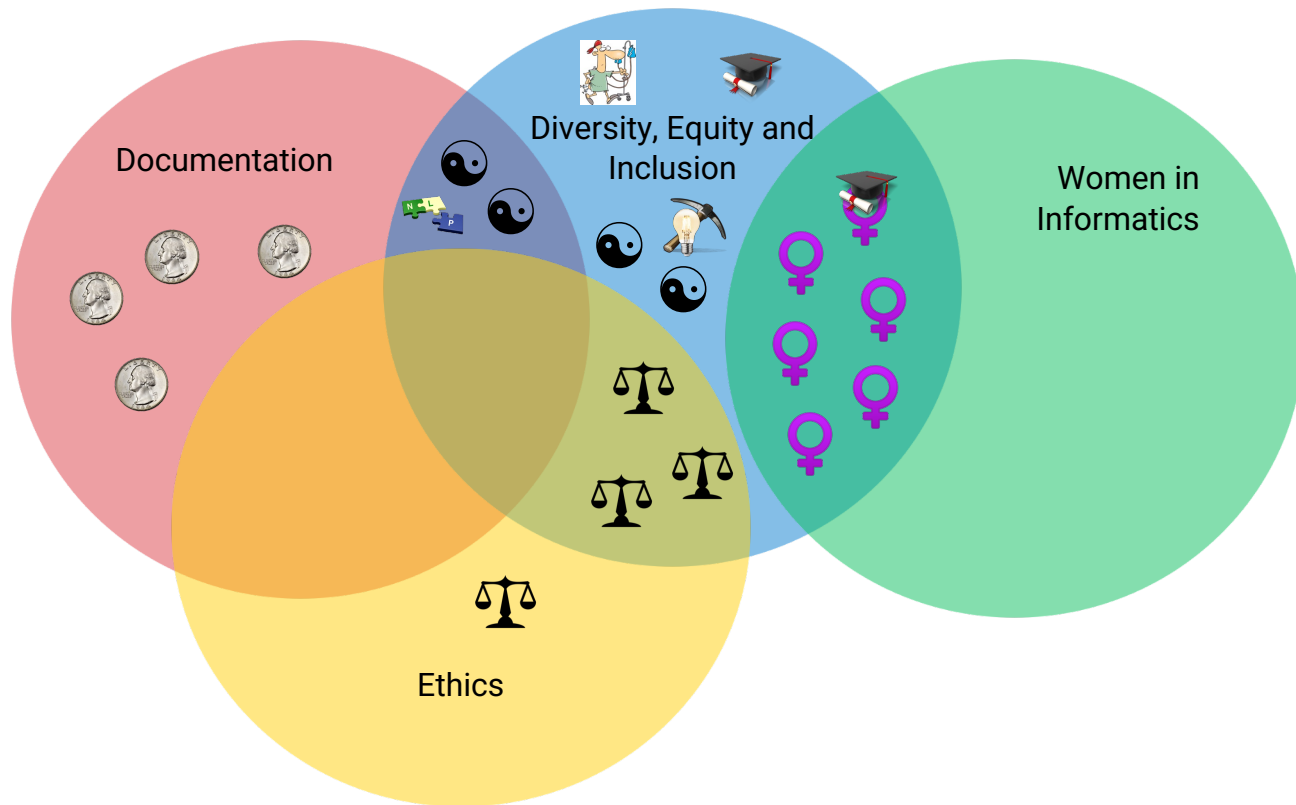
Sarah Tosoni...Fei-Fei Liu - Princess Margaret Cancer Center, Toronto









- Follow-up survey of 183 patients in a pandemic cohort
- More comfortable with sharing:
 - information and samples (90% vs. 79%)
 - with health care institution (97% vs. 83%) and researchers (85% vs. 70%)
 - provincially (69% vs. 53%), nationally (65% vs. 53%) and internationally (48% vs. 39%)
- Discomfort with sharing information with commercial companies (50% vs. 51%)
- Increased wish to track use of PHI (75% vs. 61%) and results (83% vs. 70%)

Tosoni et al.: Sharing Health Information



Overlapping Themes – Ethics and DEI



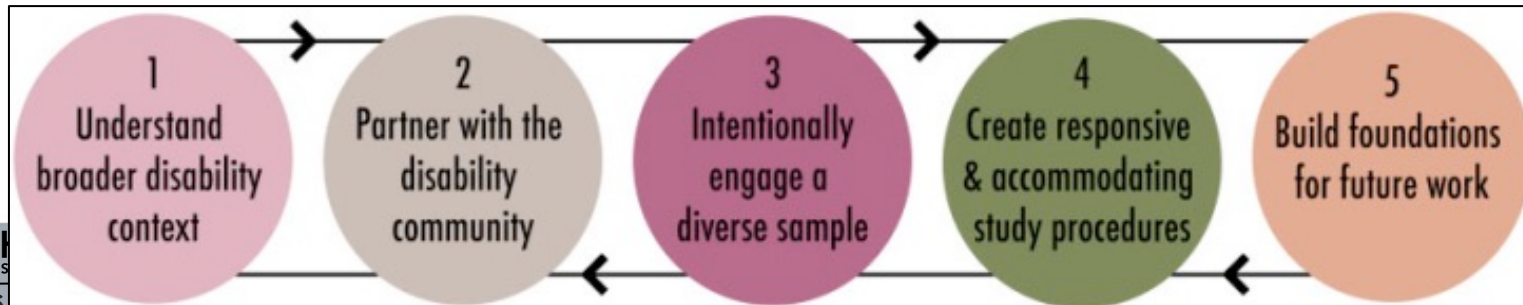
-  25x5 Task Force
-  Consumer Informatics WG
-  Education WG
-  Know. Disc. & Data Mining WG
-  Diversity, Equity & Inclusion Com.
-  Natural Language Proc. WG
-  Women in AMIA
-  Ethics, Legal & Social Issues WG

Ethical, Legal and Social Issues (DEI)

Engaging the disability community in informatics research: rationales and practical steps - JAMIA

Rupa Valdez...Raja Kushalnagar - University of Virginia and others

- Need to focus on the disability community as a health disparity population
- Digital health technologies can be enhanced using a holistic framework, simultaneously accounting for multiple forms of disability and the ways disability intersects with other forms of identity
- Offer a set of guidelines for effective engagement

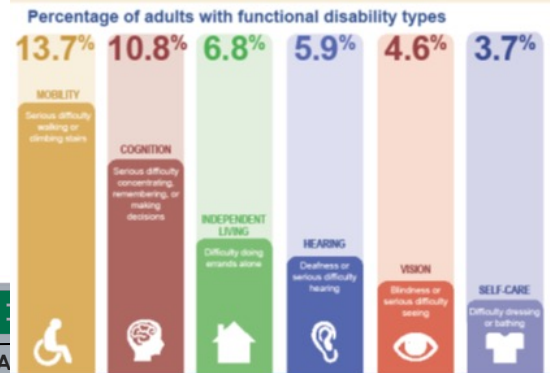
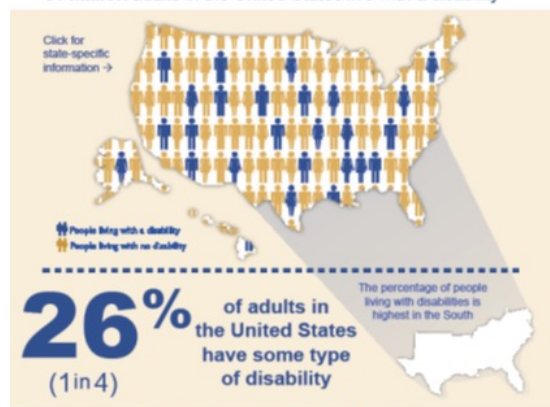


Valdez et al.: Engaging the Disabled

Disability Impacts **ALL of US**

COMMUNITIES HEALTH ACCESS

61 million adults in the United States live with a disability



Disability and **COMMUNITIES**

Disability is especially common in these groups:



Disability and **HEALTH**

Adults living with disabilities are more likely to

	With Disabilities	Without Disabilities
HAVE OBESITY	38.2%	26.2%
SMOKE	28.2%	13.4%
HAVE HEART DISEASE	11.5%	3.8%
HAVE DIABETES	16.3%	7.2%

Disability and Healthcare **ACCESS**

Healthcare access barriers for working-age adults include



Making A **DIFFERENCE**

COMMUNITIES HEALTH ACCESS

PUBLIC HEALTH IS FOR ALL OF US



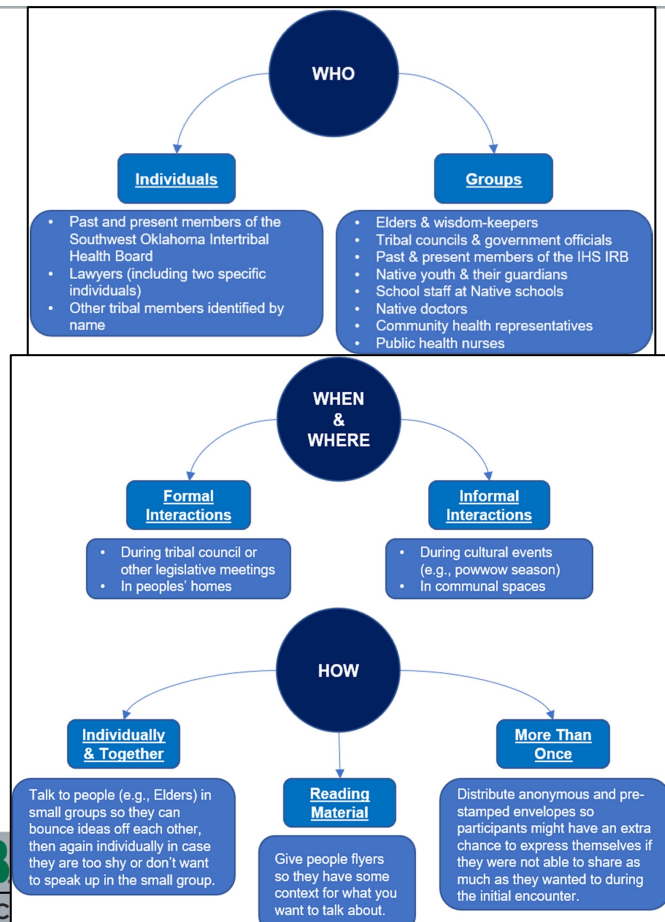
Ethical, Legal and Social Issues (DEI)

Codesigning a community-based participatory research project to assess tribal perspectives on privacy and health data sharing: A report from the Strong Heart Study - *JAMIA*

Cynthia Triplett...Cinnamon Bloss - University of California at La Jolla

- Health data sharing raises ethical issues of relevance to Native Americans, who reserve individual and collective rights to control community data
- Workshop with 14 tribal leaders to codesign a research study to assess preferences concerning health data privacy for biomedical research

Triplett et al.: Tribal Perspectives



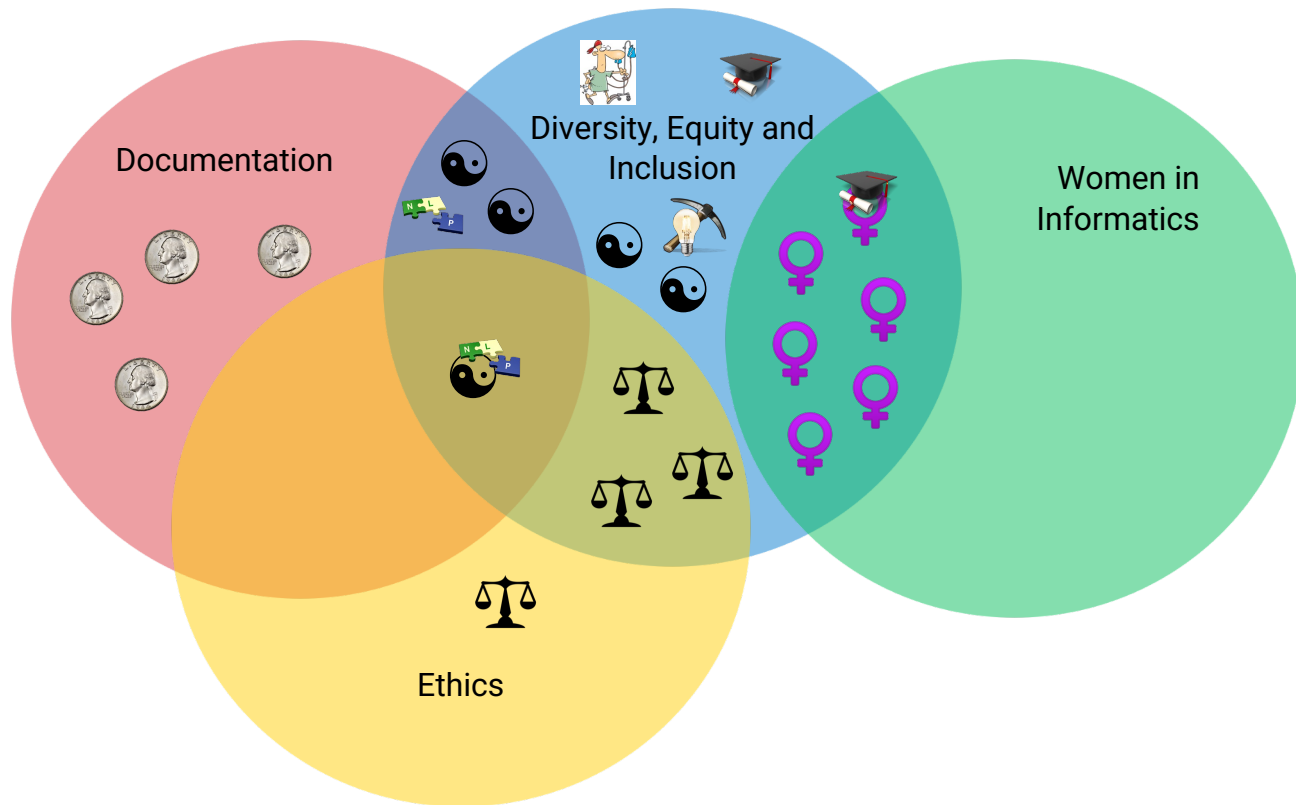
Expectation	Example
Eye contact and physical touch	When interacting with elders, use a gentle touch during your handshake, and do not spend too much time looking them in the eye.
Boundaries around compliments	Do not verbally admire their jewelry because they may give it to you. If given a gift, put it in your pocket and look at it later.
Providing food to the community	The provision of food is an expectation—not just for the participant but for the participant's family as well. It is also custom to offer a blessing for the food prior to eating.
Spend time in the community	Spend time and attend tribal meetings—with no agenda—just to hear and learn how business is conducted.









Codesigning a community-based participatory research project to assess tribal perspectives on privacy and health data sharing: A report from the Strong Heart Study - *JAMIA*

Cynthia Triplett...Cinnamon Bloss - University of California at La Jolla

- Health data sharing raises ethical issues of relevance to Native Americans, who reserve individual and collective rights to control community data
- Workshop with 14 tribal leaders to codesign a research study to assess preferences concerning health data privacy for biomedical research
- Key take-aways:
 - Listen to and learn from community members
 - Seek out the opinions, ideas, and actions of Native teenagers and children
 - Stay mindful of the power dynamic between researchers and communities

Overlapping Themes – Ethics, DEI, Doc, Ed, NLP



-  25x5 Task Force
-  Consumer Informatics WG
-  Education WG
-  Know. Disc. & Data Mining WG
-  Diversity, Equity & Inclusion Com.
-  Natural Language Proc. WG
-  Women in AMIA
-  Ethics, Legal & Social Issues WG

Diversity, Equity and Inclusion – also NLP

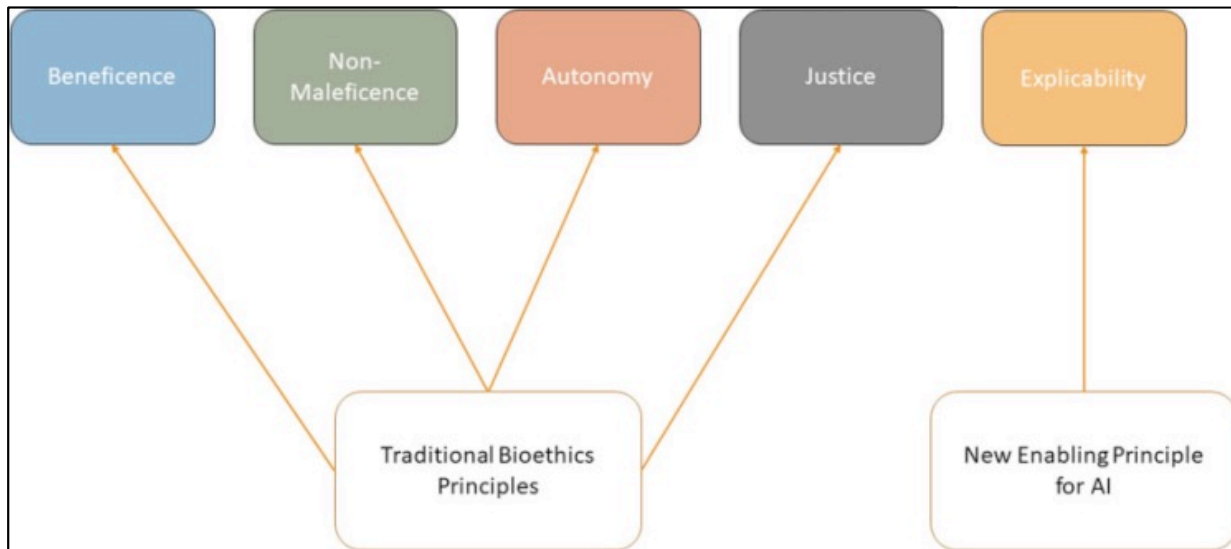
A scoping review of ethics considerations in clinical natural language processing -
JAMIA

Oliver Bear Don't Walk IV...Noémie Elhadad - Columbia University

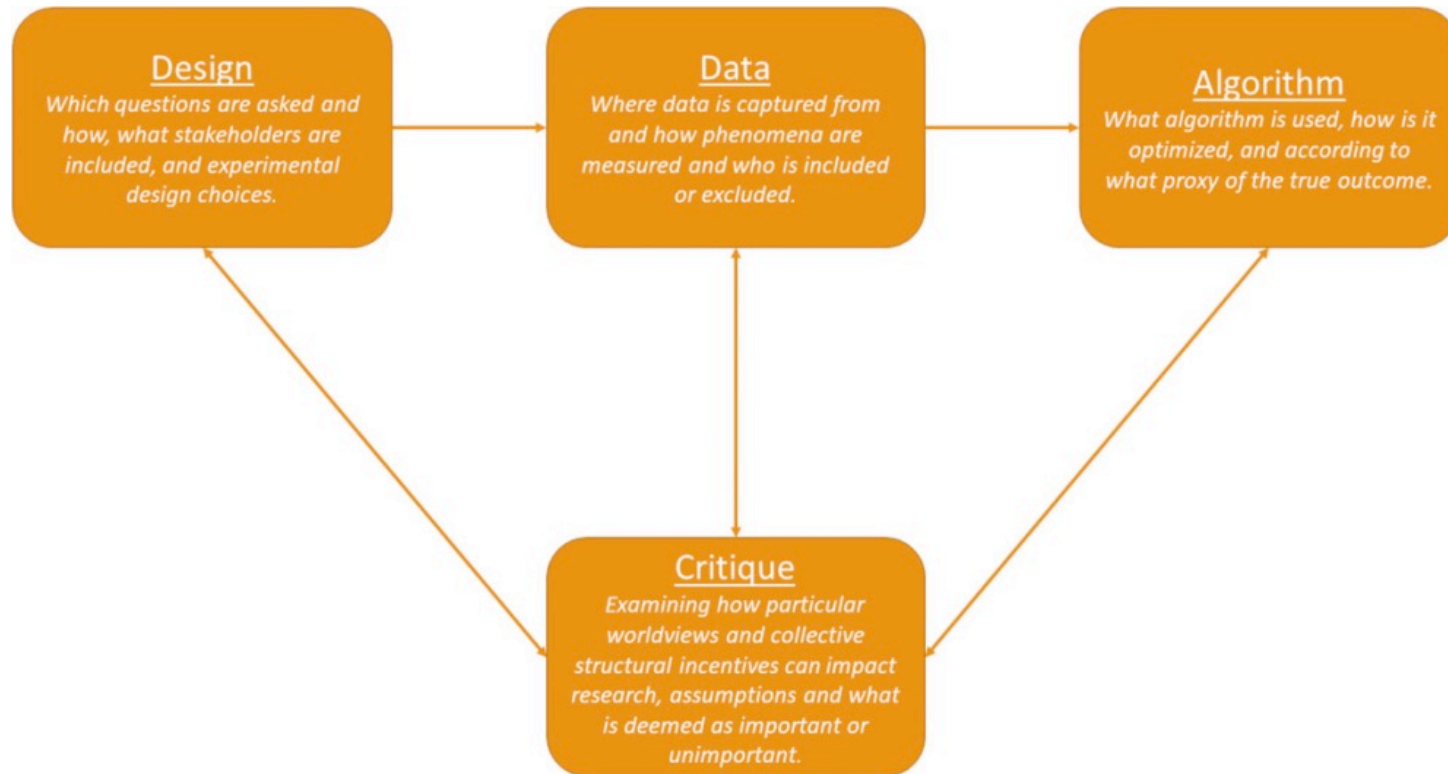
- Review through an ethics lens the state of research in clinical (i.e., documentation) NLP for the study of bias and fairness (equity and inclusion)

Holding AI to a Higher Ethical Standard

Floridi L, Cows J, Beltrametti M, Chatila R, Chazerand P, Dignum V, Luetge C, Madelin R, Pagallo U, Rossi F, Schafer B, Valcke P, Vayena E. AI4People-An Ethical Framework for a Good AI Society: Opportunities, Risks, Principles, and Recommendations. *Minds Mach.* 2018;28(4):689-707.



Bear Don't Walk, IV et al.: NLP Ethics



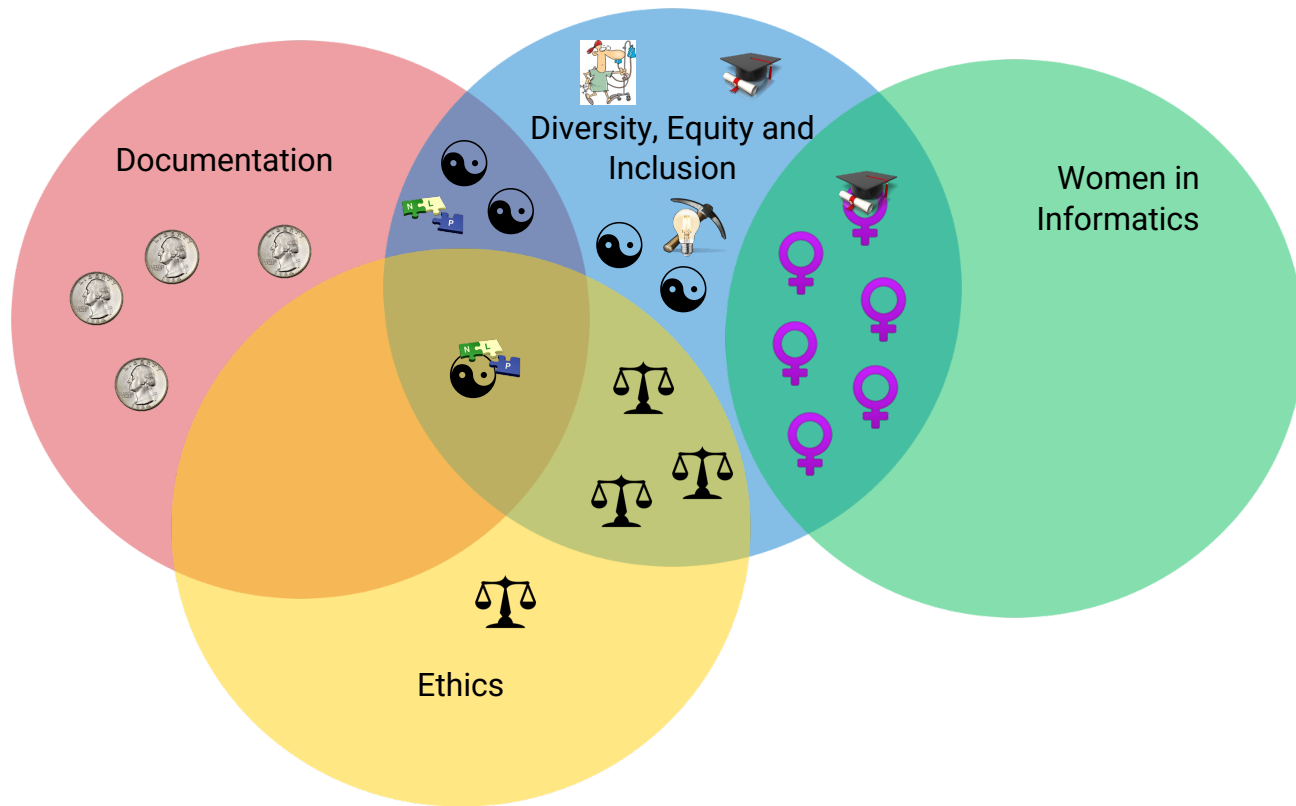
Diversity, Equity and Inclusion – also NLP









A scoping review of ethics considerations in clinical natural language processing -
JAMIA

Oliver Bear Don't Walk IV...Noémie Elhadad - Columbia University

- Review through an **ethics** lens the state of research in clinical (i.e., **documentation**) **NLP** for the study of bias and fairness (**equity and inclusion**)
- 1162 articles screened, 22 met criteria for full text review
- Categorized articles based on the design (2), data (12), algorithm (14), and critique (17) phases of the ML development process
- Three areas of research and at the intersection of clinical NLP and ethics:
 - Selecting performance metrics that interrogate bias in ML
 - Opportunities and risks of identifying sensitive patient information
 - Best practices in balancing individual autonomy, leveraging patient data, and inferring and manipulating sensitive information of subgroups

Overlapping Themes – Ethics, DEI, Doc, Ed, NLP



-  25x5 Task Force
-  Consumer Informatics WG
-  Education WG
-  Know. Disc. & Data Mining WG
-  Diversity, Equity & Inclusion Com.
-  Natural Language Proc. WG
-  Women in AMIA
-  Ethics, Legal & Social Issues WG

Making Sense of It All

- Papers
- Scoping and Systematic Reviews
- SARS-CoV-2 and COVID-19
- Crossing Working Groups/Committees
- Working Groups/Committees and Themes

WGs and Committees

- 21/27 Working Groups
- 3 Committees
- 92 papers
 - 89 unique (48 presented)
 - 3 double nominees

Working Group or Committee	Count
Biomedical Imaging Informatics Working Group	0
Clinical Decision Support Working Group	4
Clinical Information Systems Working Group	4 (1)
Clinical Research Informatics Working Group	13
Consumer Health Informatics Working Group	3
Dental Informatics Working Group	3
Education Working Group	8
Ethical, Legal, and Social Issues Working Group	4
Genomics and Translational Bioinformatics Working Group	5
Global Health Informatics Working Group	4
Intensive Care Informatics Working Group	0
Knowledge Discovery and Data Mining Working Group	4
Knowledge Representation and Semantics Working Group	0
Mental Health Informatics Working Group	1
Natural Language Processing Working Group	5
Nursing Informatics Working Group	4
Open Source Working Group	1
People and Organizational Issues-Evaluation Working Group	4
Pharmacoinformatics Working Group	3
Primary Care Informatics Working Group	0
Public Health Informatics Working Group	0
Student Working Group	0
Visual Analytics Working Group	4
Women in AMIA	6
25x5 Task Force	4
Diversity, Equity and Inclusion Committee	5

Journals

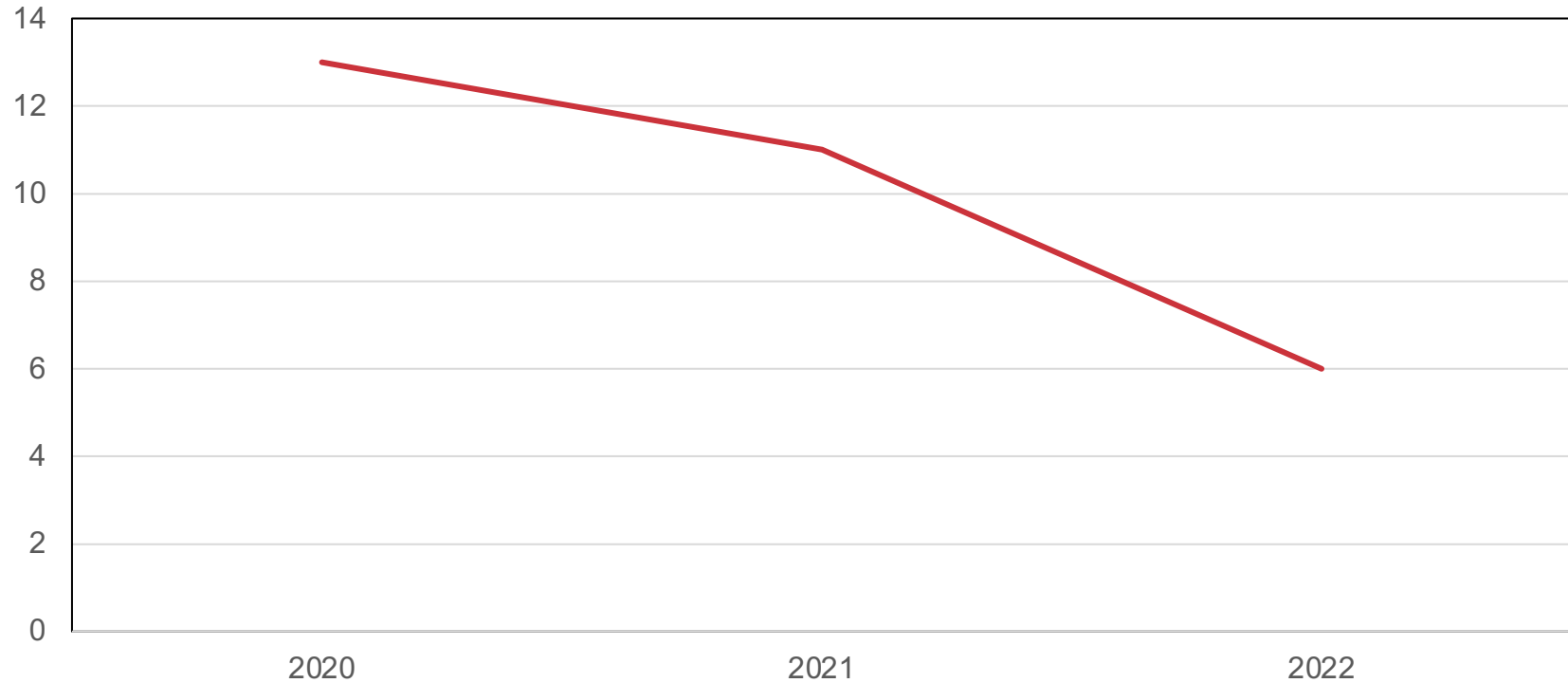
- 33 – JAMIA
- 6 – J Med Internet Res
- 5 – JBI
- 5 – Appl Clin Inform
- 2 – JAMIA Open
- 2 – AMIA Proceedings
- 2 – Nature Medicine
- 2 – Lancet Digital Health
- 2 – IEEE Trans Vis Comput Graph
- 1 – Int J Med Inform
- 1 – JAMA Network Open

One each:

Asian Pac J Cancer Prev
BMC Med Ethics
BMC Oral health
BMJ Health Care Inform
Cancer Discovery
Comput Inform Nurs
Crit Care
Frontiers in Public Health
Genome Med
Genomics
Inf Serv Use
iScience
JCO Clin Cancer Inform
JMIR Form Res
JMIR Med Inform
Journal of Healthcare Engineering
Lancet Infect Dis
Mol Psychiatry
N Engl J Med
NPJ Digit Med
Nucleic Acids Res
Nurse Educ
Oncogene
Pharmaceutics
PLoS Comput Biol
Procg of the Association for Computational Linguistics
Psicothema
Toxins (Basel)



SARS-CoV-2 and COVID-19



- 3 systematic reviews
- 5 scoping reviews
- 1 rapid review
- 4 cross-sectional surveys

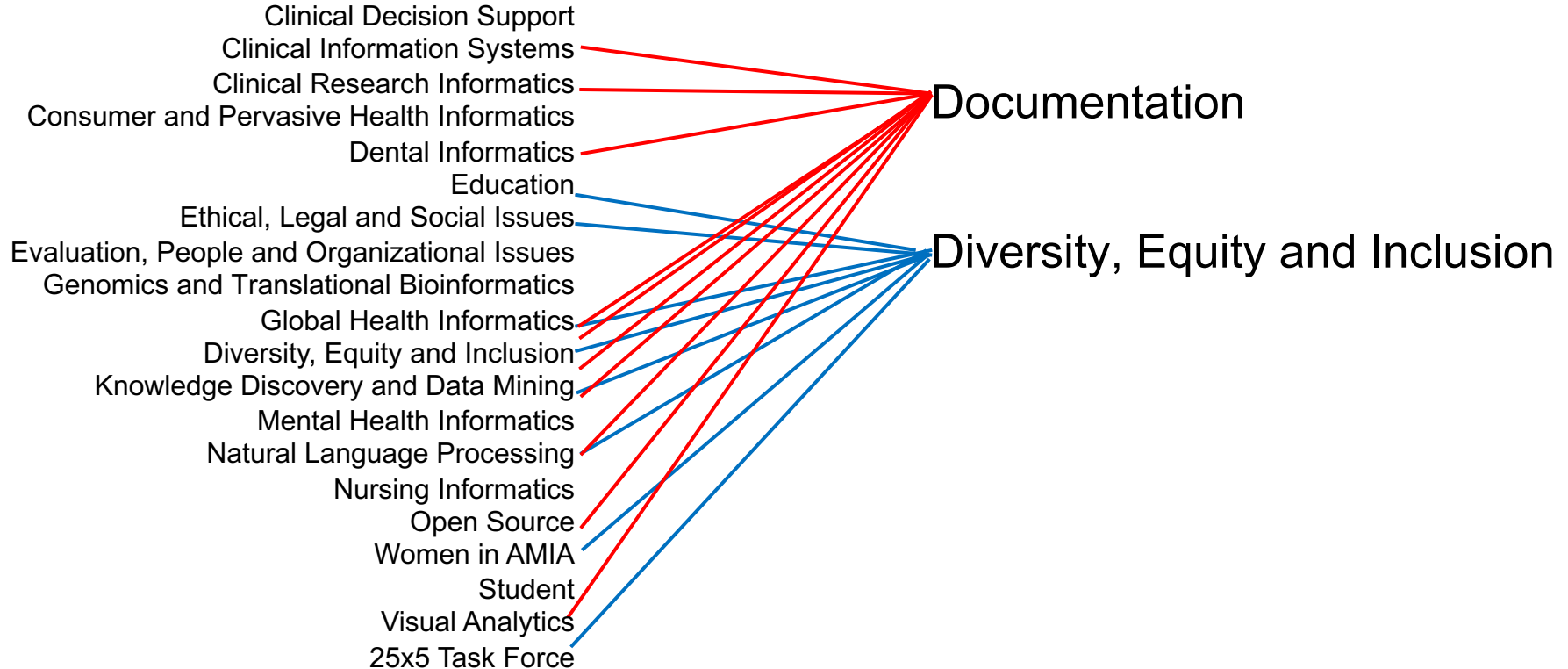
Crossing Working Group Domains

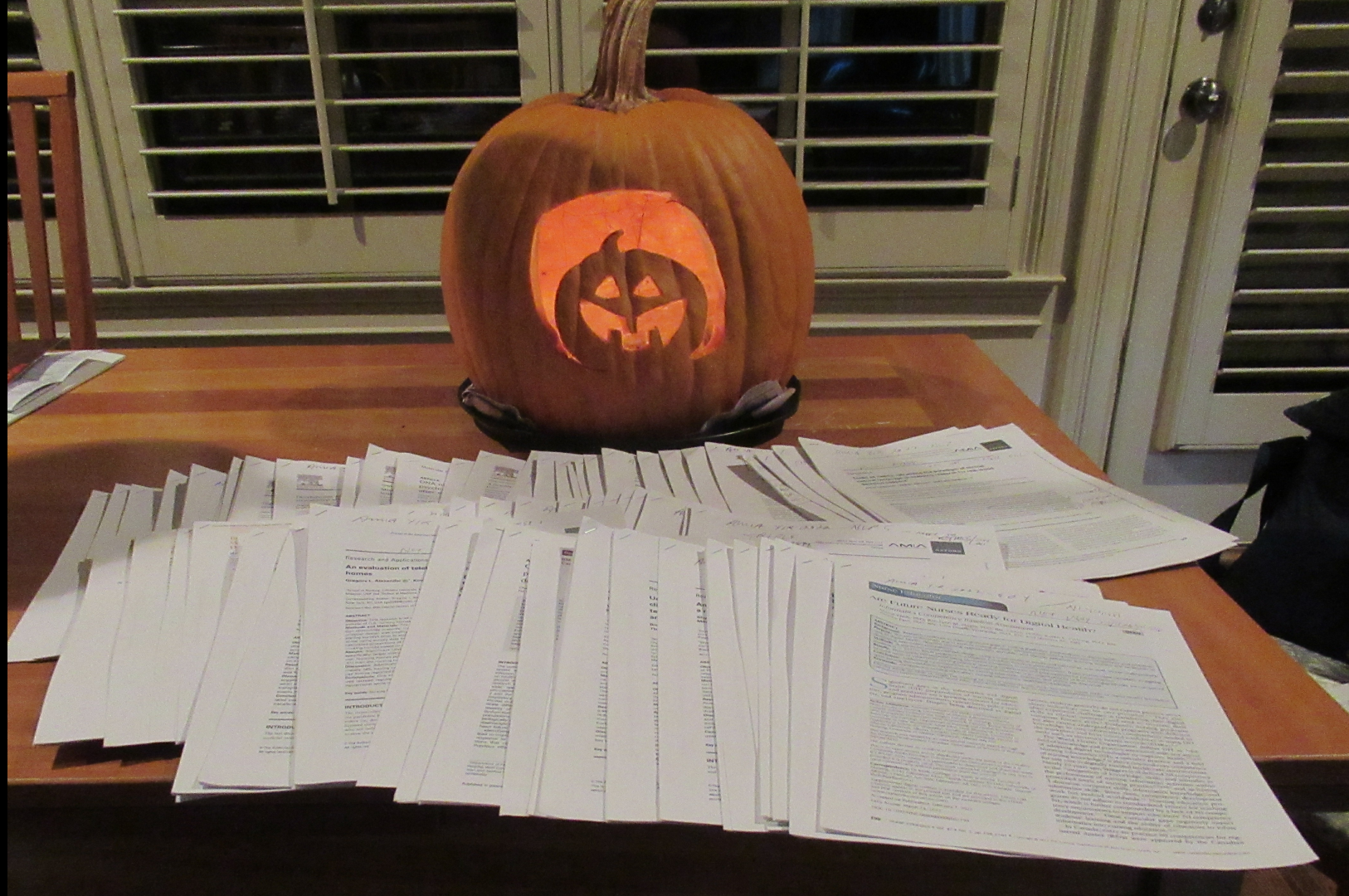


Crossing Working Group Domains



Working Groups and Themes





Thanks to the AMIA Working Group Representatives

Clinical Decision Support - Eleanor Barone

Clinical Information Systems - Eric Pan, Richard Schreiber, Scott McGrath

Clinical Research Informatics - Tamara Winden, Yasir Tarabichi

Consumer Health Informatics - Katherine Kim, Yunan Chen, Christie Martin,
Mollie McKillop, Yong Choi, Scott Sittig

Dental Informatics - Karmen Williams, Saniya Bhusari, Priya
Darshini, Khader Mohammed

Education - Kristine Alpi

Ethical, Legal, and Social Issues - Melissa Clarkson, Vignesh Subbian, Diane
Korngiebel

Genomics and Translational Bioinformatics - Nephi Walton

Global Health Informatics - Sansanee Craig, Ashish Joshi

Knowledge Discovery and Data Mining - Ying Li

Mental Health Informatics - Jessie Tenenbaum

Natural Language Processing - Yanshan Wang

Nursing Informatics - Karen Dunn Lopez

Open Source - Luke Rasmussen

People & Organizational Issues Evaluation - Mustafa Ozkaynak

Pharmacoinformatics - Gabriela Mustata Wilson

Women in AMIA - Donghua Tao

25x5 Task Force - Liz Sloss

Diversity, Equity and Inclusion Committee - Lois Walters-Threat, Benjamin Collins,
Karen Wang, Rubina Rizvi

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Andrea Hartzler

Sumbul Hashmi

Jake Jake Kantrowitz

Makoto Jones

Rainu Kaushal

Karen Keddy

Clair Kronk

Polina Kukhareva

Dana Lewis

Alexander Lex

Yuan Luo

Tamara Macieira

Allison McCoy

Mehdi Mourali

Evan Orenstein

Tomiko Oskotsky

Chrysanthi Papoutsis

Jay Patel

Rachel Richesson

Patrick Ryan

David Sanchez

Fernando Sanchez

Suchi Saria

Malte Schmieding

Jared Shenson

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Jiyoun Song

Joel Swerdel

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Diversity, Equity and Inclusion Committee

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