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Moderator:
Christopher D. Vélez, MD

All attendees will be muted and will remain in "Listen Only Mode"

Type your questions here so that the moderator can see them.
Not all questions will be answered but we will get to as many as possible.

A handout with the slides and room to take notes can be downloaded from your control panel.

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Join us for upcoming Virtual Grand Rounds!



Week 33 International VGR– Wednesday August 13, 2025
Celiac Disease from a Global Perspective
Faculty: Govind K. Makharia, MD & David S. Sanders, MD, FACG
Moderator: Carolina Olano, MD
At 9:00 am ET


Week 33 – Thursday August 14, 2025
Prevention of Alcohol-Associated Liver Disease
Faculty: Ashwani K. Singal, MD, MS, FACG
Moderator: Hanna Blaney, MD, MPH
At Noon and 8pm Eastern



Week 34 – Thursday August 21, 2025
GI Nutrition Care Series: Micronutrient Deficiencies and Malabsorption
Faculty: Kristen Roberts, PhD, RDN, CNSC, FASPEN, FAND &
Holly Estes Doetsch, DCN, RD, LD
Moderator: Lindsey Russell, MD, MSc, CNSC
At Noon and 8pm Eastern

Visit **gi.org/ACGVGR** to Register

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Disclosures

Christopher D. Vélez, MD:
Ironwood: Research Grant

Maya Balakrishnan, MD:
Boehringer Ingelheim: Research Grant; Madrigal Pharmaceuticals: Research Grant; Novo Nordisk: Research Grant; Viking Therapeutics: Research Grant

Jin Ge, MD, MBA:
Astellas Pharmaceuticals/Iota Biosciences: Consulting; Gilead Sciences: Advisory Board; Madrigal Pharmaceuticals: Consulting; Merck and Co: Research Grant

Rachel Issaka, MD, MAS:
Guardant Health Inc.: Advisory Board

**All of the relevant financial relationships listed for these individuals have been mitigated*

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Exploring Sexual and Gender Minority Health Equity through Research

Update on Progress after the 2023 American College of Gastroenterology Health Equity Research Award

Christopher Vélez, MD

Associate Program Director, Advanced Fellowship in Functional and Gastrointestinal Motility Disorders

Center for Neurointestinal Health, Massachusetts General Hospital

Mass General Brigham, Harvard Medical School

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2023 HERA Specific Aims

- Aim 1: Assessing patient and primary care needs.
  - Recruit a national US-based cohort of SGM patients with GI conditions. and primary care clinicians caring for SGM GI patients.
  - Qualitative semi-structured 1:1 interviews.
- Aim 2: GI clinician education.
  - A multisite lecture-based didactic addressing SGM-specific GI needs.
  - Pre-test, post-test, assessment at 6-months.
- Aim 3: Cohort-based study assessing GI disease burden.
  - National US-based cohort of SGM patients via the PRIDE study.
  - Biopsychosocial factors, supplemented with a digestive health survey.

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Aim 1: Assessing Patient and Primary Care Needs

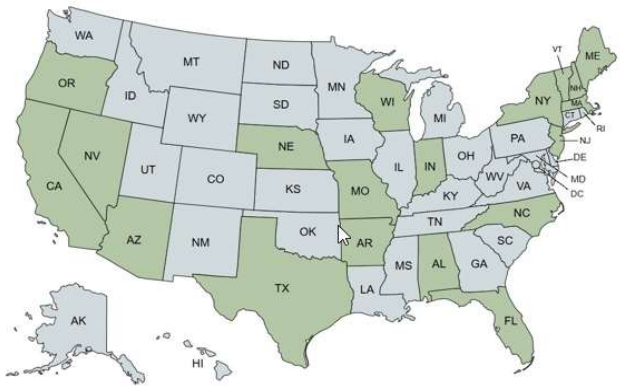

Figure 1. A map of the United States highlighting location of patient and PCP study participants.

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Aim 1: Assessing Patient and Primary Care Needs

- A random sample of 18 states within the 9 principal US census divisions.
  - 40 patient participants and 24 primary care participants.
  - 30-minute 1:1 semi-structured interviews conducted with a clinical research coordinator.
  - Interviews conducted until "thematic saturation" was achieved.
- Patient participants:
  - Illness experience, what makes care more/less affirming, discrimination.
- Clinician participants:
  - Practice referral considerations, unaffirming public discourse, increased regulatory constraints from state and federal authorities.

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Aim 1: Assessing Patient and Primary Care Needs

What experiences as a patient with digestive health problems have made you feel misunderstood or discriminated against?	**SGM discrimination and bias in digestive healthcare** *SGM patient participants find providers attribute symptoms to aspects of SGM identity* *Participants experience bias surrounding SGM identity* *National healthcare landscape is not helping move care forward for SGM participants*	*A Non-Hispanic, Black, 23-year-old, Other (including queer, pansexual, and asexual), Non-binary Person* "But a lot of the times, **people will pin my hormones, my gender identity**, on certain things when I receive healthcare, and when it's just simply not the case." *A Non-Hispanic, White. Bisexual, 31-year-old Non-Binary Person*: "I feel like especially in the South, people think that to be polite, you have to yes, sir, yes, ma'am, stuff like that. There's some people that you can tell that they have certain ideas about what it means to be trans, or **they have conspiracies about what trans people are and stuff like that**. And they just look at you weird and kind of like hurry you along...**Or like they'll ask kind of rude questions, like kind of invasive questions that aren't relevant about sex or genitals or something like that.**"

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Aim 2: GI Clinician Education

- Constructed surrounding GI grand round presentations by Dr. Sonali Paul at MGH and Boston Medical Center
  - A single 45-minute presentation.
  - Focused on broader SGM-health concerns and largely unmet GI needs.
- GI clinicians with different disciplines (nurses, advanced practice providers, fellows, attending physicians) completed tests.
  - 10 question knowledge base assessment as well as Likert scale competence assessments.
- Testing time frames:
  - Pre-test, post-test, and consolidation assessment at 6-months.

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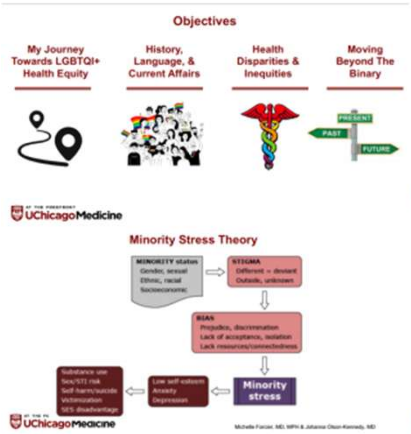
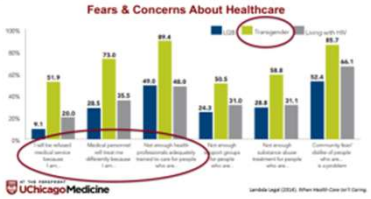
Aim 2: GI Clinician Education





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Aim 2: GI Clinician Education

Demographic category	Number (percentage) pre-test	Number (percentage) post-test	Number (percentage) 6-month Follow-up with intervention
Role			
Attending	51 (35.7%)	32 (40.5%)	37 (52.9%)
Gastroenterology trainee	17 (11.9%)	10 (12.7%)	10 (14.3%)
Advanced practice provider	12 (8.4%)	3 (3.8%)	4 (5.7%)
Endoscopy nurse/technician	13 (9.1%)	8 (10.1%)	5 (7.1%)
Clinic nurse/medical assistant	18 (12.6%)	7 (8.9%)	3 (4.3%)
Operating room nurse/staff	21 (14.7%)	12 (15.2%)	8 (11.4%)
Administrative staff	9 (6.3%)	5 (6.4%)	3 (4.3%)
Years' experience			
1–9	81 (56.6%)	47 (59.5%)	41 (58.6%)
10–19	24 (16.8%)	14 (17.7%)	10 (14.3%)
20–29	20 (14.0%)	11 (13.9%)	11 (15.7%)
30–39	10 (7.0%)	2 (2.5%)	6 (8.6%)
40+	6 (4.2%)	3 (3.8%)	2 (2.9%)
Gender identity			
Man	42 (29.4%)	24 (30.4%)	24 (34.3%)
Woman	93 (65.0%)	49 (62.0%)	42 (60.0%)
Non-binary/non-conforming	2 (1.4%)	2 (2.6%)	1 (1.4%)
Prefer not to say	4 (2.8%)	2 (2.5%)	3 (4.3%)
Sexual orientation			
Straight	126 (88.1%)	68 (86.1%)	63 (90.0%)
Gay or lesbian	7 (4.9%)	3 (3.8%)	2 (2.9%)
Bisexual	2 (1.4%)	0 (0%)	0 (0%)
Queer	1 (0.7%)	2 (2.5%)	2 (2.9%)
Other sexual orientation	2 (1.4%)	1 (1.3%)	1 (1.4%)
Prefer not to say	3 (2.1%)	3 (3.8%)	2 (2.9%)
Transgender			
Yes	2 (1.4%)	2 (2.5%)	1 (1.4%)
No	137 (95.8%)	73 (92.4%)	65 (92.9%)
Prefer not to say	2 (1.4%)	2 (2.5%)	4 (5.7%)
Demographic information not obtained	2 (1.4%)	2 (2.5%)	0 (0%)

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Aim 2: GI Clinician Education

Table 2 Average Likert scale score for subjective ratings about confidence caring for and opinions regarding the sexual and gender minority communities

Statement and Group	Mean Likert Score
I feel competent to provide care for members of the sexual and gender minority community	
Pre-test	3.62
Post-test	3.99***
6-month follow-up (intervention)	4.07***
6-month follow-up (no intervention)	3.87
I would be able to talk with a patient who identifies as a sexual and gender minority in a sensitive manner	
Pre-test	4.19
Post-test	4.38
6-month follow-up (intervention)	4.40
6-month follow-up (no intervention)	4.39
If I see discrimination against a sexual and gender minority person or group occur, I actively work to confront it	
Pre-test	4.18
Post-test	4.41
6-month follow-up (intervention)	4.36
6-month follow-up (no intervention)	4.09
I am open to learning about the experiences of sexual and gender minority people from someone who identifies as a sexual and gender minority	
Pre-test	4.57
Post-test	4.64
6-month follow-up (intervention)	4.63
6-month follow-up (no intervention)	4.57
I am comfortable with knowing that, in being an ally to sexual and gender minority individuals, people may assume I am a sexual and gender minority person	
Pre-test	3.99
Post-test	4.29
6-month follow-up (intervention)	4.34
6-month follow-up (no intervention)	4.09

1 = strongly disagree, 5 = strongly agree

***Significant at $p < 0.05$

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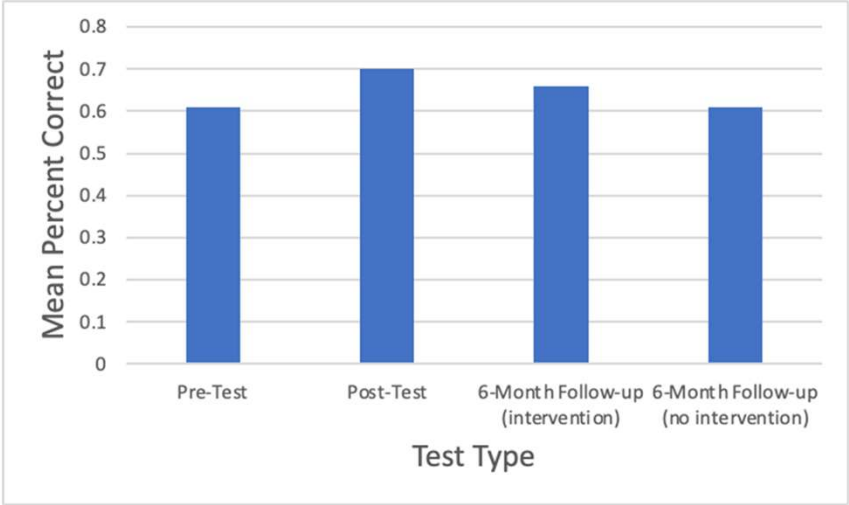
Aim 2: GI Clinician Education



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Aim 2: GI Clinician Education

Digestive Diseases and Sciences
https://doi.org/10.1007/s10620-025-08921-3

ORIGINAL ARTICLE

An Education Intervention in Gastrointestinal Healthcare Workers Improves Knowledge of Sexual and Gender Minority Digestive Health

Alexander Goldowsky[1] · Jenna Clukey[2,3] · Carl Streed Jr.[4,5] · Sonali Paul[6] · Christopher Vélez[2,3]

Received: 4 October 2024 / Accepted: 12 February 2025

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Aim 3: Cohort Based Study Assessing GI Disease Burden

Table 1: Participant Characteristics

Sexual Orientation	Total n = 3678	IBS n= 409	No IBS n=3269
Asexual/Demisexual/Gray-Ace	354 (9.6%)	47 (11.5%)	307 (9.4%)
Bisexual Pansexual	973 (23.7%)	108 (26.4%)	765 (23.4%)
Gay Lesbian	1544 (42.0%)	104 (25.4%)	1440 (44.1%)
Queer	816 (22.2%)	134 (32.8%)	682 (20.9%)
Straight Heterosexual	66 (1.8%)	8 (2.0%)	58 (1.8%)
Another sexual orientation	379 (10.0%)	8 (2.0%)	17 (0.5%)
Gender Identity	**n = 3676**	**IBS n= 409**	**No IBS n=3267**
Cisgender man	929 (25.3%)	37 (9.0%)	892 (27.3%)
Cisgender woman	1016 (27.6%)	105 (25.7%)	911 (27.9%)
Non-binary	880 (23.9%)	163 (39.9%)	717 (21.9%)
Transgender man	475 (12.9%)	67 (16.4%)	408 (12.5%)
Transgender woman	252 (6.9%)	17 (4.2%)	235 (7.2%)
Another gender identity	124 (3.4%)	20 (4.9%)	104 (3.2%)
Race and ethnicity [a]	**n = 3601**	**IBS n= 409**	**No IBS n= 3199**
American Indian or Alaska Native	16 (0.4%)	2 (0.5%)	14 (0.4%)
Asian	92 (2.6%)	5 (1.2%)	87 (2.7%)
Black	115 (3.2%)	9 (2.2%)	106 (3.3%)
Hispanic (of any race)[b]	235 (6.4%)	32 (7.8%)	203 (6.2%)
Middle Eastern/North African	8 (0.2%)	2 (0.5%)	6 (0.2%)
Native Hawaiian or Pacific Islander	1 (0%)	0 (0%)	1 (0%)
White	3040 (84.4%)	330 (82.1%)	2710 (84.7%)
None	24 (0.7%)	8 (2.0%)	16 (0.5%)
More than one race	305 (8.5%)	46 (11.4%)	259 (8.1%)

a- patients may have chosen more than one racial/ethnic group.
b- total n=3679, where IBS n=409, no IBS n=3270.

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Aim 3: Cohort Based Study Assessing GI Disease Burden

Table 2: Biopsychosocial and Social Determinants of Health Factors Associated with Increased IBS Odds

Clinical Variable	n= 409 (% of those with IBS)	Univariate Analysis		Multivariate Analysis	
		OR (95% CI)	P-value	OR (95% CI)	P - value
Sex Assigned at Birth					
Female	345 (84.4%)	OR=3.371 (2.558 - 4.442)	<.001	OR=1.438 (0.966 - 2.143)	0.074
Mental Health Conditions					
Severe Generalized Anxiety	69 (18.9%)	OR=3.756 (2.775 - 5.084)	<.001	OR=2.155 (1.359 - 3.418)	0.001
Post-Traumatic Stress Disorder	240 (58.6%)	OR=3.282 (2.612 - 4.124)	<.001	OR=1.589 (1.158 - 2.181)	0.004
Eating Disorder	66 (16.1%)	OR=3.418 (2.517 - 4.642)	<.001	OR=1.538 (1.002 - 2.36)	0.049
Other Factors					
Disability Impacting Employment	140 (34.2%)	OR=2.456 (1.951 - 3.092)	<.001		

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Overall successes of the mechanism

- "Meta" disparities work – moving beyond "p<0.05" health equity work to addressing underlying factors responsible for inequity.
  - HERA mechanism allowed for staffing support to directly query on a national context patient, primary care, and cohort-related work that can identify potential pathways to reduce SGM-related inequity.
- In an uneasy federal funding environment (particularly for health disparities work), foundation support remains critical.
  - As a more junior researcher, HERA gives folks like me a fighting chance when/if the landscape returns to more normal operating conditions.
- Return-on-investment: 172%!
  - Being an ACG award recipient provided gravitas for seeking philanthropic support from pharmaceutical industry collaborators.

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Challenges

- "ridiculous… no ones bowels identify as anything other than Bowels… probably just another" scam get a grant money .. what a joke .. everyone's insides are the same depending on your gender no matter what your sexual preference or pronouns are"
- "why are they wasting resources on shit like this"
- "stop being a r*tard and give the alphabet its letters back"
- "Pedophiles r us"
- "child mutilation"
- "Lgbtqlmnop[]{}#%^^*+="
- "child abusing groomers"
- "cement that damn closet door shut"
- "don't affirm perversion that ISN't good health."
- "Get mental help"

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Conclusions and Gratitude

- Health equity research needs to evolve towards identifying mechanisms by which to circumvent disparities related to adversely distributed social determinants of health.
  - Reporting that disparities exist in communities expected to have worse outcomes should no longer be standard.
- I have the most profound gratitude for the American College of Gastroenterology for all its efforts focused on health equity.
  - Commitment to continuing equity-related priorities.
    - HERA -> Leonidas Berry Award.
  - Committee work.
  - ACG Institute initiatives.
    - Career Development Programs.
    - Achkar Visiting Scholar Program

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A large language model-based approach to quantifying the influence of psychosocial risk and SDOH factors in liver transplantation

Thursday, August 7, 2025

ACG Viral Grand Rounds – Exploring Health Equity Through Research

Jin Ge, MD, MBA
Assistant Professor of Medicine, In Residence
Director of Clinical Artificial Intelligence, UCSF Gastroenterology
Divisions of Gastroenterology and Hepatology, and Clinical Informatics and Digital Transformation
Department of Medicine, University of California San Francisco

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Read our paper (under review) on arXiv!

arXiv > cs > arXiv:2412.07924

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Computer Science > Computers and Society

[Submitted on 10 Dec 2024 (v1), last revised 10 Jan 2025 (this version, v2)]

A large language model-based approach to quantifying the effects of social determinants in liver transplant decisions

Emily Robitschek, Asal Bastani, Kathryn Horwath, Savyon Sordean, Mark J. Pletcher, Jennifer C. Lai, Sergio Galletta, Elliott Ash, Jin Ge, Irene Y. Chen

Patient life circumstances, including social determinants of health (SDOH), shape both health outcomes and care access, contributing to persistent disparities across gender, race, and socioeconomic status. Liver transplantation exemplifies these challenges, requiring complex eligibility and allocation decisions where SDOH directly influence patient evaluation. We developed an artificial intelligence (AI)-driven framework to analyze how broadly defined SDOH -- encompassing both traditional social determinants and transplantation-related psychosocial factors -- influence patient care trajectories. Using large language models, we extracted 23 SDOH factors related to patient eligibility for liver transplantation from psychosocial evaluation notes. These SDOH ``snapshots'' significantly improve prediction of patient progression through transplantation evaluation stages and help explain liver transplantation decisions including the recommendation based on psychosocial evaluation and the listing of a patient for a liver transplantation. Our analysis helps identify patterns of SDOH prevalence across demographics that help explain racial disparities in liver transplantation decisions. We highlight specific unmet patient needs, which, if addressed, could improve the equity and efficacy of transplant care. While developed for liver transplantation, this systematic approach to analyzing previously unstructured information about patient circumstances and clinical decision-making could inform understanding of care decisions and disparities across various medical domains.

Comments: Spotlight Paper, ML4H 2024; Leonidas H. Berry Health Equity Research Award, ACG 2024; Plenary Presentation, AASLD 2024

Subjects: Computers and Society (cs.CY)

Cite as: arXiv:2412.07924 [cs.CY]

(or arXiv:2412.07924v2 [cs.CY] for this version)

https://doi.org/10.48550/arXiv.2412.07924

Submission history

From: Irene Y. Chen [view email]

[v1] Tue, 10 Dec 2024 21:12:33 UTC (16,842 KB)

[v2] Fri, 10 Jan 2025 03:28:43 UTC (23,152 KB)

Access Paper:

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Current browse context: cs.CY

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new | recent | 2024-12

Change to browse by: cs

References & Citations

NASA ADS

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Special thanks to Emily Robitschek (ETH Zurich and UCSF/UCB CPH) for leading this groundbreaking work

Overview

1. Psychosocial risk factors and social determinants of health (SDOH) are associated with and influence successful registration on the liver transplant (LT) waiting list
2. Systematically understanding psychosocial risk and SDOH could support development of targeted interventions to improve patient outcomes
3. These data are often recorded as “locked” free-text in clinical notes, preventing detailed analyses
4. Therefore, we leveraged generative artificial intelligence (GenAI) to analyze thousands of liver transplant psychosocial evaluations with the aim of identifying potentially modifiable factors

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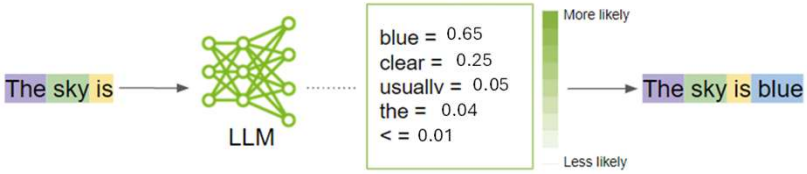
Large Language Models (LLMs) predict and generate human-like responses



Large language models process text using neural architectures trained through statistical pattern recognition across massive datasets => Like a super-powered autocomplete, LLMs predict what words should come next.

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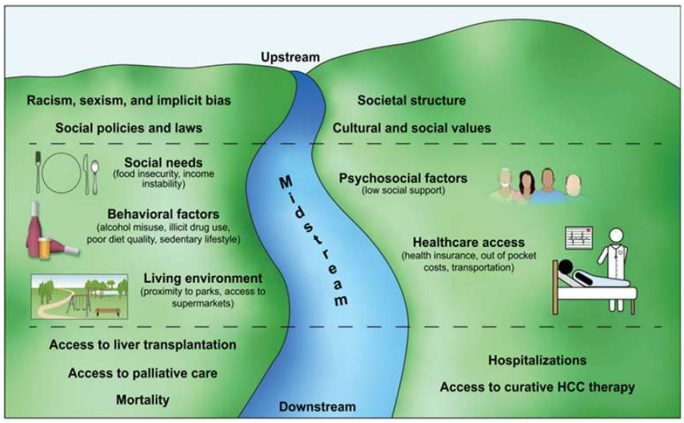
Psychosocial risk and SDOH factors are associated with liver disease and LT outcomes

Impact on waitlist registration

- Psychosocial risk and SDOH factors disproportionately concentrate liver disease risk factors (e.g., alcohol use, opioid use, obesity) among historically disadvantaged populations

Impact on successful transplant

- Disparities persist through the transplant process, with women and racial and ethnic minorities facing reduced access to evaluation, listing, and transplantation



Contribution of Structural and psychosocial/SDOH factors to Liver Disease Outcomes (from Kardashian et al. 2022)

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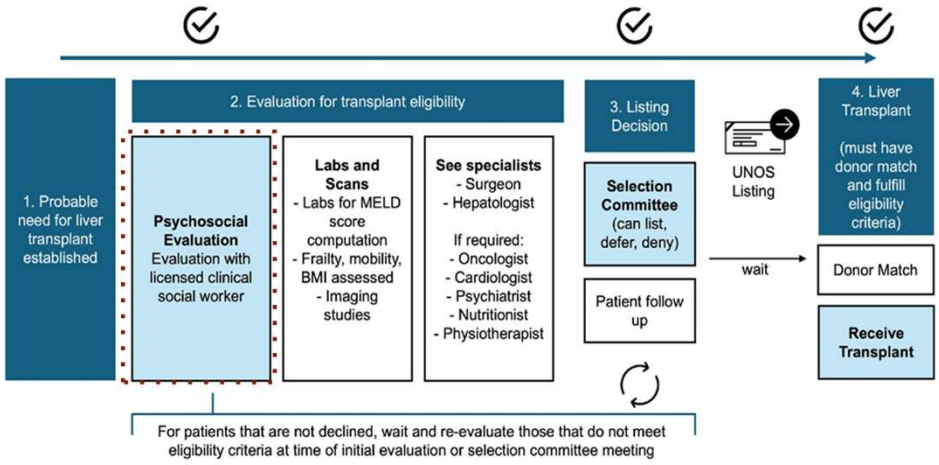
Key insight: LT psychosocial evaluation notes systematically capture these factors



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Data science gap: Psychosocial risk and SDOH factors historically cannot be easily analyzed

Psychosocial/SDOH data are "locked" in unstructured notes

- Vast majority of psychosocial risk SDOH data is contained in social work evaluation narrative notes
- Limited ability to analyze at scale
- Need for systematic analytical methods

… leading to difficulties in understanding true gaps

- Difficulty in standardizing assessment
- Challenge of manual review => labor intensive
- Limited large-scale studies

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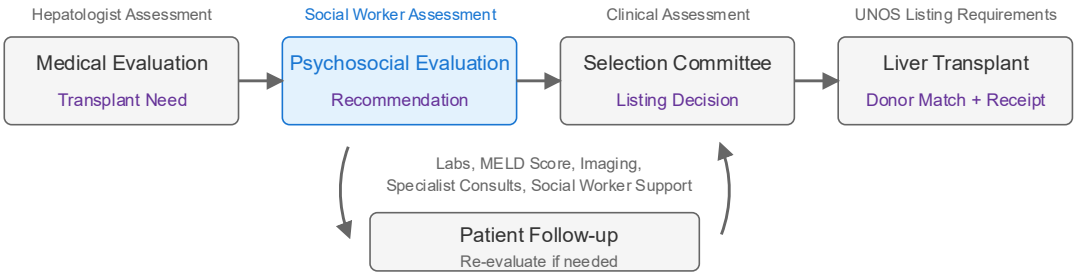
LT decisions are complex and influenced by both clinical and psychosocial risk



LT decisions are influenced by:

- **Clinical factors/urgency (structured records):** Etiology of liver disease, MELD score, HCC exception points
- **Features outside the structured record:** Psychosocial and SDOH risk recorded in mandated psychosocial evaluation

The balance between the two categories of risk in practice remains undefined

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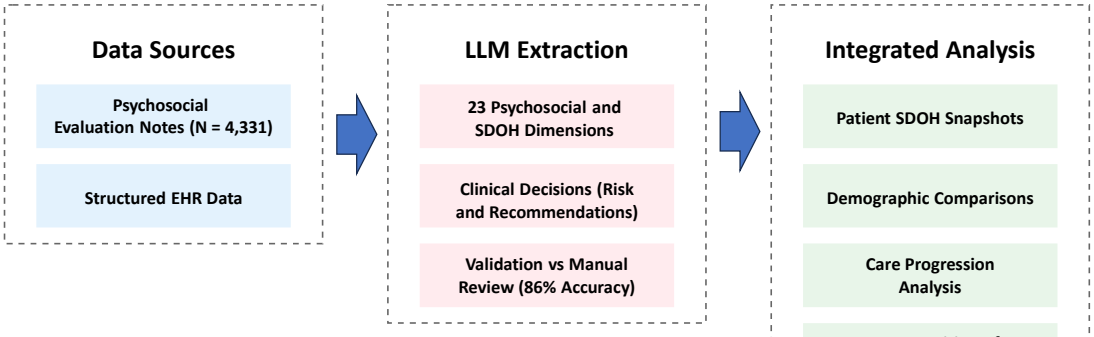
LLMs can bridge this gap by extracting and structuring dimensions from evaluation notes



Model used: PHI-compliant version of GPT-4-turbo ("Versa", zero-shot)
Dimensions captured: SDOH, Social Support, Substance Use, Other Psychosocial Risks

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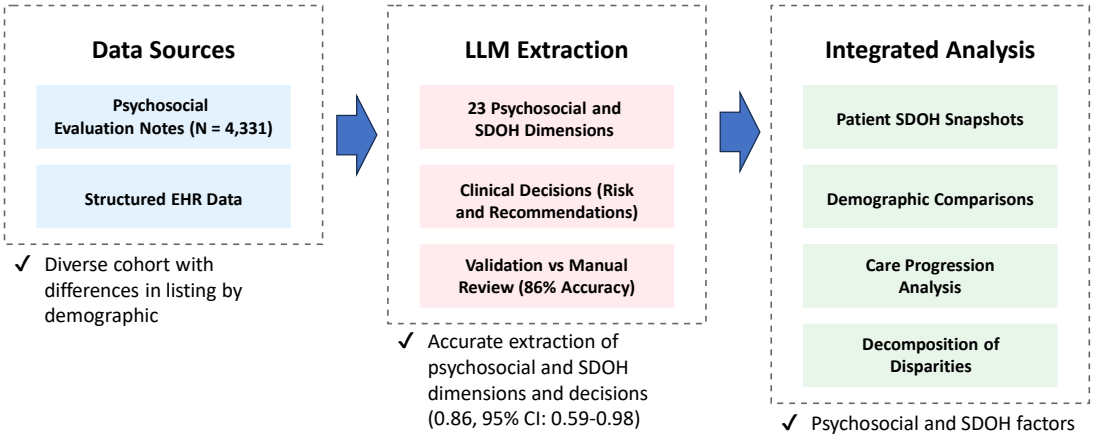
LLMs can bridge this gap by extracting and structuring dimensions from evaluation notes

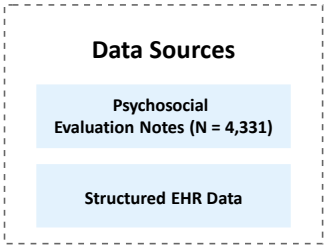


✓ Diverse cohort with differences in listing by demographic

✓ Accurate extraction of psychosocial and SDOH dimensions and decisions (0.86, 95% CI: 0.59-0.98)

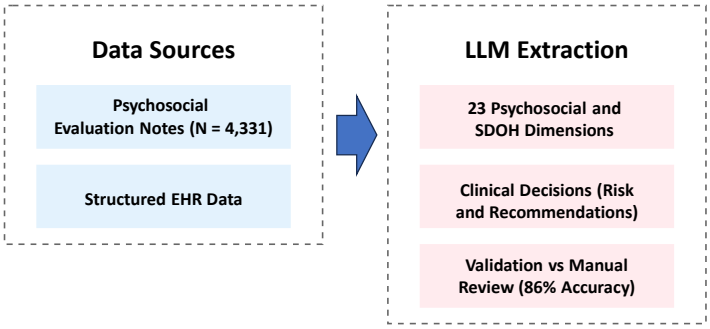
✓ Psychosocial and SDOH factors predict listing decision and enable understanding of disparities

Study Design and Methods



- ✓ Adult patients evaluated for liver transplant at UCSF between 2012-2023 (n = 3,704 w/ complete data)
- ✓ Listing status extracted from notes using REGEX search
- ✓ Key Variables from Structured EHR data:
  - ✓ **Clinical:** MELD score, HCC diagnosis, Blood type, BMI, Height, Age
  - ✓ **Demographic:** Race, Ethnicity, Sex

Study Design and Methods



- ✓ Clinical and social work consultants defined psychosocial and SDOH dimensions as well as targeted outcomes for evaluation (e.g. risk level, recommendation)
- ✓ PHI-compliant version of OpenAI GPT-4-turbo for extraction ("Versa")
- ✓ Accuracy evaluated against manual review of randomly selected notes
- ✓ Encode as binary features for modelling

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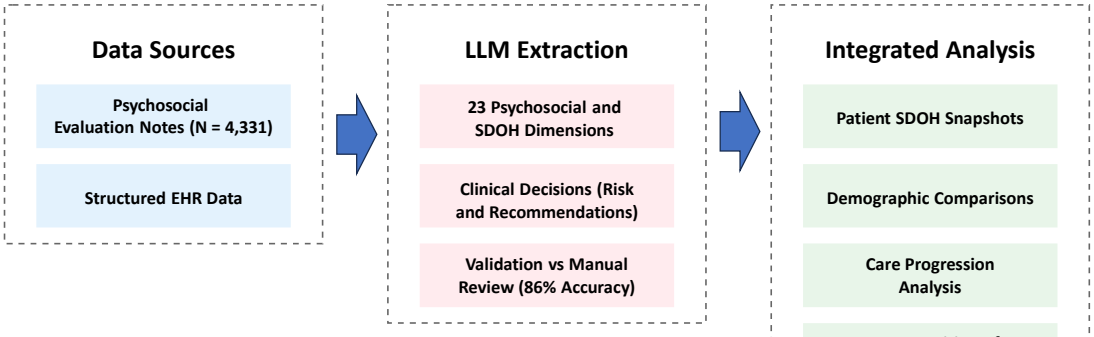
Study Design and Methods



- ✓ Psychosocial/SDOH "Snapshot" in integrated analysis:
  - ✓ FDR corrected comparisons (z-proportions test) of risk factor prevalence by demographic and LT outcome
  - ✓ Outcomes modeling (XGBoost, L1-regularized logistic regression)

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Cohort Characteristics and Outcomes

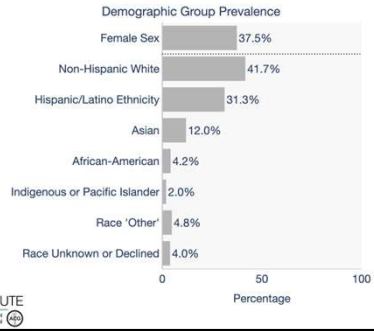
Data Sources

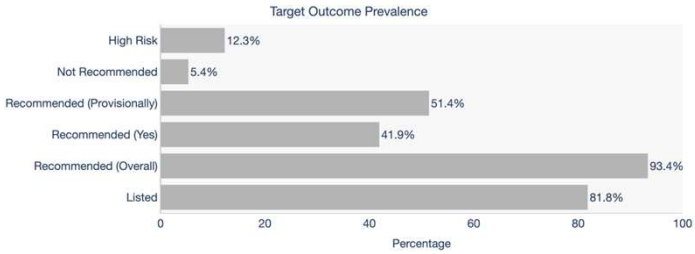
Psychosocial Evaluation Notes

Structured EHR Data

For patients with complete clinical data (n=3,704)

- Demographically diverse cohort (58.3% Non-White)
- 81.8% of patients eventually listed





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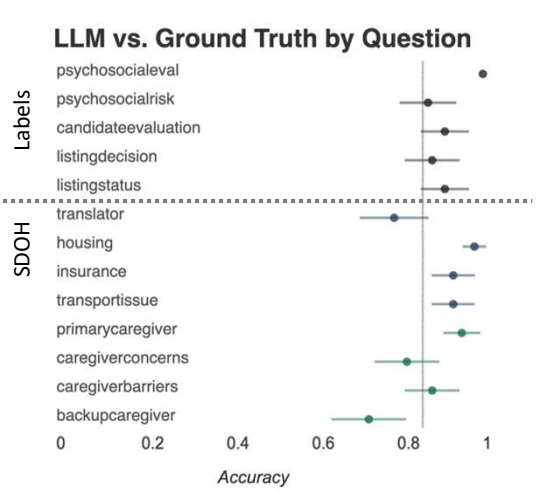
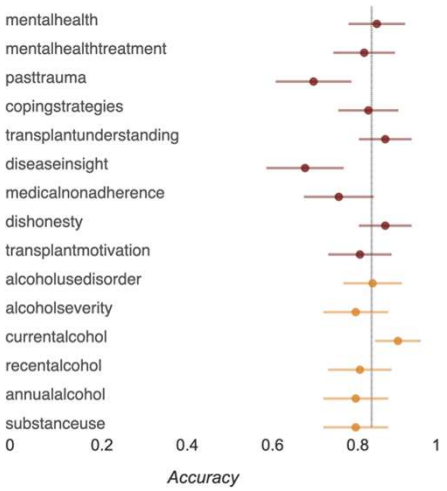
Finding 1: LLMs extracted psychosocial and SDOH factors with 86% accuracy





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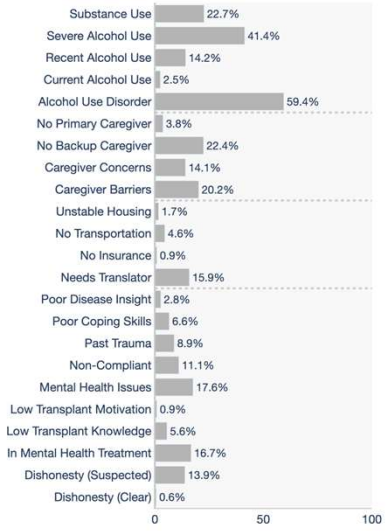
Finding 2: Comparisons of risk factor prevalences reveal specific baseline needs



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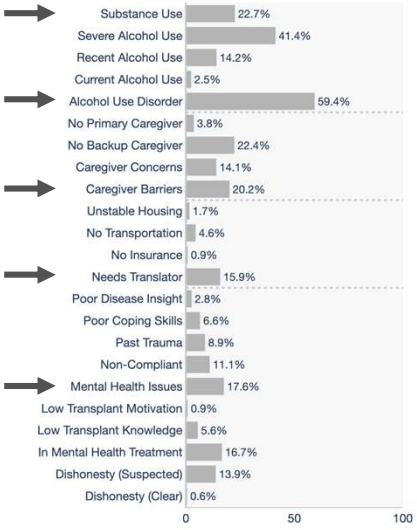
Finding 2: Comparisons of risk factor prevalences reveal specific baseline needs



Population-level findings indicate high prevalences:

- Substance use
- Translator need
- Social support challenges
- Mental health issues

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Finding 3: Prevalences of risk factors differ widely across different demographic groups

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Finding 3: Prevalences of risk factors differ widely across different demographic groups

Higher translator need amongst Asian, Hispanic, and Other race patients

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Finding 3: Prevalences of risk factors differ widely across different demographic groups

Lower prevalence of adverse substance use in Asian patients

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Finding 3: Prevalences of risk factors differ widely across different demographic groups

Female patients more likely to report past trauma and lack a primary caregiver

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Finding 3: Prevalences of risk factors differ widely across different demographic groups

Hispanic/Latino patients more likely to report ongoing mental health challenges but less likely to seek treatment

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Finding 3: Prevalences of risk factors differ widely across different demographic groups

Indigenous or Pacific Islander patients more likely to have a history of medical non-adherence and lack transportation

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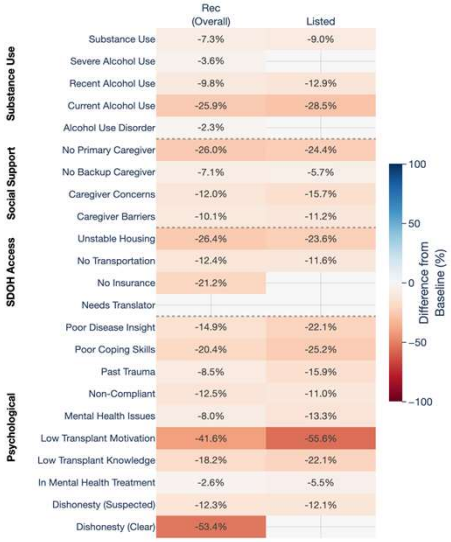
Finding 4: Prevalences of risk factors varies across recommendations and listing statuses



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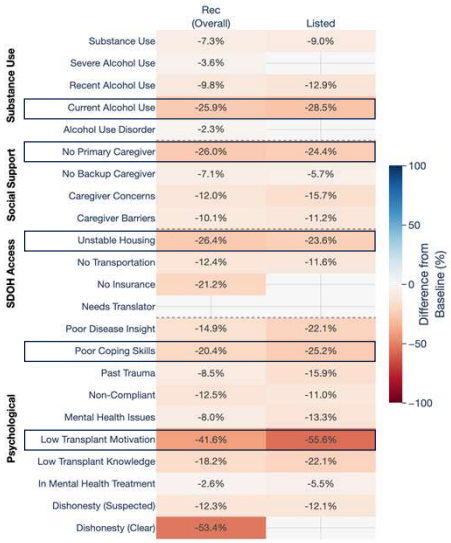
Finding 4: Prevalences of risk factors varies across recommendations and listing statuses



Associations with negative listing status

- Lack of motivation for transplant
- Current alcohol use
- Poor coping skills
- Unstable housing
- Lack of primary caregiver

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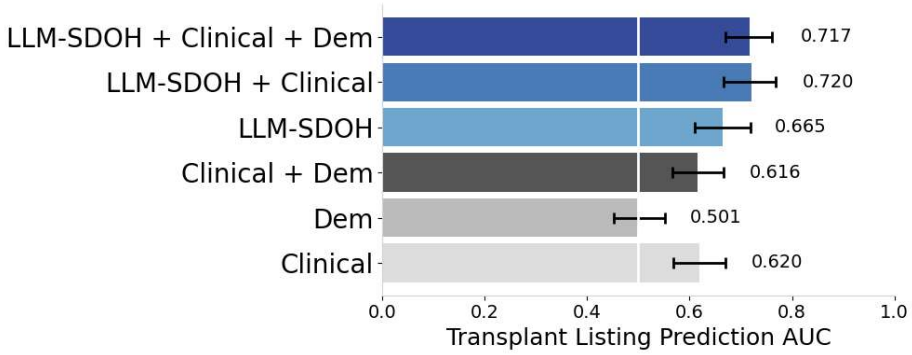
Finding 5: LLM-extracted psychosocial/SDOH information improves LT listing prediction



Feature sets for XGBoost model:

(**Dem**)ographic = Race, Ethnicity, Sex; **Clinical** = Structured Health Information (e.g. MELD Score, HCC diagnosis); **LLM-SDOH** = LLM-derived SDOH features

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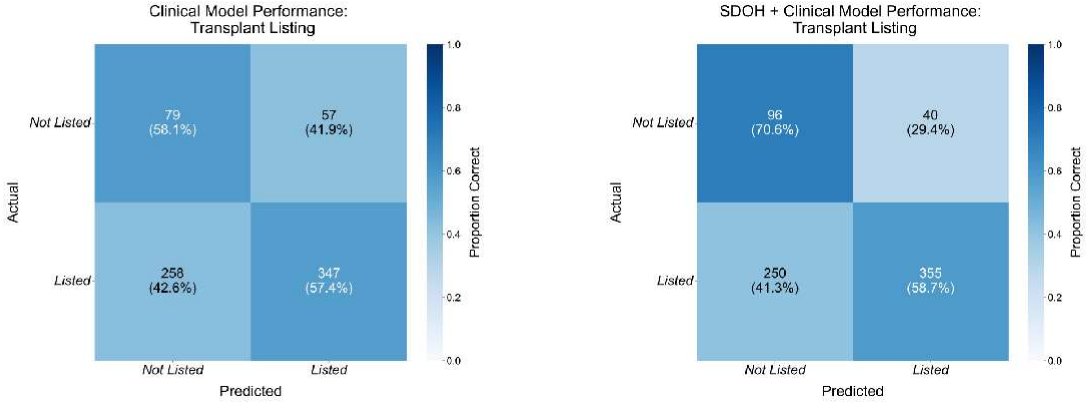
Finding 5: LLM-extracted psychosocial/SDOH information improves LT listing prediction



Feature sets for XGBoost model:

(**Dem**)ographic = Race, Ethnicity, Sex; **Clinical** = Structured Health Information (e.g. MELD Score, HCC diagnosis); **LLM-SDOH** = LLM-derived SDOH features

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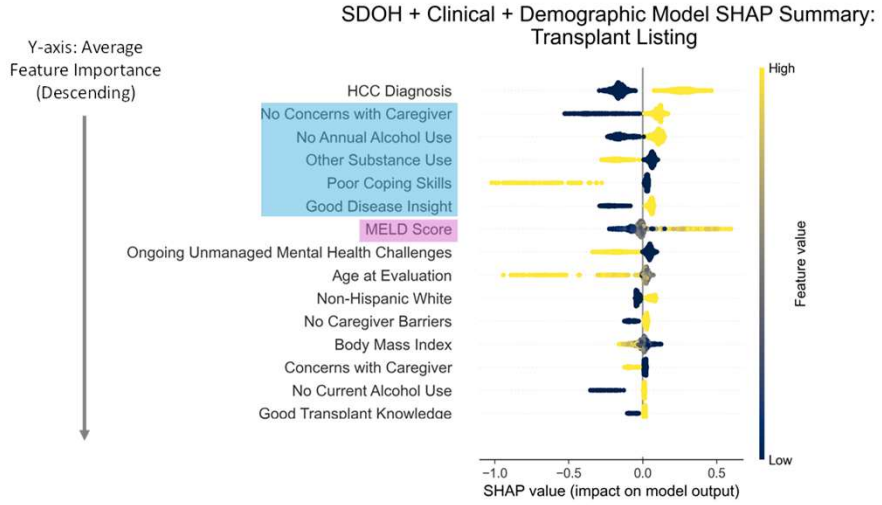
Finding 6: Psychosocial/SDOH factors may be *more important than* MELD for LT listing

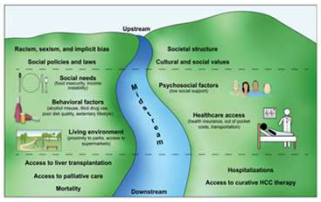


Summary and Implications

- LLMs can reliably extract psychosocial risk and SDOH factors from clinical notes (86% accuracy across 23 dimensions)
- LLM extraction allows for quantification of the impact of specific SDOH dimensions (e.g., social support, substance use history, housing, and transportation) on listing recommendation, successful waitlist registration, and transplant completion
- Adverse SDOH factors are associated with racial/ethnic demographic groups in the transplant population and may contribute to disparities
- While limited to a single center, our findings suggest concrete opportunities for potential interventions (e.g., enhanced support services, targeted screening programs)

Key Takeaways

LLMs can extract and create snapshots of decision-relevant psychosocial risk and SDOH information collected by clinical social workers during LT evaluations



Better Understand health disparities and clinical outcomes

Prioritize institutional **actions and reforms**

Generalizable framework to advance health equity and patient care

Read our paper!

Acknowledgements

- The authors thank the UCSF AI Tiger Team, Academic Research Services, Research Information Technology, and the Chancellor's Task Force for Generative AI for their software development, analytical, and technical support related to the use of Versa API gateway (the UCSF secure implementation of large language models and generative AI by means of API gateway), Versa chat (the chat user interface), and related data assets.
- The authors of this study were supported in part by ACG Institute Leonidas Berry Health Equity Research Award (JG, IYC, ER), K23DK139455 (JG), P30DK026743 (JG and JCL), Google Research Scholar (IYC), Apple Machine Learning Grant (IYC), UL1TR001872 (MJP), R01AG059183 (JCL), K24AG080021 (JCL).
- The patients and other clinical staff that made this work possible

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Addressing Health Equity Through Research

Development of a Culturally-Tailored Meal Plan to Enhance Behavioral Control among Patients with MASLD using Patient-Centered Design

Maya Balakrishnan, MD, MPH

Associate Professor of Medicine, Baylor College of Medicine (Houston, TX)

American College of Medicine, Virtual Grand Rounds

7 August 2025

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PRESENT AN EXAMPLE OF USING RESEARCH TO ADDRESS A HEALTH EQUITY GAP IN BEHAVIORAL RESEARCH FOR MASLD

2022 ACG Health Equity Research Award: "Improving outcomes among Mexican and Central American Patients with MASLD"

Discuss one study funded by the grant:

- Rationale for the research.
- Overview of study design and findings.
- Implications for future work.

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MASLD, HEALTH BEHAVIOR CHANGE, & THE HEALTH EQUITY GAP

- MASLD is highly prevalent obesity-related liver disease.
- Behavioral changes in diet & physical activity are paramount to treating MASLD. Important for weight loss/management and cardiovascular health. However, patients struggle.
- The priority population for my research = Mexican & Central American (M/CA) patients.
  - Bear the highest burden of disease in the US[1-4].
  - Under-represented in the behavioral research[6]. Dearth of behavior change interventions that address the priority population's specific behavioral, sociocultural, and clinical needs.

1. Tesfai K et al, Disparities for Hispanic Adults With MASLD in the US, CGH, 2024; 2. Nguyen VH et al. Differences in liver and mortality outcomes of NAFLD by race and ethnicity: A longitudinal real-world study, Clin Mol Hepatol, 2023; 3. Shaheen M et al, Reassessment of the Hispanic Disparity: Hepatic Steatosis Is More Prevalent in Mexican Americans, Hepatol Commun, 2021.; 4. Kallwitz ER et al. Prevalence of suspected NAFLD in Hispanic/Latino individuals differs by heritage. CGH, 2015.; 5 Heredia N … Balakrishnan M, Self perceptions of weight loss behaviors in NAFLD, Sci Reports 2022 ; 6 Balakrishnan M et al, "Behavioral weight-loss interventions for patients with NAFLD: A systematic scoping review," Hepatology Communications 2023.

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THE PROBLEM: PATIENTS STRUGGLE WITH CHANGING DIETARY BEHAVIORS

- Clinical guidelines recommend multiple dietary changes:
  - Reduce total calories consumed.
  - Change diet quality in line with Mediterranean and DASH dietary patterns:
    - Prioritize whole grains and lean proteins
    - Increase fruits/vegetables, nuts/seeds, legumes.
    - Reduce/avoid added sugars, saturated fats, highly processed foods.
- Translating these into daily life is overwhelming and complicated. Patients have to take multiple steps …
  - Select and combine the right foods
  - Plan meals.
  - Modify recipes and cooking methods.
  - Eat the right portion size..

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THEORY OF PLANNED BEHAVIOR: IN ORDER TO SUCCEED, PATIENTS NEED TO HAVE HIGH DEGREE OF BEHAVIORAL CONTROL

- Behavioral control (self-efficacy) means a high level of self-confidence in one's ability for healthy eating.
- Survey data show that patients with MASLD have low levels of self efficacy: report lack of knowledge and skills, time, cost, culture and family as barriers to healthy eating.
- According to theory, improving behavioral control can lead more successful dietary change.

1. Metz JA et al. A randomized trial of improved weight loss with a prepared meal plan in overweight and obese patients: impact on cardiovascular risk reduction. Arch Intern Med. 2000; 2. Haynes RB et al. Nutritionally complete prepared meal plan to reduce cardiovascular risk factors: a randomized clinical trial. J Am Diet Assoc, 1999; 3. Min J et al. The Effect of Meal Replacement on Weight Loss According to Calorie-Restriction Type and Proportion of Energy Intake: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. J Acad Nutr Diet, 2021; 4. Hasan B et al. The effect of culinary interventions (cooking classes) on dietary intake and behavioral change: a systematic review and evidence map. BMC Nutr 2019.

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POTENTIAL SOLUTION: PROVISION OF STRUCTURED MEAL PLANS TO BOLSTER BEHAVIORAL CONTROL

- Dietary plans that instruct patients on exactly what and how to eat over a 5-7 day period.
- Model *how* to translate complex dietary recommendations to daily eating practices.
- Associated with greater weight loss compared to dietary counseling alone.

1. Metz JA et al. A randomized trial of improved weight loss with a prepared meal plan in overweight and obese patients: impact on cardiovascular risk reduction. Arch Intern Med. 2000; 2. Haynes RB et al. Nutritionally complete prepared meal plan to reduce cardiovascular risk factors: a randomized clinical trial. J Am Diet Assoc, 1999; 3. Min J et al. The Effect of Meal Replacement on Weight Loss According to Calorie-Restriction Type and Proportion of Energy Intake: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. J Acad Nutr Diet, 2021; 4. Hasan B et al. The effect of culinary interventions (cooking classes) on dietary intake and behavioral change: a systematic review and evidence map. BMC Nutr 2019.

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THE INTERVENTION NEED, SETTING, & POPULATION

- For a structured meal plan to work, it needs to be tailored for the patient population that receives it – it needs to be feasible, acceptable, familiar, culturally congruent.

The challenge:

- No structured meal plan designed for the priority population.
- Safety-net healthcare system limited by constraints: Large volume of patients, limited access to dietitians (Harris Health System in Houston, TX).

- Needed to create culturally-tailored, group-based meal plan – but no existing processes or methods to do so.

1. Tesfai K et al, Disparities for Hispanic Adults With MASLD in the US: A Systematic Review and Meta-analysis, CGH, 2024.; 2. Nguyen VH et al. Differences in liver and mortality outcomes of non-alcoholic fatty liver disease by race and ethnicity: A longitudinal real-world study, Clin Mol Hepatol, 2023.; 3. Shaheen M et al, Reassessment of the Hispanic Disparity: Hepatic Steatosis Is More Prevalent in Mexican Americans, Hepatol Commun, 2021.; 4. Kallwitz ER et al. Prevalence of suspected NAFLD in Hispanic/Latino individuals differs by heritage. CGH, 2015.

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STUDY AIM: DEVELOP A MEAL PLAN TOOL FOR THE PRIORITY POPULATION & A PROCESS TO DO SO USING PARTICIPATORY METHODS

1. **User centered design process[1].**

   An iterative process that engages with the end-users – in this case, patients with MASLD —throughout the development process to address their needs and preferences from the start and to optimize usability of the final product (the structured meal plan).

2. **Informed by an established food literacy framework (by Vidgen and Gellegos)[2].**

1. Lyon AR & Koerner K. User-Centered Design for Psychosocial Intervention Development and Implementation. Clin Psychol 2016;
2. Vidgen HE & Gallegos D. Defining food literacy and its components. Appetite 2014.

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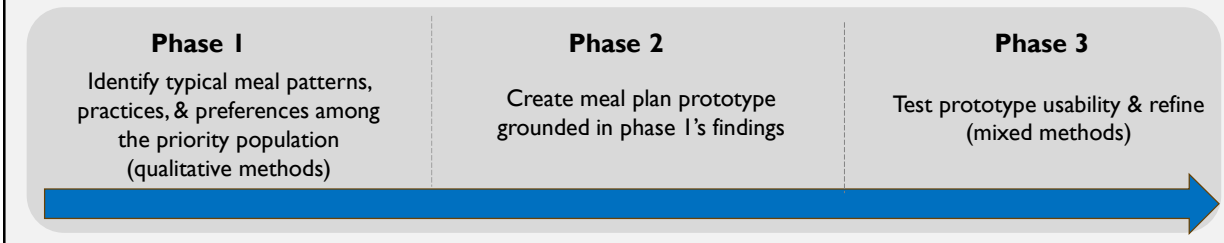
MIXED METHODS STUDY UNFOLDED OVER THREE PHASES



1. Lyon AR & Koerner K. User-Centered Design for Psychosocial Intervention Development and Implementation. Clin Psychol 2016;
2. Vidgen HE & Gallegos D. Defining food literacy and its components. Appetite 2014.

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PHASE 1

IDENTIFY TYPICAL MEAL PATTERNS, PRACTICES, & PREFERENCES AMONG THE PRIORITY POPULATION.

- Qualitative study
- Used in-depth, one-on-one interviews.
- Sample: 19 M/CA adult patients with BMI ≥25 and MASLD/metabolic syndrome/or type 2 diabetes purposively sampled from safety net clinics.
- Thematic analysis.

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PHASE 1 FINDINGS:

THREE MAIN THEMES RELEVANT TO MEAL PLAN DESIGN

Theme 1:	Theme 2:	Theme 3:
Most eat home cooked meals prepared for the family.	**Habitual two or three meal a day pattern.**	**Favored simple, traditional meals, primarily featured animal protein, cost mainly barrier to fish/fruit.**

Inventoried

- Common homemade meal recipes
- Foods and staples typically available at home.

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PHASE 2
CREATE A 7-DAY STRUCTURED MEAL PLAN PROTOTYPE

1. **Calorie restricted meal plan to achieve a 500calorie/day deficit (to promote weight loss)**
   - Three caloric levels: 1200, 1500, 1800 kcal/day designed to be prescribed to people with 3 baseline weight thresholds: 54-77 kg, 78-99 kg, and >100 kg respectively[1,2,3].

2. **Dietary quality aligned with USDA & WHO guidelines[4,5]:**
   - 50% carbohydrates, 20% protein, and 30% fat macronutrient composition.
   - At least 25 grams of dietary fiber per day
   - Focused on incorporating complex carbohydrates (e.g., whole grains, lentils, and legumes), lean protein sources (e.g., fish, chicken, beef), non-starchy vegetables and fruits, and plant-based oils.

3. **Informed by meal patterns, preferences, & practices identified in phase 1.**

1. The Diabetes Prevention Program (DPP): description of lifestyle intervention. Diabetes Care. 2002. 2. Wadden TA, et al. The Look AHEAD study. Obesity 2006. 3. Liu D, et al. Calorie Restriction with or without Time-Restricted Eating in Weight Loss. NEJM 2022. 4. Healthy Eating Guidelines for Americans 2020-2025, USDA 2020. 5. Carbohydrate intake for adults and children: WHO guidelines . Geneva: World Health Organization; 2023.

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PHASE 2
7-DAY MEAL PLAN PROTOTYPE: 21 MEALS

Meal Plan	Breakfast	Lunch	Dinner	Snack
	Equal calories	Equal calories	Equal calories	Lower calorie
1200 calorie	350-400	350-400	350-400	150
1500 calorie	430-500	430-500	430-500	150
1800 calorie	470-550	470-550	470-550	150

- Used meal recipes frequently reported in phase 1
- Registered dietitian modified to meet calorie and diet quality specifications, using staples reported as commonly available by participants in phase 1

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PHASE 3
USER TEST THE 7-DAY MEAL PLAN PROTOTYPE

- Objective: to identify and fix meal plan's major usability problems and to explore its impact on behavioral control.
- Sequential explanatory study.
- Sample: 6 M/CA adults with MASLD who additionally cooked at home.
- Followed the meal plan for 7 days & provided feedback via 21 post-meal surveys + 7 daily interviews.
- Rapid qualitative analysis.

Ivankova NV et al. "Using mixed-methods sequential explanatory design: From theory to practice." Field methods, 2006; Barnum, Carol M. Usability testing essentials: Ready, set... test!. Morgan Kaufmann, 2020..; Nielsen, J. How Many Test Users in a Usability Study? Available online: https://www.nngroup.com/articles/how-many-testusers/ (accessed on 5 June 2024. Faulkner, L. Beyond the Five-User Assumption: Benefits of Increased Sample

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PHASE 3 MAIN FINDINGS

- Completed iterative prototype refinements by User #4.
- Users reported:
  - Meals were familiar and feasible with respect to cost, prep time, and ingredient availability,
  - Using the meal plan improved aspects of behavioral control:
    - Greater knowledge for how to reduce fat and increase vegetables composition of meals.
    - Greater Portion Awareness

      I realize that I take portions that are more than I should eat . . . now I realize what I actually should be eating (P3).

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SUMMARY & MAIN TAKE AWAY

While it is widely acknowledged that culturally tailoring behavioral interventions is an important aspect of health equity, clear guidance on how to develop such interventions is lacking.

This study addresses this gap by presenting

(1) A transparent process for developing a behavioral tool using participatory methods

(2) The product—a culturally tailored dietary intervention for low acculturation M/CA patients with MASLD in a safety net health care system.

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STUDY STRENGTHS, LIMITATIONS, & NEXT STEPS

Strengths: Use of participatory methods.

- Phase 3 findings indicate that the process worked: users found the meal plan feasible and familiar, suggesting the process effectively addressed cultural relevance.

Next Steps: Process and the meal plan need further testing:

- Process: To assess its broader applicability, needs to be tested in other populations and disease states.
- Meal Plan: Larger-scale testing is necessary to assess larger scale feasibility and long-term adherence (ongoing: ClinicalTrials.gov ID NCT06854185, funded) and efficacy.

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ACKNOWLEDGEMENTS

Patients who participated in the interviews and provided user feedback.

Funding Agencies:

- American College of Gastroenterology, Health Equity Research Award.
- National Institutes of Minority Health & Disparities K23 Award.

Study Team

- Myriam Ibarra, Paula Martinez, Crystal Arguelles, Brett Deng, Ivonne Arguelles, Anna Rome

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THANK YOU

Please contact me with any questions or comments:

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Fred Hutch Cancer Center

Developing interventions to improve follow-up of abnormal FIT results in a safety-net population

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Background

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Colonoscopy after abnormal stool-based tests are inadequate

Authors (Year)	Healthcare Setting	Test Type	% Colonoscopy Completion (time)
Escaron AL et al (2022)	FQHCs	FIT	33% (12 months)
Bharti B et al (2019)	FQHCs	FIT	44% (6 months)
O'Connor EA et al (2020)	FQHCs	FIT	53% (12 months)
Scott RE et al (2023)	FQHCs	FIT	73% (3 years) - median 55days
Issaka RB et al (2021)	Safety Net Health System	FIT	41% (12 months)
Issaka RB et al (2017)	Safety Net Health System	FIT	56% (12 months)
Chubak et al (2016)	Safety Net Health System	gFOBT & FIT	58% (12 months)
Partin MR et al (2017)	VHA	gFOBT & FIT	50% (6 months)
May et al (2019)	VHA	FIT	62% (6 months)
Cooper GS et al (2021)	Integrated Health System	FIT	47% (6 months)
Mohl JT et al (2023)	Multiple Integrated Health Systems	FIT & mt-sDNA	56% (12 months)
Chubak et al (2016)	Integrated Health System	gFOBT & FIT	68% (12 months)
Cooper GS et al (2021)	Integrated Health System	mt-sDNA	72% (6 months)
Chubak et al (2016)	Integrated Health System	gFOBT & FIT	76% (12 months)

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gFOBT: guaiac fecal occult blood test; FQHC: Federally Qualified Health Centers; FIT: Fecal immunochemical test; mt-sDNA : multitarget stool DNA –FIT; VHA: Veterans Health Affairs

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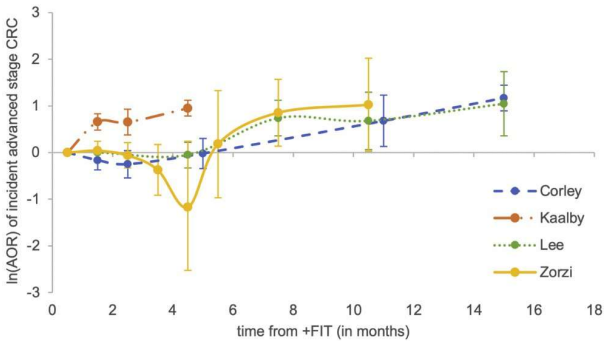
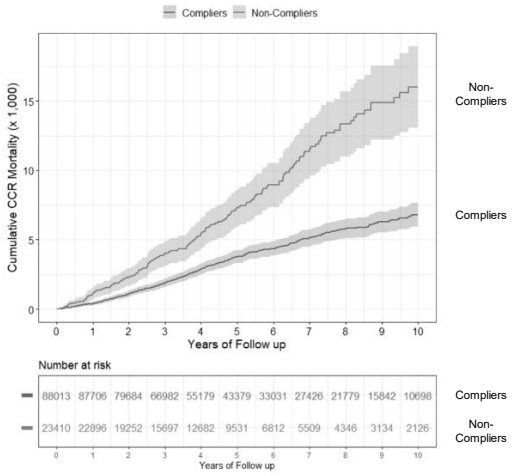
Lack of follow-up colonoscopy increases CRC stage and mortality





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Forbes N et al, Clin Gastro & Hep, 2021
Zorzi M et al, Gut, 2022

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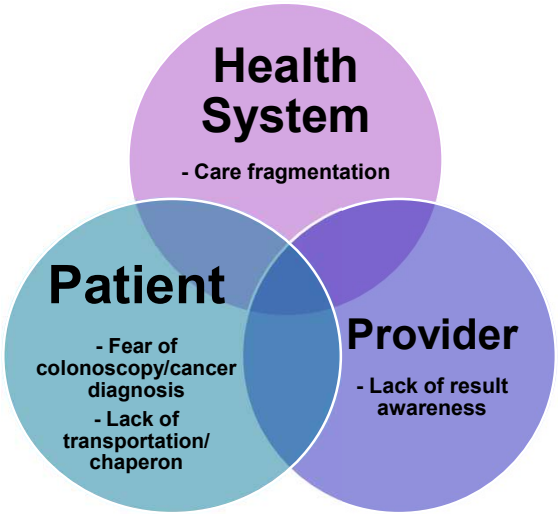
Common themes from patients, providers & electronic records



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Issaka RB et al. JAMA Net Open. 2021
Coronado CD et al. BMC Gastro, 2021
Issaka RB et al, Prev. Med Reports, 2022

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Navigation

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Systematic Review

13 studies included

All used **patient navigation** as a stand-alone intervention or within an organized CRC screening program

Three studies reported on the effect of the intervention compared to a control group

Navigation was associated with an average increase of **13.6 percentage points** (range 5.0-21.1) in follow-up colonoscopy completion

Issaka RB et al, Gastro, 2024

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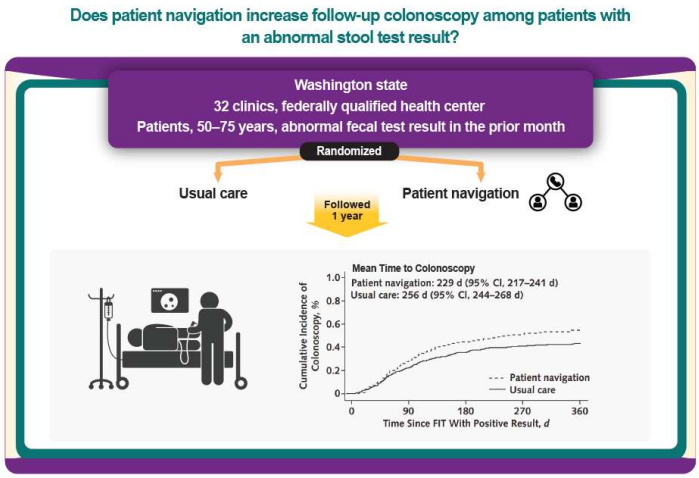
Navigation improved follow-up colonoscopy by 13.0% in FQHC



Coronado GC et al, Ann Int Med, 2025

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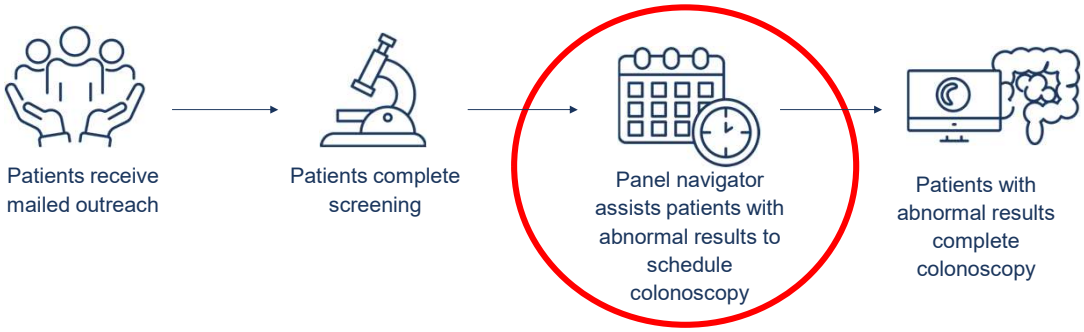
Centralized Mailed FIT + Navigation



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Changes in Navigation

2022	VS	2023
Start outreach 3 months after abnormal result		Start outreach 1 month after abnormal result
No direct scheduling- triage to endoscopy suite schedulers	SCHEDULE	Direct colonoscopy scheduling
Up to 3 contact attempts made		Up to 12 contact attempts made (1x/month for 12 months)

Kimura A et al, Under Review, 2025
Unpublished Data - Do Not Distribute

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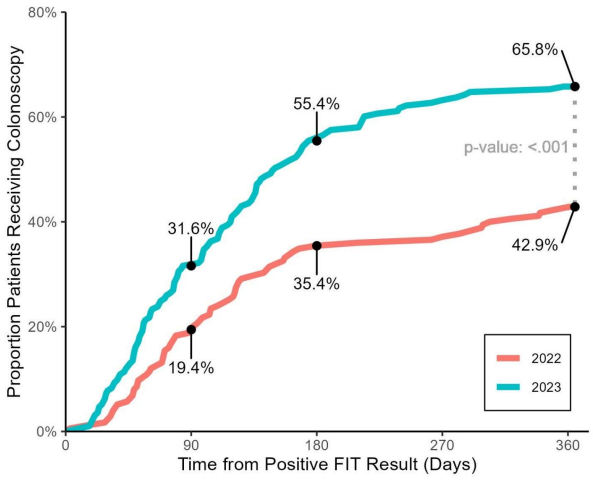
Follow-up colonoscopy outcomes



Kimura A et al, Under Review, 2025
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Video Decision Aid

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Video decision aid to decrease fear of colonoscopy

In a population that requires follow-up after an abnormal non-invasive test result

Fear of colonoscopy is a frequently cited barrier to lack of CRC screening

- Fear/concerns about the bowel preparation
- Fear of procedural pain
- Fear of procedural complications
- Fear of cancer diagnosis

Video decision aids are a potential tool to address this barrier

- Improve knowledge about complicated procedures
- Improve accuracy of risk perceptions
- Decrease decision conflict
- Addressing the above can in turn reduce fear

Basch CH et al. Jnl Comm Hlth. 2016
Ufere NN et al. Clin Gatro & hep. 2022

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Video decision aid to decrease fear of colonoscopy

VIDEO DEVELOPMENT
Study team wrote script, obtained live colonoscopy footage, and produced video decision aid

RECRUITMENT
Eligible participants were contacted, consented, and randomized 1:1 to video or usual care

BASELINE SURVEYS
Participants completed a baseline survey with questions about the primary outcomes

VIDEO DECISION AID
Participants randomized to the intervention viewed the 8-minute video decision aid

POST-VIDEO SURVEYS
Participants randomized to the video completed a post-intervention survey

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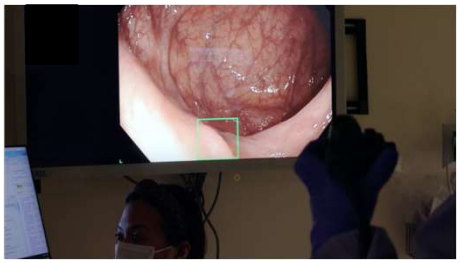
Video decision aid to decrease fear of colonoscopy



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Video decision aid - pilot results

Fear of colonoscopy decreased by an average of **17.7%** across six measures

Survey Question	*Mean Scores*				
Please rate how fearful you are about the following aspects of the colonoscopy procedure. How fearful are you of...*					
	Pre-Video†	**Post-Video†**	**Difference (%)**	**95% CI**	**p-value**
The overall colonoscopy procedure	2.31	2.10	-0.21 (9.1%)	-0.53, 0.12	0.10
The colonoscopy prep	2.34	1.83	-0.52 (22.2%)	-0.92, -1.12	<0.01
The actual colonoscopy procedure	2.33	1.89	-0.44 (18.9%)	-0.76, -0.13	<0.01
The procedure being painful	2.45	1.86	-0.59 (24.1%)	-0.88, -0.29	<0.01
Possible complications from procedure	2.48	2.10	-0.38 (15.3%)	-0.82, 0.06	0.04
Having to tell your family about results	1.86	1.52	-0.34 (18.3%)	-0.65, -0.03	0.02
Overall **Mean Fear Score**:	2.30	1.90	-0.41 (17.7%)	-0.61, -0.22	<0.01
Is thinking about CRC emotionally stressful?	2.14	1.96	-0.18 (8.4%)	-0.33, -0.03	0.01

† Includes the 29 out of 32 patients who completed both the pre- and post-video survey
*5-point scale. 1 = "Not at all Fearful"; 5 = "Extremely Fearful"

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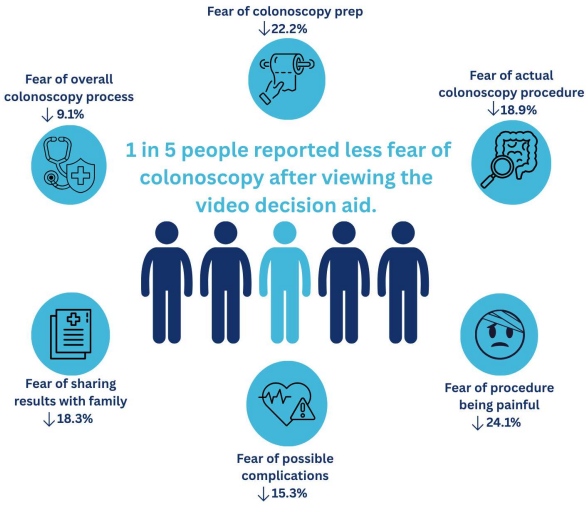
Video decision aid reduced fear across multiple domains



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Next Steps: Improving follow-up colonoscopy completion

NCI R01 Application

- Interventions to improve follow-up colonoscopy completion
  - Are sparse with limited effectiveness
  - Typically, only address a single barrier to care (e.g., provider reminder)
  - Do not address multiple barriers that safety-net patients face
- In addition to our new standard of care (centralized CRC screening across the health system with navigation to follow-up colonoscopy)
  - Layer on interventions deployed at the patient-level that address other identified barriers
    - Video addressing fear of colonoscopy
    - Rideshare Transportation Program

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Conclusions

- Lack of follow-up colonoscopy after abnormal FIT results is inadequate and a persistent problem in CRC prevention.
- There is a significant need for interventions to improve follow-up of abnormal CRC screening tests.
- Navigation improves follow-up of colonoscopy completion, but effect size vary across settings and navigation alone is unlikely to help us achieve the 80% follow-up goal.
- In a pilot study, a video decision aid reduced fear of colonoscopy across multiple domains and should be considered as part of a toolkit for improving follow-up.
- Multi-level and multi-component interventions are likely needed to achieve the goal of reducing cancer mortality and mortality disparities.

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Acknowledgments

Funding Sources

- American College of Gastroenterology
- Fred Hutchinson Cancer Center
- Carl Hansen Family Fund
- NIH/NCI K08 CA241296
- NIH/NCI P30 CA015704
- NIH/NCI P50 CA244432
- Kathryn Surace-Smith Endowment
- UW Medicine

HICOR

- Talor Hopkins, MA
- Michelle Ndugulile

Colorectal Cancer Screening Program

- Nkem Akinsoto, MSc
- Victoria Fang, MD
- Amanda Kimura, MPH
- Adewunmi Nuga, MD, PhD
- Amy Peck, RHIT
- Kaitlin Todd, MS
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- HMC/UW GI nurses and care coordinators
- SolidLine Media

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