Theme 1: Insight

How do we know what we **know**?

The Predictive Care Team

We are an interdisciplinary research group who study the interplay of AI and mental health.


Laura Sikstrom


Marta Maslej


Patrycja Szkudlarek

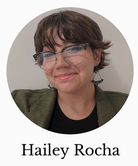

Peter Muirhead


Chris Dharma

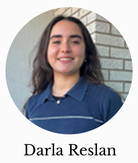

Priya Saibel


Sita Adill Mohammed

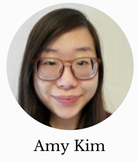

Renee Rosenmann


Hailey Rocha


Zoe Findlay


Darla Reslan


Robert Xiao


Amy Kim

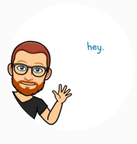

Yifan Wang


Igor Sokolov

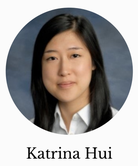

Valeria Khudiakova


Sara Ling

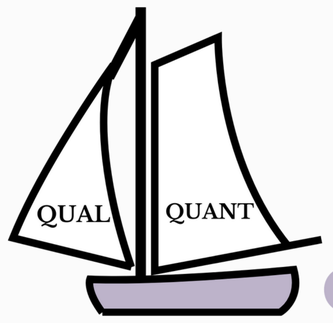

Juveria Zaheer



Daniel Buchman


Katrina Hui


AL the AI



Iterative Process of Data Integration

Like a sailboat tacking across water, this visual metaphor represents the interplay between quantitative and qualitative data. Each 'tack' signifies a monthly data integration meeting where we explore how our approaches intersect and diverge with a single theme as our compass. This dynamic process often brings the Predictive Care team somewhere new, and unexpected.

Balanced Approach

Challenging traditional scientific practices, our hybrid methodology merges diverse perspectives, creating a more fullsome understanding of the role of AI in mental health.

Shared Vocabulary

We've developed a shared vocabulary, which has been instrumental in ensuring effective communication and integration across disciplines.

Impact

By hybridizing disciplines, our team is breaking new ground in our understanding of the critical issues facing AI and mental health and leading impactful solutions.

"...we will train a binary classifier on features extracted from the unstructured data, which will be BERT embeddings..."

"...some patients are admitted to the CCR on a Form 1 and if stat IMs are refused, mechanical restraints may be used..."

"...behind every sociotechnical system are what Seaver refers to as "the brads", so algorithmic systems are not neutral interventions..."

"...maybe this is a kind of epistemic injustice, such as hermeneutical injustice..."

Outputs

Sikstrom, L., Rosenmann, R., Shen, N., Glasspool, EM. 2022. *What is 'AI' and what is it doing in psychiatry?* **Webinar presented with the RBC Patient & Family Learning Space at the Centre for Addiction and Mental Health.**

Wang, Y., Maslej, MM, Sikstrom. L. 2023. *Intersectionality in Mental Health Care* **- Example Notebook. FairLearn Python.**

Findlay, Z. 2022. *Involving lived experience advisors in research: A How-To Guide for the Predictive Care Team*. **(Unpublished manual).**

Sikstrom, L., Maslej, MM., Findlay, Z., Strudwick, G., Hui, K., Zaheer, J., Hill, SL., Buchman, DZ. 2023. *Predictive care: a protocol for a computational ethnographic approach to building fair models of inpatient violence in emergency psychiatry.* **BMJ Open, 13:e069255.**

Dharma, C., Bondy, S., Sikstrom, L, Zaheer, J., Muirhead, P., Maslej, M. *Examining Systemic and Interpersonal Bias in Violence Risk Assessments for Acute Psychiatric Care*. **JAMA Network Open (Under Review).**

Reslan, D., Maslej, M., Hui, K., Buchman, D, Zaheer, J. Hill, S. Sikstrom, L. (2022, September). *When measures become targets: the unintended consequences of psychiatric AI*. **Critical Digital Humanities International Conference, Toronto, Canada.**

SCAN ME

Check out our new website!

SSHRC CRSH

Google Research

camh | Krembil Centre for Neuroinformatics

Predictive Care Lab

Charting the Future of Artificial Intelligence in Mental Health

Theme 2: Structure/Agency

How are emergency psychiatric services accessed and experienced?

BACKGROUND

In the 1960s, a global movement led to the significant de-institutionalization of psychiatric care in many countries. One result is that p*sychiatric beds in Canada fell from 69k to 20k between 1965-1981 [1].* The process of reorganizing the system resulted in a variety of new structures and processes [2]. Unfortunately, the much needed resources never fully materialized.

STRUCTURES

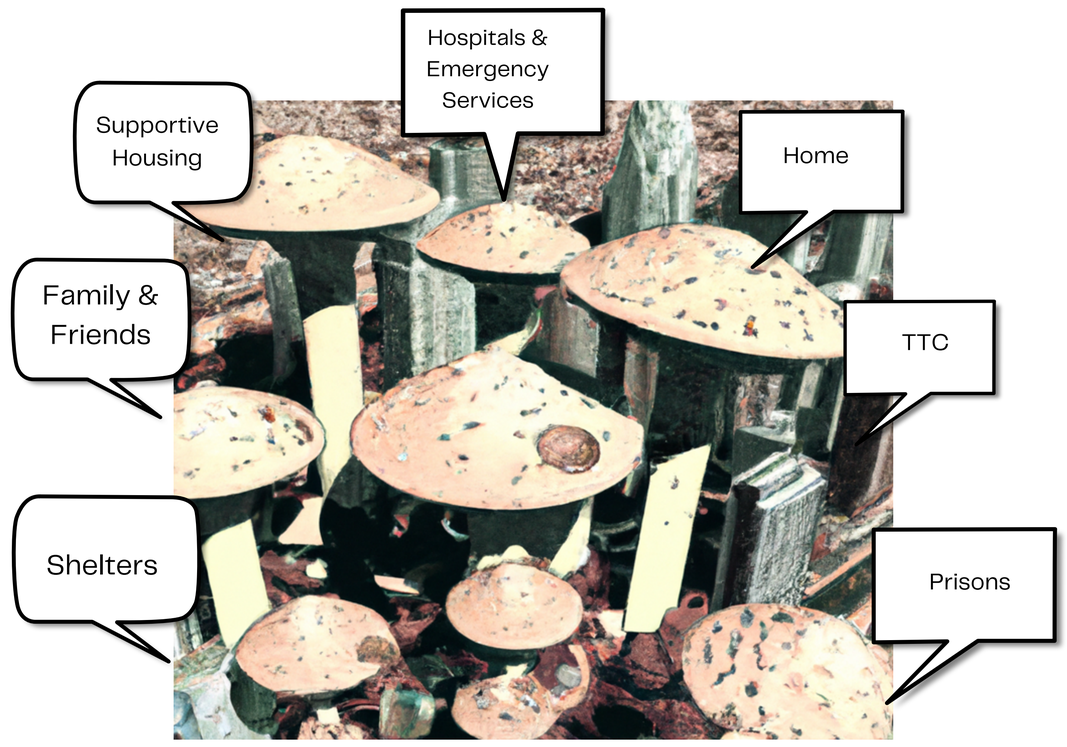
Enduring and relatively stable patterns, institutions, and systems within society that shape and constrain human behaviour.

"So someone called the police.. The police [came to my house and] asked me if I was violent or aggressive and I just say no. So they tell me my doctor wants to see me and that I need to go to CAMH. So I go with them... I will never argue with the police, they are the law." Patient Interview (P08)

AGENCY

The capacity of individuals to shape their own lives and the world around them.

"I think just by my charismatic personality, my people person personality, you know, assisted me in there [the ED] and there are lots of folks in our society that do not have those tools... Like for instance, getting extra sandwiches, juices, I was always well taken care of... I felt like I built a rapport with the nurses and the staff there. And I felt that I navigated, you know, to my best ability as a patient throughout my tenure at CAMH." P06



The Community Care Assemblage

Like mushrooms, a wide range of both formal and informal systems, services, organizations and collaborative activities assembled to support the well-being of individuals with mental health and addictions disorders after deinstutionalization. Within this interconnected system, the ED acts as a nexus between community and ongoing insitutionalized forms of care.

.

GOOD CARE, FLAWED SYSTEMS

"…. I would tell them, they're in the hands of the best people in the country. Very supportive, empathetic, firm sometimes, which is good. [But] I don't like how CAMH is tied into the medical model of treating mental health issues. Just drugs, and more drugs, and doctors, and more drugs. Psychiatrists and even more drugs. But I also have my own personal experience, which is positive." - P20

"IT'S THE SYSTEM"

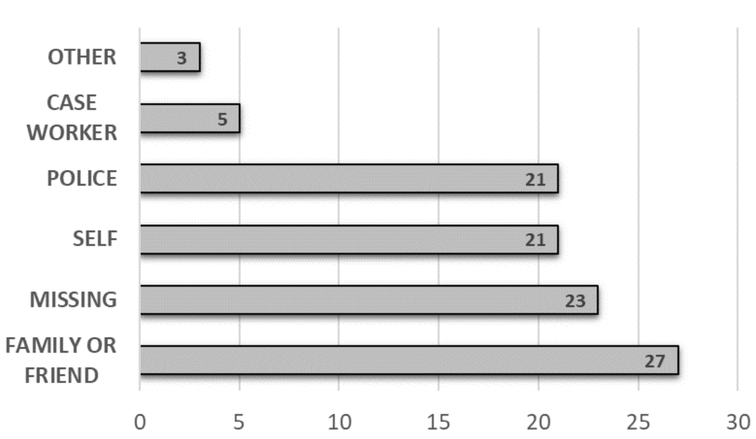
"So it's not about the individuals or even the police themselves, but about, like the system in general, the bigger system. You know, there's only so many beds, so many doctors and nurses. The stress you gotta be under is gotta be unbearable at times." P16

"NOWHERE ELSE TO GO"

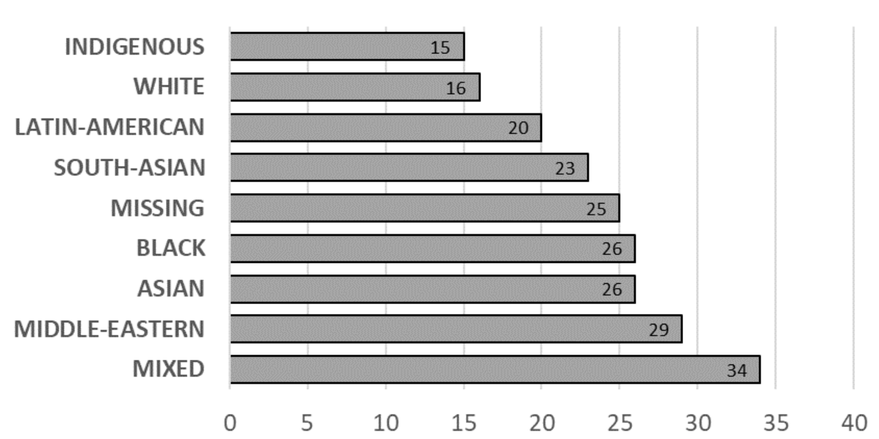
"It was my second visit... I spoke to a social worker or a doctor, or, I don't even know. And they were just kinda like, 'We're done with you' and left me in the room. I started pacing. And I started throwing my body against the wall... I was like, 'Is anyone gonna help me?' You know?... And like sure, I wasn't acting rationally or whatever... But, I don't know where else to go when I'm feeling that way. Like, there's literally nowhere else." - P03

ADMISSION DATA

Most clients come into the ED with family or friends, but some are apprehended for admission by police. This mode of admission is more common for some racially marginalized groups, as compared to other groups.



Admission mode % (*n*=10,236).



Admission by Police by Ethnicity (% of total for that racial/ethnic group)

Conclusion

The Emergency Department at CAMH is heir to a long line of attempts to reform psychiatric care. Many of our participants navigate this community care assemblage from within the cracks and fissures created by the transformation of psychiatric services. And while most patients characterize their care as compassionate and timely, they also identify the many ways that 'the system' is failing them.

[1] Sealy, P., & Whitehead, P. C. (2004). Forty Years of Deinstitutionalization of Psychiatric Services in Canada: An Empirical Assessment. The Canadian Journal of Psychiatry, 49(4), 249–257.
[2] Davies, M., et al. 2016. After the Asylum in Canada: Surviving deinstitutionalisation and Revising History. In, Deinstutionalisation and After: Post-war psychiatry in the Western World.

Google Research

camh | Krembil Centre for Neuroinformatics

SSHRC CRSH

Predictive Care Lab
Charting the Future of Artificial Intelligence in Mental Health

Theme 3: Articulations

How is risk assessment *coordinated* among interprofessional care teams?

AWARENESS

To work together, individuals need to gain some level of knowledge about each other's activities.

"Nurses will always give you the scoop." C03

ARTICULATION

Cooperating individuals must be able to partition the work into units and then reintegrate it after the work is performed.

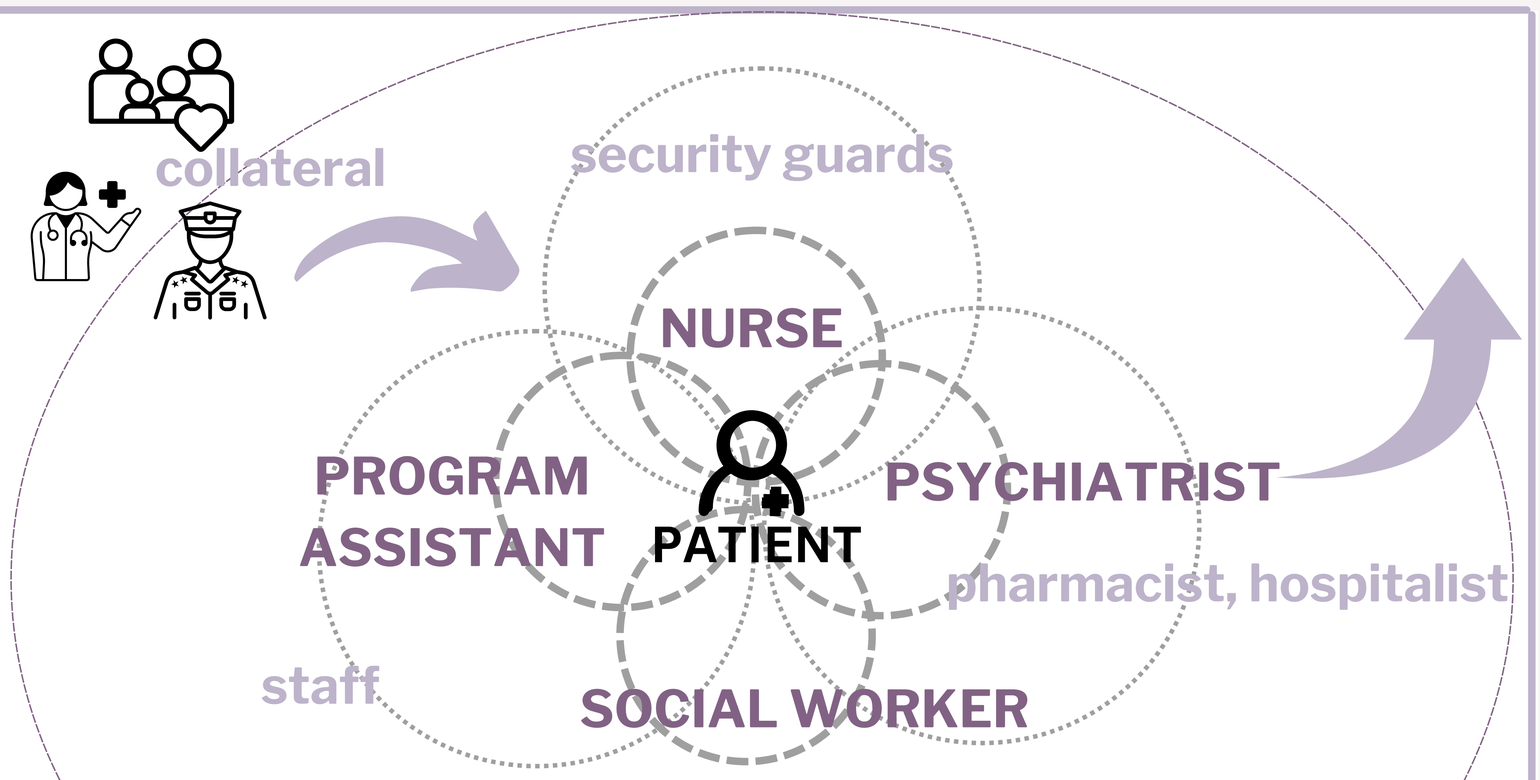
"I find the FMT* so helpful because I feel like the nurses... are excellent at documenting risk and documenting their interactions with patients..... And so the FMT like, is the number one place that I go to for information, in addition to speaking to the nurse who's on shift, but sometimes they've turned over. And so the FMT is really my only way to go back and find out things that happened when I wasn't there.' C01

APPROPRIATION

The adaptation of a technology unintended by designers.

"The FMT should be filled out within the first three hours of every shift. The FMT should [be used to] help clinicians identify early in the shift where clients may need intervention."

FMT Implementation User Manual (V1, 2014)



The Collaborative Acute Care Environment

Interprofessional teams of regulated and non-regulated health professionals cooperate to support patient care in the ED. Cooperative work is enabled by both the *technical systems* meant to support this work (such as Electronic Health Records) and a workforce that *values* different forms of expertise and shared decision-making.

OH COMPUTER
WHERE ART THOU?

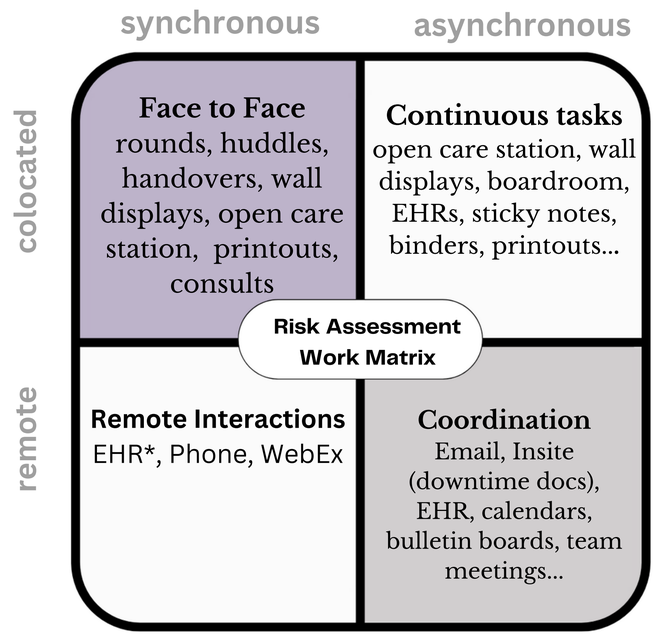
"The nurses are amazing and always on it. I have never entered a situation where I felt like I wasn't prepped [verbally] for what to expect." C07

TEAMWORK, DREAMWORK

"[Based on] my experience of the ED there is the ability to, you know, do a lot of case discussion... So there's a lot of collegial kind of collaboration that goes on within the team. Also having those allied providers, nurses, social workers, pharmacists, is very, very nice to have.... So, yeah, that kind of teamwork. [The] interdisciplinary aspect of the emergency department strengthens [everything], in my opinion." C12

COLLATERAL

"So, you know, I don't want to seem like I'm aligning in any way with the police... I'm also not, you know, trying to place myself against the police. I'm just trying to be neutral. And, but, I do like to gather some information because usually, [the police are] a reliable source of, you know, objective information." C12



The work that makes other work exist and possible

Risk assessment is a continuous work task that is divided amongst all the staff in the ED. PAs are primarily responsible for ensuring that basic needs are met (food, clothing), while nurses monitor vital signs, observe behaviours and communicate these risks in writing and verbally to other staff. Psychiatrists are primarily responsible for integrating all of this information to develop an impression and a plan. Social workers support discharge and care planning.

Conclusion

Risk assessment involves coordinated work among interprofessional care teams across both time (between shifts) and space (within the ED itself, the wider hospital, and the wider community care assemblage). The EHR is primarily used to document and retrieve past information on risk, while verbal updates are considered more reliable and up-to-date.

*FMT = Functional Monitoring Tool

SSHRC CRSH
camh | Krembil Centre for Neuroinformatics
Google Research
Predictive Care Lab
Charting the Future of Artificial Intelligence in Mental Health

Theme 4: Disgust

How do strong emotions impact decision making and care?

Pathogen-Related Disgust

Contamination Avoidance

Cleanliness Impurity

“Dirt is matter out of place.”

-- Mary Douglas

Moral-Related Disgust

Taboos Values

Boundaries Norms

In the absence of all tables due to COVID-19 ‘ restrictions, patients place their lunches upon the flat top of the garbage bins. And then are quickly told, “Do not eat there.”

Navigating the Social Landscape of the ED

The ED is a not just a medical space, it is also a complex social landscape with unpsoken social norms and expectations. Both patients and providers learn to navigate this landscape over time. Any moral or normative breaches of this landscape often result in unexpected and powerful emotional outbursts. A former staff who brings their new baby to say hello brings unexpected laughter and joy to the entire care station. A story of a child about to removed from their family evokes audible sighs of sadness. Disgust, we found, is a less common, but powerful emotion in acute psychiatric care. Often limited to the most complex violations of our societal norms and expectations, our ethnographic findings suggest that disgust might override our ability to critically reflect on instances where biases might impact decision-making.

Pathogen

“The food is the same disgusting food. Pardon my language. It’s disgusting. Let me tell you what I got yesterday. Ok. Steamed pumpkin. Yes, yes, that’s it. Steamed pumpkin..... Have you ever tried to eat it the whole day? All night? And then the next day? and the next night? There’s gonna be a pumpkin with a pumpkin. Disgusting. Just disgusting.” P11

Incident Report Analysis Topic #12

Copt Touch Sexual Innapropria Ppt Assault Behavior Pts Comment Stop Accuse Close Make Repeat Pt place Immedi Requi Pt refus Fight PRNS Approach Told Anoth State Initi Redirect Deni Shout Observ Dismiss

Behavioural Norms

“So the things I’m looking for [in safety assessment] are the intensity of stare, aimless movements, inability to sit still, a sense of inner anguish that you can see when someone is restless... they sit down, stand up, walk towards the door with unorganized movements... they’re not interruptable. Accuse me of things I couldn’t possibly have done. You know, these kinds of things.” C04

Experiment

Mood Induction	AI-assisted risk assessment	Decision
Calmness Anger Anxiety **Disgust**	Call Summary Call received at 8:42pm for J Smith (name changed), a 39 year old **African-American** male at 23 Eastside Blvd. Call made by his sister when she found him at home in a delirious state. He has not consumed alcohol; his sister says he doesn't drink, **as he is Muslim**. Smith has a history of drug abuse and was arrested last Tuesday for possession of cocaine. Sister called the hotline, asking for urgent help. **AI recommendation**: In this situation, the AI thinks you should call police.	❑ Call medical help ❑ Call police

Outputs

AMS Healthcare Fellowship in Compassion and AI, *Promoting compassionate care in acute psychiatry with human-AI teams ($75,000),* **PI: Maslej, M.M; Mentors: Hill, S., Ratto, M., Zaheer, J.**

Muirhead, P., Wang, Y., Bucago, C., Maslej, M, Sikstrom, L.. (In Prep). *Thresholds and Violence in Acute Psychiatry: Implications for Practice from a Computational Ethnographic Study*. **Social Science & Medicine.**

Maslej, M.M., Sikstrom, L., Ratto, M., Zaheer, J., Hassan, M., & Abdool, P. (Submitted). *Productive Mistrust: A Conceptual Framework for Clinician-AI Teaming in Mental Health Care.* **ACM Conference on Computer-Supported Cooperative Work and Social Computing.**

Maslej, MM., Dharma, C., Bondy, S., Muirhead, P., Zaheer, J., Sikstrom, L. (2023, October). *Predictive Care: The False Promise of Fair AI Models in Acute Psychiatry*. **AI in Medicine, T-CAIREM, Toronto, Canada.**

AMS advancing innovative healthcare with compassion at its core

SSHRC CRSH

camh | Krembil Centre for Neuroinformatics

Google Research

Predictive Care Lab
Charting the Future of Artificial Intelligence in Mental Health

Theme 5: Teaming

How do we implement AI into mental health care?

Human-AI Teaming involves close coordination between humans and AI teammates with a shared goal. In mental health, teaming involves AI supporting, augmenting, or enhancing clinical tasks, not prescribing or automating them.

Fig 1A. Past conceptualization AI to replace clinicians

Research focus. AI systems are trained to predict outcomes, risks, or behaviours to prescribe clinical decisions

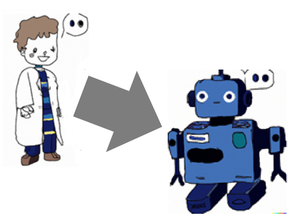
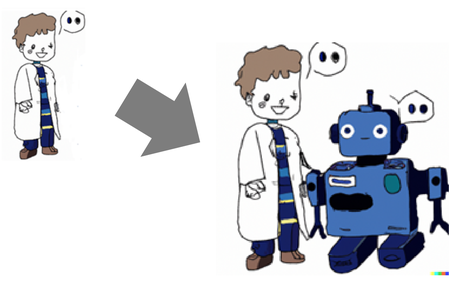


Fig 1B. Present conceptualization Clinicians who use AI to replace those who do not

Research focus. AI systems are being trained to complement the capabilities of clinicians, supplement performance gaps, or augment clinical practices.



...Or clinicians who team well with AI will replace those who do not.

But how do we achieve effective teaming?

Teaming is Complementary

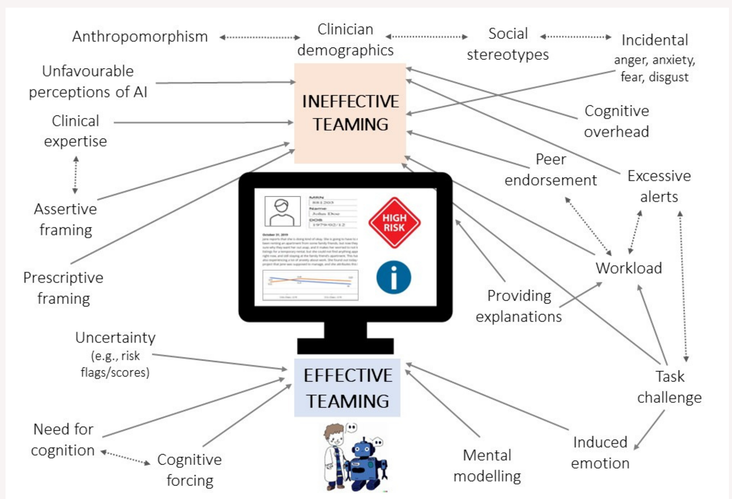
The human-AI team is deemed effective if **outcomes of its implementation are better than those achieved by the clinician or AI alone**

Clinicians		AI Systems	
Pros	*Cons*	*Pros*	*Cons*

What are complementary capabilities of clinicians and AI systems?
What kinds of AI systems are conducive to successful teaming?

Teaming Considers Context

Outcomes of human-AI teaming must be evaluated, **under realistic conditions of the care setting.**



THE SOCIOTECHNICAL. How will interpersonal dynamics, workflows, and larger social and organizational systems interact with the technical features of AI (and with each other) to impact mental health care?

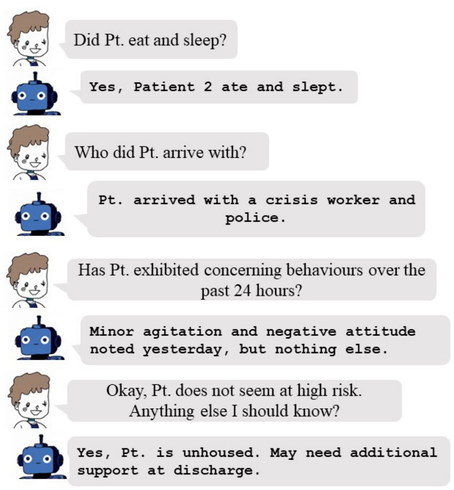
OH COMPUTER
WHERE ART THOU?

Sociotechnical realities clinical workflows may not support AI implementation

The Future of Teaming

CURRENT

FUTURE



The binary trust model
AI teammate provides information, which the clinician may or may not use

The dialogue partner model
Generative AI-enabled reciprocal interactions

Outputs

AMS Healthcare Fellowship in Compassion and AI, *Promoting compassionate care in acute psychiatry with human-AI teams ($75,000),* **PI: Maslej, M.M; Mentors: Hill, S., Ratto, M., Zaheer, J..**

Maslej, M.M., Sikstrom, L., Ratto, M., Zaheer, J., Hassan, M., & Abdool, P. (Submitted). *Productive Mistrust: A Conceptual Framework for Clinician-AI Teaming in Mental Health Care.* **ACM Conference on Computer-Supported Cooperative Work and Social Computing.**

Sikstrom, L., Maslej, MM., Muirhead, P., Zaheer, J., Hill, S. (In Prep). *The Sociotechnical Revisited: An Ethnographic Case Study of Human-AI Teaming in Emergency Psychiatry.* Technological Forecasting and Social Change.

Google Research | camh Krembil Centre for Neuroinformatics | AMS advancing innovative healthcare with compassion at its core | Predictive Care Lab — Charting the Future of Artificial Intelligence in Mental Health