An EHR-Embedded Pragmatic Stepped-Wedge Randomized Controlled Trial: Optimizing Care in the Critically Ill by Liberalizing the Target O2 in Mechanically-Ventilated ICU Patients (OCCULT O2)

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Rationale: Occult hypoxemia (OH) occur oxygen saturation via arterial blood gas (SaO2) <88% despite an oxygen saturation via pulse oximetry (SpO2)≥90%. OH is common in patients with darker skin tones and has been associated with higher in-hospital mortality. We designed the OCCULT O2 trial to determine the effectiveness of limiting OH by standardizing an intermediate SpO2 range without increasing duration of mechanical ventilation.

Methods: This is an EHR-embedded, multisite, cluster-randomized, stepped-wedge trial implementing a multimodal educational and EHR order panel intervention aimed at achieving an intermediate oxygen saturation (SpO2 90-96%) compared to the previous standard of care (SpO2 88-94%) in mechanically ventilated adult patients admitted to the Intensive Care Unit (ICU) across a ten-hospital health system. The primary outcome is ventilator free days (VFD30), defined as days alive and not requiring invasive mechanical ventilation (IMV) in 30 days. Secondary outcomes include ICU free days (IFD30), hospital free days (HFD30), and instances of OH. We analyzed primary and secondary outcomes using generalized linear mixed effects modeling frameworks. Results reported as median [IQR] unless noted otherwise. For all analyses, the intervention target range of oxygen saturation (SpO2 90-96%) was compared to the reference standard of care target (SpO2 88-94%). The study arm was included as a fixed effect, while each cluster was modeled as a random effect. The adjusted model controlled for demographic variables, co-morbidities, encounter time and location. The OH model also adjusted for number of arterial blood gases.

Results: We enrolled 3,326 patients between September 15, 2024, and May 31, 2025. 1,351 (41%) were female, 2,317 (70%) self-identified as white, and 270 (8.1%) as black. Age was 63 years [48-73], with a baseline SOFA score of 8 [6-11], and SpO2/FiO2 of 167 [100-240]. Patients received 52 hours [24-121] of IMV, during which SpO2s were modestly increased (mean 96.31% vs 96.10%, Δ SpO2 0.21%, p=0.006), and more patients experienced hyperoxemia (SpO2 >96% when FiO2 >0.21) (95% (1,424) vs. 93% (1,708), p=0.025) in the intervention group. Overall, 327 (9.8%) patients had OH, but OH rates or the proportion with hypoxemia (SpO2 <88% when FiO2 <100%) (51% (938) vs. 52% (778), p=0.7) were not different.

Conclusion: Embedding an EHR order panel intervention to standardize a higher, intermediate SpO2 target range across a 10-hospital health system facilitated successful execution of a cluster-randomized, stepped-wedge trial, but did not change clinically important outcomes, including VFD30. Both the mean SpO2 and hyperoxemia frequency indicate that higher than targeted SpO2s are quite common in clinical care among mechanically ventilated patients at UCHealth. Yet, because raising the SpO2 target did not reduce OH rates, targeting an intervention in real-time while patients are experiencing OH may be more effective.

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The Scientist Avatar: An Interactive Tool to Promote Higher Education within the Aurora Community

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Background: Science and healthcare are progressing at an unprecedented rate, with continual advances shaping both fields. Despite these developments, the demographic representation of students in these fields has shown little change over time. In 2016, for example, historically underrepresented students accounted for only 9% of doctoral degrees awarded in science and engineering (NCSES 2019). This project aims to address this persistent disparity in higher education by seeking to inform and motivate young students to consider higher education and careers in science. The goal of this project is to reduce the disconnect between science and healthcare careers and students in the Aurora, CO community. Through the creation of engaging, low-pressure interactive simulations, we aim to foster greater student interest and confidence in pursuing higher education and careers within science and healthcare fields.

Setting/Population: This project is aimed towards elementary and middle school students attending public schools in the Aurora area. Future iterations of the project will target students of a similar age demographic in other locations.

Methods: We developed an avatar-based approach in which an interactive scientist avatar responds to common questions about their job and the steps required to enter the field. The avatars reflect a range of genders, races, and primary languages, allowing students to choose an avatar they feel comfortable interacting with, and reinforcing the principle that anyone can become a scientist. This fall, the scientist avatar was implemented as part of the ECHO program at a local elementary school, where it was tested by more than thirty students.

Results: Early implementation of the avatar demonstrated positive reception among students in the intended age groups, including elementary and middle school participants. The avatar provides answers to practical questions regarding the role of scientists and pathways into the profession, while also offering a limited set of science-related fun facts and jokes to maintain engagement. Each interaction concludes with a reminder that anyone can become a scientist. Conclusions/Next Directions: Moving forward, we plan to broaden the scope of this model to include additional professions across science and healthcare. We have designed speech pathways for four medical specialties (pulmonology, cardiology, neurology, and surgery) that will introduce students to the experience of becoming a physician. Current efforts are focused on transforming these pathways into fully interactive avatars, which will similarly reflect diversity in gender, race, and primary language spoken.

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A Pragmatic ED-to-Community Medications for Opioid Use Disorder Care Continuum

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Background: Emergency departments (EDs) are an increasingly utilized access point for initiating medications for opioid use disorder (MOUD).

However, evaluating continuity of care after ED-initiated MOUD is challenging, as engagement with non-affiliated community opioid treatment programs (OTPs) is not captured in routinely available electronic health record (EHR) data. This study addresses this gap by evaluating the use of electronic surveys sent to community OTPs as a pragmatic, scalable method for capturing post ED-discharge treatment engagement and retention.

Setting/Population: This program is embedded within the University of Colorado Hospital (UCH) ED and serves adult patients screening positive for opioid use disorder (OUD) via routine ED–based workflows. For patients interested in treatment, ED social workers facilitate “warm handoffs” to community OTP partners prior to ED discharge and document referral location in the EHR. Community OTPs were identified based on historical referral volume and targeted outreach to establish collaboration for follow-up and longitudinal data collection.

Methods: We conducted a retrospective cohort study of UCH ED adult patients from January 1, 2025, to December 31, 2025, who initiated MOUD (buprenorphine or methadone) and/or received referral to a community-based OTP. Eligible encounters were identified via EHR analytics report and validated by the study team. Electronic REDCap surveys were manually configured and scheduled within REDCap by the study team (approximately 5 minutes per patient). They were delivered via email to designated community partner contacts with documentation of patient consent for data sharing at the time of the patient’s clinic intake appointment and at 30, 60, and 90 days following ED referral. Surveys asked about first clinic attendance and ongoing treatment engagement.

Results: Among 472 ED patients who screened positive for OUD, 229 (49%) engaged in care resulting in referral to a community OTP. Of these, 215 patients received ED-initiated buprenorphine or methadone, while 14 patients only requested referral. Overall, 65 (28%) of referred patients attended an intake appointment with a community partner. Among patients who successfully transitioned to community treatment, continued engagement was observed among 50 (77%) patients at 30 days, 40 (62%) at 60 days, and 29 (45%) patients at 90 days. A total of 714 surveys were sent to community OTPs, and 635 were returned (89% response rate).

Conclusions: This study demonstrates that secure REDCap-based protected health information-sharing surveys are feasible and have high completion rates within a decentralized referral network of unaffiliated community providers. Integrating routinely collected ED data with scheduled electronic survey delivery represents a scalable approach to capturing treatment engagement beyond a health system and addresses a critical gap in evaluating real-world continuity of MOUD after ED discharge.

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Depression and Anxiety Disorders Present at Breast Cancer Diagnosis Impact Quality of Life Scores

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Background: Patient reported outcomes (PROs) capture quality of life (QoL) insights throughout breast cancer (BC) treatment and survivorship and are impacted by clinical characteristics like surgery type and adjuvant therapies.

Setting/Population: We examined the impact of preexisting psychiatric diagnoses on BC patients from pre operation through three years post operation, hypothesizing that patients with psychiatric diagnoses would report lower PROs and slower return to baseline. Female BC patients receiving surgery at an academic medical center between June 2019 and July 2025 were invited to join a longitudinal PRO study.

Methods: Participants completed BREAST-Q modules assessing satisfaction with breasts (SwB), psychosocial wellbeing (PsyW), physical wellbeing (PhW), and sexual wellbeing (SxW). Demographic and clinicopathologic data were collected. Retrospective chart review identified preexisting psychiatric diagnoses categorized as depressive, anxiety, substance use, stress, bipolar, and personality disorders. Analyses were limited to participants who completed preoperative and at least one postoperative survey. Bivariate

analyses were performed using chi-square tests or Fisher exact test for categorical variables and Wilcoxon-Mann-Whitney tests for continuous variables.

Results: Of 431 participants, 215 (119 lumpectomy, 96 mastectomy) qualified for inclusion. The prevalence of depressive and anxiety disorders was 27.4% (n=59) and 25.6% (n=55) respectively, with 14.8% (n=32) diagnosed with both. Lumpectomy patients with a psychiatric diagnosis were less likely to be married or in a relationship (55.8% vs 78.9%, p<0.01). Mastectomy patients with a psychiatric diagnosis were more likely to receive adjuvant chemotherapy (57.1% vs 35.8%, p=0.04). There were no other significant differences in demographics. Among lumpectomy patients, both depression and anxiety were associated with significantly lower SwB scores at two years after surgery. Depression was associated with significantly lower PsyW scores at baseline and significantly lower SxW scores from baseline through two years after surgery. Anxiety was associated with significantly higher PhW scores two and three years after surgery. Among mastectomy patients, both depression and anxiety were associated with significantly lower SwB at one and two years after surgery, significantly lower PsyW scores from baseline through survivorship, significantly lower SxW scores at baseline, and no impact on PhW scores.

Conclusions: Preexisting depressive and anxiety disorder diagnoses impact pre and postoperative PROs, although effects vary by time, BREAST-Q domain, and surgery type. Patients undergoing mastectomy with preexisting depressive or anxiety disorders demonstrated more pervasive reduction in multiple BREAST-Q domains compared to those undergoing lumpectomy. These results emphasize the importance of identifying and addressing preexisting psychiatric diagnoses at initial breast cancer intake.

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How Two Projects Complement and Support Parenting People with SUD and SDoH Across Colorado

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Background: High rates of maternal mortality in Colorado and the U.S. disproportionately affect structurally marginalized populations, including people of color, individuals living in poverty, those with lower educational attainment, older birthing people, and those in frontier areas. Substance use disorder (SUD) and untreated behavioral health conditions are key, modifiable contributors to these inequities. In Colorado, an estimated 90% of 174 pregnancy associated deaths from 2016–2020 were deemed preventable and could be averted through interventions at the patient, provider, facility, system, or community level. In response, the Colorado Legislature created a two year pilot program, Integrated Care for Women & Babies (ICWB), to integrate SUD care into obstetric (OB) settings. After the pilot period, ICWB was continued, and a complementary sister program—IMprove Perinatal Access, Coordination & Treatment to Behavioral Health (IMPACT)—was launched to integrate community navigation into perinatal behavioral health and SUD care.

Setting/Population: Since 2020, ICWB has engaged 23 clinics (18 medical clinics and five SUD treatment sites) across Colorado through three cohorts. Since 2023, IMPACT BH has included 11 clinics across seven counties.

Methods: Through practice facilitation, clinics received milestone based guidance, implementation tools, shared learning opportunities, and targeted training based on identified practice needs. All clinics focused on improving universal screening for SUD, behavioral health conditions, and social needs. Clinics also implemented strategies such as contingency management, peer support specialists, and standardized policies for breastfeeding and urine toxicology testing. Organization level outcomes included progress toward evidence based quality

improvement milestones (Milestone Attestation Checklist, MAC). Practices reported participant reach, demographics, and aggregate outcomes (e.g., screening rates, number of births). Descriptive statistics were calculated for organizational and patient level outcomes.

Results: Overall, 14.7% (1,652) screened positive for substance use, with 75.9% screening positive for non opioids. Among those who screened positive for opioids, 77.3% were prescribed medications for opioid use disorder (MOUD). Substantial organizational improvements were observed, with 12–43% increases in MAC milestone completion rates with the greatest gains in data use for tracking progress, and a 20% improvement in MOUD prescribing confidence.

Conclusions: ICWB and IMPACT BH support improved care for pregnant and parenting families with substance use challenges by strengthening screening, integrating non clinical supports, and fostering community collaboration. Additional opportunities include addressing stigma and bias related to SUD and planning for sustainability beyond project support. Overall, these programs enhance clinic and community readiness and demonstrate scalable strategies for broader adoption.

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Community-engaged development and application of a planning guide for sustainment of the Better Asthma Control for Kids (BACK) program

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Background: Sustainment of evidence-based practices in real-world settings remains a key challenge in implementation science. Our Better Asthma Control for Kids (BACK) program is an Asthma Navigator-supported intervention to deliver evidence-based asthma management and care coordination to students with uncontrolled asthma and their caregivers. To inform sustainment planning, we worked with our Community Advisory Board (CAB) members to create a BACK Planning for Sustainment Guide (PSG) to elicit school priorities and guide sustainment strategies.

Setting/Population: School nurses (SNs) in 100 schools across Colorado have been implementing BACK between 2023-2026 in a hybrid implementation-effectiveness trial. In Fall 2025, SNs from 41 schools entered the Sustainment phase, in which schools must decide how they want to sustain the program without fully programmatic funded asthma navigators. Methods: Guided by the Practical, Robust Implementation and Sustainability Model (PRISM) framework, we developed our PSG to capture the school nurse-led team's perspectives on sustaining BACK. First, we iteratively refined the prototype PSG with feedback from a multi-disciplinary working group of regional CABs. Next, a BACK team member attempted to meet with 34 nurses representing ten school districts entering the sustainment phase. In these meetings, nurses specified their preferences for continuing each BACK intervention function included in the PSG - these were aggregated across schools to create district-level profiles.

Results: The final PSG developed included two menus of Sustainment Planning options: Option 1) School health teams sustain BACK with capacity building support from the BACK research team, and Option 2) Continue delivering BACK through 1:1 Asthma Navigator visits with students/families (requires district/regional funding). To apply the PSG, we requested meetings with 34 eligible school nurses: 17 nurses agreed to review the PSG. Among these, 17 nurses (representing 22 schools) expressed interest in sustaining some BACK functions. All 22 schools selected Option 1 due to the lack of district financial means for navigator support. Sustainment priorities included: asthma assessment (100%), 1:1 BACK self-management and asthma education sessions (85%), while only 19% prioritized group BACK asthma education sessions.

Conclusions: This work represents an innovative approach to working with CABs to guide the development and application of a PSG to specify

profiles of sustainment priorities and preferences. The next step will be to work with schools to develop multi-pronged sustainment strategies tailored to these priorities and other PRISM contextual influences.

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Patient and Clinician Strategies to Increase Goals of Care Conversations in Primary Care: A Cluster Randomized Clinical Trial

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Background: Goals of care conversations add value and improve outcomes for patients with serious illnesses. Goals of care conversations involve eliciting patients' values and preferences for current and future medical care with the goal of aligning care with patients' wishes. Patient and clinician barriers limit these conversations in the outpatient setting. Objective: Test whether randomized patient engagement strategies, delivered with clinician implementation strategies, increase documentation of goals of care conversations in primary care.

Methods: Pragmatic, sequential, multiple assignment cluster randomized clinical trial (SMART) in 3 VA health systems. Eligible patients had serious illness and were in the top 10th percentile of risk of hospitalization or death. In Stage 1 (6 months), all clinicians received a brief goals of care conversations training, and their patient panels were randomized as a unit to receive usual care versus mailed PREPARE materials. In Stage 2 (9 months), all clinicians received training to encourage team processes adapted to local context, leadership engagement, and priority patient lists. The patient panels of clinicians who documented <4 goals of care conversations were re-randomized to PREPARE materials versus PREPARE materials plus phone outreach. The primary endpoint was the rate of primary care documentation of a goals of care conversations during Stage 2.

Results: Of 2,307 Stage 2 patients (mean [SD] age 72.5 [9.6] years; 96.4% male), 136 (5.9%) had goals of care documentation by primary care (site 1, 39/1434 [2.7%]; site 2, 87/404 [21.5%]; site 3, 10/469 [2.1%]. 410/2,307 patients (17.8%) had any clinician/setting documentation. Stage 2 documentation did not differ by level of patient engagement based on primary care (adjusted risk difference, 0.016, 95% CI -0.007, 0.053; p=0.25) or any clinician/setting (p=0.47). In Stage 1, 24/2786 (0.9%) had GOCC with primary care, and 278/2786 (10.0%) had any clinician/setting documentation. None of the analyses showed significant differences in documentation for patient-engagement strategies. Site was consistently associated with documentation (p<0.001) as well as age.

Conclusions: In this pragmatic, multisite SMART, sequential patient engagement strategies did not significantly increase outpatient goals of care conversations. Substantial site variation suggested that organizational context may be critical to increasing goals of care conversations for clinician implementation strategies.

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Siblings and Parent Interactions Around Eating and Feeding Behaviors in the Home Food Environment

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Background: While it is common to have siblings in the household, very little is known about sibling eating behaviors and food parenting practices with siblings. It is also unknown whether parents use similar or different feeding practices with siblings based on individual child characteristics such as gender, weight status, or temperament. This is important to investigate to inform the development of family-based nutrition interventions. The main aim of the current study is to describe the variation in eating behaviors and feeding practices within families with siblings and to determine whether these variations depend on individual sibling gender, weight status, or temperament.

Methods: We analyzed a sibling dyad subsample (n=344 siblings from 158 unique families) from an National Institutes of Health (NIH)-funded longitudinal cohort study of families with children in Minnesota from 6 racial/ethnic groups (African American, Native American, Latino/a/e, Somali/Ethiopian, Hmong, and non-Hispanic White). Parents self-reported their feeding practices and child eating behaviors specific to each sibling separately in a survey at baseline and again 18 months later. Differences across siblings were described, and then estimated using within-family regression models.

Results: Two-thirds of families had siblings with different eating behaviors and parents engaged in different feeding practices across siblings in more than half of families. Child eating behaviors differed by sibling gender and weight status, with girl siblings and siblings with overweight/obesity having more unhealthful eating behaviors compared to their counterparts. Food parenting practice differed by sibling gender (unstructured practices), by weight status (pressuring to eat), and by temperament (food restriction).

Conclusions: Given the differences found in sibling eating behaviors and food parenting practices with different siblings, family-based childhood obesity interventions may need to assess for sibling gender, weight status, and temperament when researching the home environment. Findings will inform further research on siblings and set the stage for informing the development of interventions on parental feeding practices and child eating behaviors when there are siblings in the home.

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Understanding Challenges and Opportunities in Neurological Treatment among Resettled Refugees: A Photovoice Approach

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Background: The number of forcibly displaced individuals worldwide has reached record levels due to ongoing wars and human rights violations. Due to experiences of trauma, like torture and interpersonal violence, they have greater vulnerability to poor health outcomes, including neurological conditions. Among U.S.-resettled refugees, the most common neurological conditions are headache disorders, traumatic brain injury, and sleep disorders. This study explores U.S.-resettled refugees' experiences with these conditions to inform adaptation of existing interventions to meet the needs of refugee patient communities.

Setting/Population: Persons with lived experience being resettled as refugees or asylees living in the United States, who spoke English or Spanish, and experience neurological disorders of headache, sleep issues, or history of traumatic brain injury were eligible to participate. Methods: We employed Photovoice, a community-based participatory research method combining participant-led photography and group discussion. Participants use photos and narrative storytelling to reflect on their lived experiences and challenges. We conducted sessions virtually and offered synchronous and asynchronous options. All discussions were recorded, transcribed, and

coded with a mixed inductive/deductive approach. Researchers and community partners with lived experience as refugees developed themes iterative and by consensus.

Results/Discussion: We enrolled 36 English- and Spanish-speaking participants, 6 of whom were terminated due to voluntary withdrawal or lost to follow-up. The final sample included 30 participants, 16 were Spanish-speaking. The average age was 38.8 years (SD 10.5, range 22–67). Most participants were female (n = 19, 63.3%) and represented 19 countries, with 56.7% (n = 17) from Latin America/Caribbean and 20% (n = 6) from Africa. Thematic analysis of photographs, session notes, and transcripts include experiences of social isolation, dismissal of symptoms, workplace challenges, and the role of non-pharmacological and holistic approaches to healing like exercise, faith, and nature.

Conclusions: This project will culminate in online and in-person photo exhibitions in community and academic spaces. The findings will inform adaptations of available evidence-based interventions to improve care and policy recommendations. This project is the first of three phases of a larger parent project aiming to build capacity among refugees participating in neurologic research and to develop peer support for refugees with neurological disorders. An expansion study will also include Arabic speakers in 2026.

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Youth Perspectives on Engagement Processes and Measurement in Youth Advisory Boards for Pragmatic Health Research

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Background: Youth engagement in research can improve its quality and success, yet youth remain underrepresented. Youth Advisory Boards (YABs) offer youth a formal, structured way to contribute to all phases of pediatric health research. Little is known about how youth define meaningful engagement and if YABs utilize practices and processes to foster meaningful engagement. There are no standardized measures to capture and document youth research engagement in YABs. We sought to understand youth perspectives on effective YAB engagement and what youth identify as the best ways to evaluate their engagement.

Setting/Population: Youth ages 10-24 were recruited from active YABs throughout the US. Methods: Participants complete a survey on validated measures (Research Engagement Survey Tool [REST]; Patient Engagement in Research Scale [PEIRS] and the Youth Adult Partnership Rubric [Y-APR]) via REDCap. The survey asks participants to report on their engagement experiences, complete three validated measures, and assess each for use with YABs. Then, each youth participates in a focus group (FG) via Zoom, co-moderated by trained qualitative staff and youth co-investigators. FGs are being conducted Nov 2025 to Jan 2026 and explore perspectives on YAB activities and practices (i.e., orientation, communication, meeting structures, capacity building, research input, etc.) and discussion of the measures. Youth are compensated $25 for survey completion and $50 for FGs. FGs are recorded and transcripts will be coded and analyzed using a practical thematic analysis. Results: 13 of 30 participants completed surveys and FGs to date; recruited participants (n=39) represent 16 states and have mean age of 17 years. Surveys show YAB members vary on whether they agree each tool was easy to understand [REST 53%; PEIRS 100%; Y-APR 92%]. Ratings of how well each measure represented their experience are similar (mean on a 5-point scale: REST 4.21; PEIRS 3.85; Y-APR 4.15). Preliminary FG results show YAB leaders

value a welcoming environment and ensuring everyone feels heard, diverse representation, and orientation and clear roles. Youth wanted to see the value of their perspectives through clear and direct impacts on the research process. Youth stated that the REST measure was confusing and challenging to complete and had a strong preference for the PIERS and Y-APR measures. Specific questions around a supportive environment, using youth feedback, and impact on personal lives were deemed essential to measure youth engagement. Participants were supportive of the surveys and wanted more opportunities to complete evaluations of their YAB experiences and give feedback to leaders. Additional results will be available to present in May. Conclusions: Youth perspectives can help inform best practices for effectively leading and evaluating YABs. This project will continue to refine and test best practices and measurement tools for youth engagement in research.

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Engaging Multilingual Communities to Plan Research in Refugee Women's Mental Health: A Concept Mapping Approach

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Background: Effective strategies for engaging community partners in research planning remain underdeveloped, particularly when language differences add complexity. In a study comparing engagement methods in underrepresented communities, we implemented Concept Mapping, an approach for collaboratively generating and prioritizing ideas, with a multilingual community group to develop a shared understand and priorities for intervention on refugee women's mental health.

Setting/Population: 19 former refugee women from Somalia, Sudan, and Afghanistan were engaged. They spoke Arabic, Dari, English, Pashto and Somali and had varied education and literacy.

Methods: Participants generated 219 statements related to their definitions of, experiences with, and barriers and challenges with mental health and healthcare. Facilitators consolidated to 99 statements, which were translated in Arabic, Dari, Somali and Pashto. Participants rated statements on feasibility and importance for intervention (scale 1-5) and sorted into categories. Data were cleaned and formatted for R-CMAP, an open-source software for Group Concept Mapping. Using R-CMAP, we produced a multidimensional scaling point map and tested cluster solutions ranging from two to six clusters. Models provided visual and statistical representations of conceptual groupings and informed interpretation of thematic structures. Descriptive statistics for feasibility and importance ratings were calculated. Cluster solutions were reviewed for suitability and presented to the community group for review and interpretation.

Results: Importance ratings showed little variability (M=4.55, SD = .79), with most statements rated very important. Feasibility ratings were more variable (M=2.16, SD =1.34), with implications for research study planning. Visual inspection of elbow plots and polygon maps suggested a 4-6 cluster solution; qualitative review favored a five-cluster model. The community group discussed and named clusters: 1) Emotional and Mental Wellness, 2) Adjustment After Resettlement, 3) Cultural and Structural Factors in Getting Care, 4) Opportunities and Challenges to Support Mental Health, and 5) Stigma, Fear and Misconceptions. The group prioritized 3 areas for intervention: 1) enhancing peer support and

empowerment, 2) improving provider training and cultural understanding, and 3) training mental health providers from immigrant communities.

Conclusions: Concept Mapping is a powerful tool for idea generation and prioritization in community-engaged research planning. Despite multilingual implementation challenges, R-CMAP enabled a robust and interpretable solution, supporting inclusive engagement and practical prioritization. While Concept Mapping requires complex statistical modeling, accessible platforms, such as R-CMAP, are available for researchers with minimal to intermediate analytic experience. Results will inform additional engagement to plan research grounded in community experiences.

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A 'Modular' Approach to Group Model Building: The iHOUSE Advisory Pool

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Background: Group Model Building (GMB) has played an integral role in modelling the impact of social systems on health outcomes and identifying barriers to health services access. Conducting GMB with community can help account for diverse personal experiences and incorporate insight into the experiences of communities that might otherwise be missed while developing simulation models. Historically, GMB processes have been applied in intensive, small-group formats over short periods of time. Rapidly changing contexts and highly complex systems such as housing insecurity and homelessness require a more iterative model of building process to account for the heterogeneity of experiences. For the Improving Health and Housing Outcomes through a Simulation and Economic (iHOUSE) Model - an agent-based model of the homelessness continuum in Denver among people with HIV and /or substance use disorders - we developed a 'modular' method of GMB to identify and engage a comprehensive Advisory Pool (AP).

Setting/Population: We sought to engage a multisectoral, multidisciplinary pool of advisors involved in housing and homelessness services and policy from the Denver Metro area.

Methods: The modeling team identified seven areas for stakeholder input (i.e., input opportunities) and matched each with a corresponding engagement activity. We solicited referrals from study team members, local and national experts in housing/homelessness, and state and city leaders (n=18). Each referral included a brief description of expertise so that they could be matched to input opportunities. AP members were invited by email to the AP and then to their matched input opportunities between Dec 2025 and June 2026. Summaries of input and direct impact on the iHOUSE Model are reported to the AP between engagement events.

Results: Input opportunities and activities include defining archetypes of housing (card sort), non-health outcomes (graphs over time), model face validity (group discussion), special populations (group discussion), policy levers (power mapping), data sufficiency (group discussion) and model translation (What? So What? Now What?). We identified and included 122 stakeholders in the iHOUSE AP. AP members included policymakers and their staff at the state and local level, government agency staff, program directors, housing development organizations, and direct client services staff. In Dec 2025, we engaged 13 AP members who are housing services and local government staff and used a card sorting method to understand how housing types are organized in Denver. Additional engagement activities are scheduled for Spring 2026. Outputs and impacts on the model will be presented at COPRH Con.

Conclusions: The GMB process can be conducted flexibly in a modular approach to engage a broader set of stakeholder partners,

iterate on developing simulation models, and increase stakeholder buy-in for models to inform policy and practice in the real-world.

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Adapting a Pragmatic, EMR-embedded Clinical Trial of Prostrate Cancer Patients to Enhance Enrollment

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Background: PragMet is a pragmatic, adaptive trial evaluating the feasibility of enrolling patients with prostate cancer into a randomized interventional study of Metformin using electronic medical record(EMR)-embedded strategies across a multi-hospital system. The primary endpoint was the feasibility of enrollment, defined as 200 patients on intervention within 2 years. After the first year of accrual (starting October 2022), enrollment slowed, prompting the introduction of targeted strategies in March 2025 to engage patients and providers and enhance accrual. Additionally, protocol was amended in January 2025 to update primary endpoint to enrolling 100 subjects in 4 years.

Setting/Population: UCHealth is a large, integrated health system that supports EMR-embedded trials. 40 sub-investigators across three geographic regions of UCHealth (Metro Denver, Northern/Southern Colorado) use a shared Epic instance with access to common tools. Patients with prostate cancer who are at risk for diabetes are identified through Epic parameters (e.g. ICD codes, medications, labs). Potentially eligible patients are offered a consent form in the patient portal before study providers confirm eligibility.

Methods: The intervention focused on bilateral engagement with patients and providers, integrating classical research techniques within an EMR-embedded framework. Research coordinators contacted potential participants to facilitate the consent process and prompted providers on study-related tasks for upcoming visits with consented patients. This aims to increase interaction with real time pop-up Epic Our Practice Advisories (OPAs) for study procedures.

Results: Following the intervention, the proportion of enrolled patients among those who signed a treatment consent increased by 8.1 percentage points from 31.2% to 39.3%. Total monthly accrual increased from 1.2 to 3.4 enrollments per month. Productive OPA interactions (e.g. ordering eligibility labs, ordering metformin, or marking patients as eligible or withdrawn rather than deferring or cancelling the advisory) increased from 24.3% to 34.2%, regardless of enrollment outcome. Overall enrollments increased from 34 to 66 participants from March 2025 through the end of December 2025 (~9 months).

Conclusions: A hybrid approach combining pragmatic, EMR-based trial operations with traditional research strategies improved accrual. Pragmatic, EMR-embedded trials are nuanced and require flexibility and a willingness to pilot and refine processes. An intensive review of trial processes was conducted to determine barriers to enrollment. The study team implemented changes that preserved the pragmatic nature of the trial while addressing barriers to enrollment. Translating traditional clinical trial approaches into automated, EMR-embedded electronic formats depends on broad institutional buy-in, and may require tailored solutions based on patient population, provider relationship, and invasiveness of the intervention.

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An Evidence-Oriented Evaluation of the Care Standards for Pediatric Cleft Lip and Palate Management

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Background: Recent state policy shifts and new recommendations by the American Law Institute (ALI) indicate a transition from custom-based medicine to evidence-based practice as the burden of proof in future medicolegal work and litigation. At this time, there is varying evidence strength for many guidelines used to treat children with craniofacial conditions such as cleft lip and cleft palate.

Setting/Population: We chose to analyze the implementation of craniofacial standards across the largest American Craniofacial Surgical Centers. Six institutions were selected for deeper analysis and comparison to recent ACPA guidelines.

Methods: The 2024 ACPA guidelines were compared across a literature search that prioritized the highest grades of evidence for each recommendation category. Ultimately, 29 articles were used to rank the evidence tiers of major ACPA guidelines. Six institutions with the highest craniofacial patient load were evaluated and compared to ACPA recommendations and the medicolegal requirements in their respective states. Special care was taken to identify themes indicative of a custom-based or evidence-based legal standard.

Results: Among the ACPA guidelines, we found that the recommended timings and protocols for cleft palate repairs were backed by high-tier evidence composed of systematic reviews and peer-reviewed RCTs (Tier I Evidence). However, submucous cleft palate management, feeding schedules, and the protocolization of multidisciplinary teams for craniofacial patients were based on expert opinion or literature that had since been retracted (Tier II/III Evidence). Our investigation found findings consistent with updates from the ALI; all six of the states examined incorporated some degree of evidence-based medicine into their medicolegal terminology. Comparison of the nation's largest craniofacial centers with ACPA recommendations showed frequent incorporation of guidelines supported by low-quality evidence.

Conclusions: Cleft lip and palate are the most prevalent craniofacial conditions in pediatric populations. Evidence based research must continue to be pursued and incorporated into national craniofacial guidelines, particularly to inform multidisciplinary care and follow-up for these populations. Higher evidence levels in guideline creation will lead to stronger, more timely patient care upon dissemination to regional craniofacial centers.

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Designing Precision Feedback for Screening and Referral of Health-Related Social Needs in Pediatric Primary Care

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Background: Identifying and addressing health-related social needs (HRSN) in pediatric primary care can be essential for enhancing lifetime health factors for children across the developmental span. However, pediatric primary care teams lack feedback about their HRSN screening and referral practices to inform improvement efforts. Precision feedback can help close the referral loop by automating the prioritization of coaching and appreciation feedback messages adapted to clinicians' information needs and preferences. With the goal of providing precision feedback, we designed a system for pediatric primary care professionals to improve HRSN screening and referral.

Setting/Population: Our study involved general pediatricians and clinical social workers practicing in pediatric primary care settings. Participants were recruited from diverse healthcare settings across the U.S. that routinely screen for and refer patients for HRSN, including academic medical centers, patient-centered medical homes, federally qualified health centers, and freestanding pediatric clinics.

Methods: In a human-centered design process, we conducted field observations and semi-structured online interviews to understand clinical contexts and healthcare professionals' information needs and preferences. We performed a hybrid inductive-deductive thematic analysis to identify design requirements for precision feedback. Next, we iteratively developed prototype feedback messages to meet the design requirements. Finally, we conducted mixed-methods online think-aloud usability testing with scenario comparisons for the messages, guided by the Technology Acceptance Model and the Usability Perception Scale.

Results: We observed workflows in 3 pediatric clinics and interviewed 17 pediatricians and 7 clinical social workers. We developed 38 design requirements across 6 information domains: message content, performance levels, comparisons, time intervals and trends, feedback delivery, and feedback recipients. We then developed 12 coaching and 8 appreciation messages for use with the measures. Each message was specified with compatible quality measures, comparators, and visual displays. Lastly, we conducted 2 rounds of message usability testing, each with 3 pediatricians and 3 social workers, assessing 4 usability aspects: ease of use (mean 4.4/5), usefulness (mean 4.5/5), attitude toward using (mean 4.6/5), and behavioral intention to use (mean 4.3/5). Qualitative results showed strong usability but highlighted the need for numeracy-friendly feedback containing specific, actionable recommendations.

Conclusions: Pediatric primary care professionals have diverse information needs and preferences that one-size-fits-all feedback may not satisfy. Precision feedback messages we designed were perceived to be acceptable, usable, and useful. Based on the findings, we are assessing the technical feasibility of a precision feedback system for HRSN screening and referral to pediatric clinics.

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Financial toxicity in patients with CLL and lymphoma based on initial management strategy: A cross-sectional analysis of patient-reported outcomes from the BISON-PRO Quality of Life Study

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Background: Emerging novel treatment strategies for chronic lymphocytic leukemia (CLL) and lymphomas have prolonged patient survival. However, novel therapeutic paradigms may be associated with greater financial hardship, or "financial toxicity" (FT), and worse health-related

quality of life (HRQoL). There is a lack of data regarding FT in real-world patients diagnosed with lymphoma, and measuring patient-reported FT in these patient cohorts may guide pragmatic interventions to improve financial wellbeing.

Setting/Population: We performed a cross-sectional study of adults with CLL and lymphoma enrolled in the Blood Disorder Symptomatology Outcomes Network - Patient Reported Outcomes (BISON-PRO) Quality of Life Study. Patients who are seen for an initial consultation in the University of Colorado lymphoma clinics are prospectively approached for enrollment.

Methods: The following baseline patient-reported outcomes (PRO) surveys are completed by patients after enrollment: FACT-LEU for CLL / FACT-LYM for lymphoma, PROMIS Global Health 10 and Profile 29+2, and FACIT-COST for FT. Patients were stratified based on initial management strategy: active surveillance, cellular therapies and active systemic/radiation therapy. Patients were additionally stratified based on receipt of previous therapy. Welch's t-test was used to compare FT and various HRQoL domains. One-way ANOVA was used to compare FT and HRQoL between the three management strategy cohorts.

Results: 152 patients were included: median age 64.7 years (22-91), 44% female, 89% White, 4% Black, 3% Asian, 5% Hispanic/Latino. Planned initial management strategy was 51% systemic/radiation therapy, 39% active surveillance, and 10% cellular therapies. Patients planned to receive cellular therapies had higher mean FACIT-COST scores. [F(2,149)=5.16, p=.0068; active surveillance mean=18.5   4.1, cellular therapies mean=23.3   5.1, systemic/radiation therapy mean=18.9   6.0]. There were no differences in FACIT-COST scores based on receipt of previous therapy [p=0.655; prior treatment mean=19.4   5.8, no prior treatment mean=19.0   5.1].

Conclusions: In this cross-sectional analysis of baseline FT in patients with CLL/lymphoma with different initial management strategies, patients planned to receive cellular therapies had less FT and better financial wellbeing as compared to patients planned for active surveillance or active systemic/radiation therapies. In addition, patients with no prior therapy had no difference in FT as compared to patients who had been previously treated. Of note, patients planned for active surveillance and systemic/radiation therapies had similar mean FT scores. These data indicate that untreated patients with CLL/lymphoma may be vulnerable to the same factors that worsen FT for patients receiving active therapies, and further study to assess these potential FT drivers (such as lost wages due to missed work, costs of frequent health care appointments, or travel costs) is warranted.

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Procedure Type Impacting Perioperative Harm: Analysis of a Nationwide Database

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Introduction: Since the initial implementation of the VA-NSQIP in 1994, the adoption of similar national quality improvement databases has enabled hospitals to reduce morbidity and mortality associated with specific surgical procedures and patient populations. Prior research has established that surgical complications contribute to adverse outcomes for both patients and healthcare systems. However, the overall incidence of perioperative harm remains inadequately defined as previous studies have not encompassed a population sufficiently large enough to yield reliable estimates. To better understand the extent of perioperative harm, this study analyzed the Vizient Clinical Database (CDB) to quantify the overall incidence of perioperative harm at a national level.

Methods: This was a retrospective review of the Vizient CDB including all patients ≥18 years old who underwent an operative procedure in fiscal year 2023. Twenty-five surgical procedure types were first categorized as either elective or non-elective cases. Next, using Vizient's 37 categories of harm, the incidence of perioperative harm was

assessed based on surgical procedure type. Peri-operative harm included records of harm recorded during the pre-operative, peri-operative, and post-operative periods not previously associated with a patient's diagnosis in the CDB prior to their surgical procedure (i.e. sepsis, shock, hemorrhage, etc.). Descriptive statistics were utilized and a univariable statistical analysis was conducted.

Results: A total of 2,615,511 patients were extracted from the Vizient CDB for inclusion in this analysis. Among these, 613,807 (23.4%) patients experienced episodes of perioperative harm, with a cumulative total of 1,636,787 recorded incidents of harm. Notably, transplant and cardiac surgeries exhibited the highest incidence of peri-operative harm, with 68.7% and 51.0% respectively. For transplant surgery, non-elective cases demonstrated a harm incidence of 73.9% compared to 55.6% for elective cases. For cardiac surgery, non-elective cases had a harm incidence of 45.8% while elective cases had an incidence of 58.7%. The adjusted odds ratio for the incidence of perioperative harm was found to be 8.81 (95% CI: 8.60-9.01) for transplant surgery and 4.40 (95% CI: 4.35-4.45) for cardiac surgery, in comparison to non-specialized general surgery cases.

Conclusion: This analysis of the Vizient CDB provides the most comprehensive overview of perioperative harm incidence across various surgical specialties to date. A substantial proportion of patients, 1 in 4, experience harm, highlighting the ongoing need for quality improvement initiatives to understand the root cause of harm and the importance of targeted interventions to mitigate complications in high-risk surgical subspecialties.

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MedED: A tool to improve patient interpretation and perceived understanding of a sample mammography report

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Introduction: Immediate patient access to radiology, pathology, and laboratory results through their health portal increases the accessibility of health information. Prior research suggests that complex medical terminology may limit patients' interpretation of their results and contribute to increased anxiety, including in breast care and terminology used in breast pathology and radiology reports. To better support patient understanding of their mammogram report, a novel Google Chrome extension (MedEd) was developed and found to be acceptable to patients in prior research conducted by our team; however it is unknown if the use of this tool improves patients' ability to interpret their results. This study aims to assess the impact of MedEd on a patient's perceived comprehension of a mammogram report.

Methods: Female patients seen for a screening mammogram between May 2023 to August 2023 were invited to participate in a semi-structured interview that assessed experiences interpreting a sample mammography report of BIRADS 5 and their perception of the report with and without MedEd. The first three interviews were conducted as a team (MGH/DC, AL/DC) and the remaining were conducted by a single interviewer (DC). All interviews were transcribed verbatim by a single interviewer (DC). Two researchers (DC, AL) independently coded interviews for thematic elements using Dedoose software.

Results: Fourteen (14) patients completed semi-structured interviews and three thematic areas were identified. Table 1 demonstrates these major themes and corresponding codes. Most patients described a partial understanding of the mammogram report which was limited by medical terminology in the report, along with abbreviations and metric measurements. After using MedEd, most patients described improved perceived comprehension of the report's contents and had

positive reactions to the tool, including that it could help reduce anxiety and confirm terminology definitions. Some patients noted accessibility limitations in the tool's functionality, including requiring a specific browser for use. Some patients highlighted the continued desire for provider consultation for further discussions about report contents, but indicated MedEd can bridge the time gap between result release and consultation, aid in creating structured questions to bring to the consultation or help answer remaining questions about their report after consultation. Some patients noted that the information provided in the tool is overwhelming and were left with confusion on next steps in treatment and how the report's contents related to their health.

Conclusion: The immediate release of medical reports can promote patient autonomy but can also increase anxiety and confusion as patients interpret their health information before provider support is available. MedEd improved most patients' perceived interpretation of a sample mammogram report and holds promise in supporting patients following result release.

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Targeting Impact: Identifying, Mitigating, and Reporting the Loss of Generalizable Impact in Health Outcomes Research

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Background: Health outcomes research studies seldom produce their desired impact. In particular, generalizing from a trial is problematic when the settings, staff, and patients participating are not representative of the target population. Expanding upon the CONSORT guidelines, Reach Effectiveness, Adoption, Implementation and Maintenance (RE-AIM), and other research planning/reporting models, our objectives were to: 1) present a framework for conceptualizing issues of trial participation, representativeness, and effectiveness that lead to generalizable impact; 2) provide guidance to identify and mitigate potential drop-offs in generalizable impact in various phases of a research study – such as limited participation; 3) share tools and resources to estimate, record, and report actual drop-offs in a standard, transparent way; and 4) provide a case example using these resources.

Methods: First, we conducted a literature scan to summarize proposed approaches to the planning, implementation, and evaluation of generalizable impact (participation, representativeness, and effectiveness) across studies – including the RE-AIM cascade of drop-offs in impact. Next, based on the literature scan, we detailed issues involved across distinct stages of intervention research (e.g. pilot, efficacy, pragmatic). We then developed tools for researchers to proactively and retrospectively identify, address and report on design decisions that influence generalizable impact. Prototype tools were refined iteratively with input from a user-centered design firm, a think-aloud session with post-doctoral health researchers and their mentors, and reactions to tools from attendees at an implementation science conference.

Results: Participation and representativeness are influenced by several factors, including multi-level partners (e.g. community, health system, clinic, staff, and patient), inclusion and exclusion criteria and recruitment methods. Key factors influencing

effectiveness are intervention intensity and comprehensiveness, fidelity of delivery, participant engagement, and tailoring to context and participants. To address generalizable impact, we developed three tools including 1) a revised RE-AIM Cascade Tracking worksheet, 2) an updated version of the expanded CONSORT, and 3) a prototype of the Loss of Generable Impact Calculator for Planning and Reporting Participation, Representativeness, and Effectiveness (LOGIC-PRePaRE) worksheet. The former two are available as fillable PDFs and the third as an Excel spreadsheet. These resources address multiple steps in trials that often reduce generalizable impact, allowing researchers to identify and mitigate drop-offs proactively and to report actual drop-offs transparently. A use case of the My Own Health Report (MOHR) trial in Colorado illustrates these issues.

Conclusions: This work provides tools grounded in the RE-AIM framework to address generalizable impact and to transparently report on these issues.

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Co-Designing eGAPcare: Multidisciplinary Stakeholder Perspectives to Inform a Telehealth Fall Prevention Protocol

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Background: Falls are the leading cause of fatal and nonfatal injuries among adults aged ≥65, with 14 million adults reporting a fall annually. A randomized clinical trial of the Geriatric Acute and Post-Acute Fall Prevention (GAPcare) intervention showed that we can reduce fall-related emergency department (ED) visits by 66% compared to usual care without increasing ED length of stay and with high patient and caregiver satisfaction. However, GAPcare relies on in-person pharmacists and physical therapists (PTs), potentially reducing scalability. To address this, we developed eGAPcare, a telehealth adaptation of GAPcare that could be deployed at smaller EDs that are not staffed with local pharmacists and PTs. We held 3 multidisciplinary workgroups to co-design the final protocol and enhance its feasibility and safety. Our objective was to qualitatively summarize insights from these sessions.

Setting/Population: We held 3 workgroups from September-October 2025 with community dwelling older adults, healthcare workers, and research staff. Workgroup 1 (virtual) included healthcare workers and research staff only. Workgroups 2 and 3 (hybrid) included all parties. Hybrid sessions were offered by Zoom and at the Medical Center of the Rockies.

Methods: Workgroup 1 focused on patient experience using guiding principles: teamwork, empathy, safety, and ease. Participants discussed in small groups before sharing insights collectively. Workgroup 2 used hypothetical patient scenarios to identify protocol gaps and inform training, addressing complex ED presentations, caregiver reluctance, ethical considerations, and patients lacking primary care providers (PCPs). Workgroup 3 simulated an eGAPcare recruitment session in an older ED patient presenting with a fall, including approach, consent, and telehealth pharmacy/PT consultation. We used Zoom recordings and staff notes to summarize findings and protocol modifications.

Results: Key protocol changes included (1) refined procedures to enable patients to more easily use the iPad for the intervention; (2) notifying ED clinicians when patients lack a PCP to connect them to resources. Additional recommendations included: (1) destigmatizing falls using "slips and trips" and emphasizing that falls can occur at any age; (2) replacing the use of "elderly" during the approach with "older adult"; (3) ensuring staff competency with telehealth-specific safety measures (e.g. gait belt use); and (4)

creating a visual flowchart of intervention steps for patients and clinicians to enhance comprehension of the complex intervention.

Conclusions: Engaging stakeholders through structured workgroups was critical for adapting an in-person intervention to telehealth. Input informed protocol modifications that enhanced feasibility, safety, and patient experience, laying the groundwork for successful implementation and broader adoption of eGAPcare. Future work will report formal themes from qualitative analysis of workgroup meetings.

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Patient, Caregiver, and Nurse Perspectives of the ALERT-ED Intervention: A Digital Fall Prevention Tool for ED Patients

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Background: Falls are the leading cause of injury and death in older adults. Emergency departments (EDs) often screen for fall risk, but many patients are not informed or referred to fall prevention resources. Digital tools could improve this, but only if designed with user engagement. This qualitative study evaluated the perceived feasibility, acceptability, and usability of a novel intervention, Awareness and Linkage to Resources for At-Risk ED Patients (ALERT-ED), which is a digital tool that notifies patients at-risk for falls in their after-visit summary (AVS) and connects them to fall prevention resources via an Artificial Intelligent (AI) chatbot named Livi.

Setting/Population: This study was conducted at a large, academic-level I trauma center and community EDs within the same health system.

Methods: We conducted semi-structured interviews in English and Spanish from March to October 2025. We recruited patients aged ≥65 and their designated adult caregivers during the ED visit, while ED nurses were recruited via email and word of mouth. We created an interview guide informed by prior research on end-user prototype testing, study team expertise, and pilot interview feedback. Interviews were audio-recorded, transcribed using a HIPAA-compliant AI tool, and de-identified. We used rapid qualitative analysis in which summaries of the data were entered into a matrix to enable direct comparisons across participants within their groups (patients, caregivers, nurses). Codes were developed deductively from the interview guides and inductively throughout the coding process. Themes and subthemes were refined through team consensus.

Results: We interviewed 11 patients, 4 caregivers, and 7 nurses, identifying 5 key themes: (1) Nurses emphasized that feasibility will depend on engaging frontline nurses to draw attention to the AVS and sufficiently engage patients at the point of care; (2) Patient and caregiver acceptance of the AI tool was dependent on trust, readability, and personalization; (3) Privacy concerns and skepticism about AI exist among patients and caregivers; (4) Usability was enhanced by easy access to the tool without password barriers; (5) Accessibility challenges may exist for those with sensory or motor impairments, and limited digital literacy, but caregiver support would increase engagement and accessibility.

Conclusion: The ALERT-ED intervention is perceived as acceptable and usable among ED patients, caregivers, and nurses, while feasibility is dependent on nurse engagement. Successful adoption will require practical implementation strategies that align with clinical workflows and caregiver involvement. Feedback will help inform a future pragmatic trial of the intervention among ED patients at risk for falls.

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Background: Health outcomes research studies seldom produce their desired impact. In particular, generalizing from a trial is problematic when the settings, staff, and patients participating are not representative of the target population. Expanding upon the CONSORT guidelines, Reach Effectiveness, Adoption, Implementation and Maintenance (RE-AIM), and other research planning/reporting models, our objectives were to: 1) present a framework for conceptualizing issues of trial participation, representativeness, and effectiveness that lead to generalizable impact; 2) provide guidance to identify and mitigate potential drop-offs in generalizable impact in various phases of a research study – such as limited participation; 3) share tools and resources to estimate, record, and report actual drop-offs in a standard, transparent way; and 4) provide a case example using these resources.

Methods: First, we conducted a literature scan to summarize proposed approaches to the planning, implementation, and evaluation of generalizable impact (participation, representativeness, and effectiveness) across studies – including the RE-AIM cascade of drop-offs in impact. Next, based on the literature scan, we detailed issues involved across distinct stages of intervention research (e.g. pilot, efficacy, pragmatic). We then developed tools for researchers to proactively and retrospectively identify, address and report on design decisions that influence generalizable impact. Prototype tools were refined iteratively with input from a user-centered design firm, a think-aloud session with post-doctoral health researchers and their mentors, and reactions to tools from attendees at an implementation science conference.

Results: Participation and representativeness are influenced by several factors, including multi-level partners (e.g. community, health system, clinic, staff, and patient), inclusion and exclusion criteria and recruitment methods. Key factors influencing effectiveness are intervention intensity and comprehensiveness, fidelity of delivery, participant engagement, and tailoring to context and participants. To address generalizable impact, we developed three tools including 1) a revised RE-AIM Cascade Tracking worksheet, 2) an updated version of the expanded CONSORT, and 3) a prototype of the Loss of Generable Impact Calculator for Planning and Reporting Participation, Representativeness, and Effectiveness (LOGIC-PRePaRE) worksheet. The former two are available as fillable PDFs and the third as an Excel spreadsheet. These resources address multiple steps in trials that often reduce generalizable impact, allowing researchers to identify and mitigate drop-offs proactively and to report actual drop-offs transparently. A use case of the My Own Health Report (MOHR) trial in Colorado illustrates these issues.

Conclusions: This work provides tools grounded in the RE-AIM framework to address generalizable impact and to transparently report on these issues.

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Surgical Modality Selection in Gallbladder Disease: Utilization of the SACS Score to Guide Robotic Use

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Background: Gallbladder disease is a leading indication for emergency general surgery, yet selection of surgical modality (robotic, laparoscopic, or open cholecystectomy) remains highly variable in clinical practice. Decision-making is particularly challenging in patients with severe inflammation or distorted anatomy, where achieving the critical view of safety may be difficult and risk of conversion or subtotal cholecystectomy is increased. The Severe Acute Cholecystitis Score (SACS) is a validated preoperative risk stratification tool that may predict operative complexity, but its potential role in guiding real-world operative planning and robotic utilization has not been well studied. This pragmatic study evaluates whether SACS can support standardized, evidence-based modality selection in acute care surgery.

Setting/Population: This study includes all adult patients undergoing cholecystectomy by the Trauma and Acute Care Surgery service at University of Colorado Hospital between January 1, 2023 and July 10, 2025. The cohort reflects routine clinical practice across laparoscopic, robotic, and open approaches during a period of expanding robotic adoption.

Methods: We are conducting a retrospective observational study using structured electronic health record data extracted via Health Data Compass and supplemented by manual chart review. Data are stored in a secure REDCap database developed for this project. Variables include patient demographics, operative approach, perioperative outcomes, and intraoperative findings. SACS and Parkland Grading Scale variables are captured through a mix of automated extraction and manual chart review in Epic. A trained team of medical student reviewers performs chart review for abstraction of intraoperative findings not otherwise included in flowsheet/lab data. Planned analyses include descriptive statistics, logistic regression to evaluate associations between SACS and binary outcomes (e.g., subtotal cholecystectomy, conversion to open), and ANOVA to compare continuous outcomes such as operative time.

Results: To date, approximately 80% of 1,191 eligible cases have been reviewed and entered into the study database. Statistical analysis has not yet commenced; analytic support from the CU Center for Innovative Design and Analysis has been secured via an MSA grant. Data collection is expected to be completed by February 2026, with final analyses to follow.

Conclusions: This work-in-progress study leverages real-world clinical data to evaluate the utility of SACS as a decision-support tool for surgical modality selection. By identifying clinically meaningful SACS thresholds associated with operative complexity and outcomes, this study aims to reduce unwarranted variation in care, inform appropriate robotic case selection, and optimize surgical resource utilization in acute cholecystitis.

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Costs of Partner Engagement in Implementation Research: Conceptual, Methodological, and Dissemination Issues

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Background: Multi-level partner engagement (e.g., patients, clinicians, and system leaders) is critical for implementation success and many acknowledge that successful engagement takes both time and resources. However, there has been little attention to the measurement of engagement time and costs to inform decision-making and evaluation efforts. We present a systematic approach to tracking and gathering the costs of multi-level partner engagement in implementation research. We further provide examples and resources to guide others as they design, implement, and evaluate engagement approaches with goals of producing replicable, efficient approaches that have equitable and sustainable impact.

Setting: Four pilot projects funded through a University of Colorado Anschutz Medical Campus research center on rapid and rigorous pragmatic research.

Methods: We developed and refined an engagement tracking tool, using iterative cycles, to document and analyze the planning, implementation, impact, and costs of engagement activities across four different pilot projects funded through a University of Colorado Anschutz Medical Campus research center on rapid and rigorous pragmatic research. Engagement was defined as "involvement of patients and other healthcare stakeholders who are equitable partners, as opposed to research subjects, who leverage their lived experience and expertise to influence research to be more patient centered, relevant, and useful." All project teams were provided support for integrating partner engagement work and documentation into their research. We use these data to estimate the total engagement costs within and across projects and to explore relevant direct and opportunity costs.

Results: Despite common research priorities, engagement guidance, and cost assessment methods, there were substantial differences in engagement costs across the four projects. Total engagement costs ranged from $7,971 to $44,344, with differences due primarily to different incentive structures, number and type of external partners involved in the research, the nature of the intervention, and varying engagement strategies. In all but one project, direct costs accounted for in the project budget (e.g. incentives paid, meeting expenses) exceeded estimated opportunity costs for the partners.

Conclusions: Longitudinal, partner-centered engagement is critical for intervention success and sustainability. However, these efforts require resource investment, such as team and partner time and aligned funds, to support decision-making and high-quality engagement. Empirical assessment of the costs of partner engagement is critical for justifying use of limited resources for engagement, understanding variation in direct and opportunity costs across projects and engagement types, demonstrating the value of pragmatic research that incorporates engagement efforts, and informing intervention replication, scale-up, and sustainability.

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Identifying Breast Cancer Risk In Patients Undergoing Gender-affirming Chest Masculinization Surgery

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Background: Breast cancer risk among transgender and gender-diverse individuals undergoing gender-affirming chest masculinization surgery (GACMS) is poorly defined with limited existing literature. This study aims to characterize risk factors and clinical management in this population.

Methods: A retrospective review of all patients who underwent GACMS at a single academic center was conducted. Variables included demographics, reproductive history, family history of breast cancer, preoperative genetic testing and imaging, International Breast Intervention Study (IBIS) breast cancer risk scores, and final pathology. The primary outcome was prevalence of elevated breast cancer risk, defined as an IBIS score ≥20% (high risk) or 15-19% (intermediate risk). Secondary outcomes included frequency of referrals to genetics and/or breast surgical oncology, and incidence of high-risk or malignant findings on final pathology. Descriptive statistics were calculated using frequencies/percentages for categorical variables and means/standard deviations/ranges for continuous variables. Pearson's correlation was used to evaluate relationships between IBIS score and continuous variables.

Results: Between April 2019 and December 2024, 288 individuals underwent GACMS. The mean age was 26.6 ± 7.4 years and mean BMI was 27.4 ± 6.2 kg/m2. Patients predominantly identified as trans male (n=201, 69.8%) or non-binary (n=87, 30.2%), and most were White (n=212, 73.6%). Ninety-six patients (33.3%) reported a family history of breast cancer, including 87 (30.2%) with either first- (n=13) or second-degree (n=74) relatives. Fifteen underwent pre-operative genetic testing, with three testing positive for pathogenic variants (BRCA2, PALB2, and TP53). Thirty-five patients had preoperative mammography, with one demonstrating high-risk features. IBIS scores were calculable for 80 patients (mean 16.1 ± 5.5, range 6.7 – 39.2). Overall, 45 patients (56.2%) had average risk scores, 19 (23.8%) had intermediate breast cancer risk scores, and 16 (20.0%) had high risk scores. There was no significant relationship between IBIS score and age (Pearson's correlate -0.08, p=0.48), BMI (Pearson's correlate 0.07, p=0.54), or age at first menses (Pearson's correlate -0.19, p=0.09). Eight patients were referred to breast surgical oncology and 15 to genetics; four high-risk patients (4/16, 25.0%) underwent risk-reducing mastectomy with breast surgical oncology. Final pathology was benign in nearly all cases, with one patient diagnosed with intermediate-grade ductal carcinoma in situ.

Conclusion: One-third of patients presenting for GACMS reported a family history of breast cancer, and a subset carried high-risk genetic variants or elevated IBIS scores. Although incidental malignancy was rare, these findings underscore the importance of systematic risk assessment, selective preoperative referrals, and ongoing research to inform screening and management guidelines for these patients pursuing GACMS.

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AI-Assisted Programing in Perioperative Data Collection

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Background: Commercial fitness activity trackers are validated, cost-effective, and well-tolerated tools for capturing important perioperative metrics like physical activity and sleep data. However, because they are intended for consumer use, daily manual data collection in large cohort studies is time-consuming, resource-intensive, and error-prone. To improve data fidelity and reduce research burden, we leveraged Artificial Intelligence (AI)-assisted programming to develop an automated pipeline for data collection and processing.

Methods: Two ongoing prospective studies employing perioperative activity trackers, encompassing eight surgical subspecialties, were identified at a single academic center. Using

ChatGPT code generation tools, we developed a Python program which runs weekly in a secure environment to automate data extraction from Garmin vívofit® 4 and vívoactive® 5 devices. Data is checked at every download for fidelity, consolidated into a dataframe, and uploaded automatically to REDCap databases via secure API tokens, mitigating the risks and burden of manual entry.

Results: Over 110 patients have been enrolled, representing 11,680 patient-days of data. Manual processing for vívofit® 4 devices decreased from 45–60 minutes per patient to 22.9 ± 7.9 seconds with automation (118–157× faster). For vívoactive 5 devices, processing time fell from 2–4 hours to 31.5 ± 3.4 seconds. This equates to at least 105 hours saved and preliminary observations suggest improved transcription accuracy.

Conclusion: Artificial Intelligence-assisted programming drastically improved the efficiency, accuracy, and scope of perioperative data collection. AI provides a foundation for any researcher to deploy advanced coding techniques and data collection methods in an accessible manner. Subsequently, this approach provides the foundation to expand clinical investigations into the relationships between modifiable factors, such as activity, and surgical outcomes in myriad contexts using readily accessible commercial fitness trackers. Although investigators must remain diligent in protecting data privacy and actively implement safeguards in methodologic pipelines, artificial intelligence is helping to transform the world of clinical research.

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Comparing Methods to Engage Hispanic and Latino Families and Providers of Autistic Children in Research

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Background: Autism affects 1 in 31 children in the United States across all racial and ethnic backgrounds. Autism prevalence is higher among Hispanic/Latino (H/L) children (3.30%) compared to non-H/L children (2.77%). Despite this higher prevalence, H/L children experience delays in accessing therapy services, which contribute to developmental delays, reduced quality of life, and increased financial strain for families. Additionally, H/L and other minoritized populations are often not engaged in autism research, limiting the relevance, effectiveness, and equity of existing interventions for diverse communities.

Setting/Population: This study engaged culturally diverse, multilingual stakeholders that included H/L caregivers, autistic adults, occupational therapists, and teachers, representing varied lived, clinical, and educational perspectives in the tri-state area of PA, NJ and DE.

Methods: This mixed-methods study engaged 130 stakeholders (parents, autistic adults, occupational therapists, and teachers) in Design Thinking and Focus Group sessions to evaluate stakeholder engagement in autism research for H/L communities, learn about the challenges in access and use of therapy services, and culturally adapt the Ayres Sensory Integration (ASI)® Intervention. Engagement quality and frequency were assessed using the Stakeholder-Centric Engagement Evaluation (S-CEE) across ten domains.

Results: A total of 130 stakeholders participated in Design Thinking (DT) and Focus Group (FG) sessions, including 77 parents, 8 autistic adults, 12 occupational therapists, and 33 teachers. High levels of engagement were observed across both DT and FG methods, with mean S-CEE scores of 4.0 or higher across all engagement domains. DT sessions demonstrated higher ratings for both how well and how often stakeholders' input was acted upon and for mutual learning (Areas 4 and 5). FG sessions showed comparable engagement, particularly for respect for participants' perspectives (Domain 2, how well) and

transparency and inclusion of diverse viewpoints (Domain 9, how often). Qualitative analysis is underway to identify themes related to barriers and facilitators to service access and use, which are informing the ASI® cultural adaptation processes.

Conclusions: This study demonstrates that high-quality stakeholder engagement can be achieved using both Design Thinking and Focus Group methods to engage the Hispanic/Latino autistic community. Design Thinking enables deeper stakeholder engagement by actively supporting the co-development of actionable solutions, while Focus Groups contribute rich perspectives.

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Using Puppets in Primary Care to Support Positive Family Home Engagement During Infancy

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Background: Research shows that increasing home exposure to positive parenting practices improves child behavior and development, and yet few low-cost, high-reach interventions exist, especially in infancy. Pediatric primary care provides an important venue for embedding such a wide-reaching early developmental and parenting intervention. Our study team has previously used finger puppets to promote infant-directed speech and joint attention in early infancy. In this study, we explored the feasibility and acceptability of introducing hand puppets during infant well visits to promote positive parenting practices.

Setting/Population: This pilot study was conducted at a university-affiliated primary care clinic and included English-speaking families presenting for the 6- or 9-month well visit.

Methods: All caregivers completed an intake survey and were given a puppet and accompanying one-page Power of Positive Parenting handout with examples related to feeding, diaper changes, dressing, bathing, and playing. Caregivers were contacted for a 1-month follow-up telephone survey. Primary outcomes were related to feasibility and acceptability. For secondary outcomes, pre-post changes to caregiver child development knowledge (SPEAK-CAT) and parent-child interactions (BRIGANCE Parent-Child Interaction Scale, BPCIS) were compared using paired t-tests of mean differences.

Results: Of 89 families screened during well visits, 51 (57%) were eligible and 37 (73%) enrolled, including 32 mothers, 4 fathers, and 1 grandmother. Most caregivers (78%) completed follow-up, with a majority of children identified as black (38%) or Hispanic (59%) and on Medicaid (86%). All families used the puppet, with the participating caregiver or another family member using it at least daily (59% and 41%, respectively) or even several times a day (45% and 31%, respectively). A mean of 2.8 (SD 1.2) family members used the puppet, including the mother (97%), father (59%), sibling (62%), grandmother (18%), aunt (7%), uncle (7%), and cousin (4%). Most families (62%) used the accompanying Power of Positive Parenting handout, with almost all families (95%) saying the handout was very/somewhat helpful. Most families said the puppet helped them talk with (69%) and encourage (83%) their child more often, with almost all participants very/somewhat satisfied with the puppet (97%), very/somewhat likely to continue using the puppet (93%), and very/somewhat likely to recommend puppets (100%). Caregivers described several positive experiences using the puppets with their children. For secondary outcomes, there were no significant changes in the pre-post SPEAK-CAT (54.0 vs. 56.5, p=0.7) or BPCIS (31.9 vs. 32.2, p=0.6).

Conclusions: Our Power of Positive Parenting intervention was feasible and acceptable to disseminate through primary care infant well visits with high parental satisfaction. The puppet was especially accessible, with a wide variety of family members using it in the home environment.

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Early Language Promotion Through Public Libraries: A Pilot Implementation Study with High Family Engagement

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Background: Children struggle to catch-up from early language deficits, contributing to critical disparities in school readiness. Public libraries have been identified as an underused community resource for pediatricians to promote early literacy. Over the past decade, we developed PUPPETalk (PUppets to Play, Praise, Educate, and Talk) as a simple, low-cost intervention for clinical and community-based settings using finger puppets to support positive, language-rich caregiver-infant interactions. PUPPETalk costs $1USD and takes 1 minute to deliver. We explored the feasibility and acceptability of introducing PUPPETalk through Denver Public Library (DPL).

Setting/Population: Caregivers with infants under 6 months attending DPL programs
Methods: Library staff in DPL's Early Learning Department completed a 1-hour workshop and delivered PUPPETalk as part of existing early literacy programs to families with infants under 6 months. DPL staff and participating parents completed online surveys at baseline and follow-up. Primary outcomes were feasibility and acceptability. Pre-post changes to DPL staff child development knowledge (SPEAK-CAT) and parent-child interactions (BRIGANCE Parent-Child Interaction Scale, BPCIS) were compared using paired t-tests of mean differences.

Results: Of 9 DPL staff trained, 8 (89%) completed 6-month follow-up. They were a mean age of 43.6 (12.6) years and had worked at DPL for a mean of 8.0 (5.5) years. PUPPETalk was delivered through Baby Storytime, the LENA Start Program, Denver Health Well Visits, and the librarian desk. It took most staff (71%) 1-5 minutes to deliver, with most finding it very/somewhat easy to provide to families (71%) and very/somewhat well-received by families (86%). Almost all staff (88%) were very likely to recommend the program. Staff had no pre-post change in SPEAK-CAT scores (68.5 vs. 70.3, p=0.5). Of 63 families enrolled (61 mothers, 2 fathers), 36 (57%) completed 1-month follow-up. Children were an average age of 4.6 (3.2) months, with most identified as Hispanic (52%) or white (37%). Most (56%) were on Medicaid. All but one family used the puppet, with the mother (29%) or another family member (18%) using it at least daily. A mean of 3.1 (1.8) family members used the puppet, including the mother (100%), father (71%), sibling (31%), grandmother (34%), grandfather (18%), aunt (26%), uncle (14%), and cousin (9%). Most families (67%) said the puppet helped them talk more often with their child, with most very/somewhat satisfied with the puppet (94%), very/somewhat likely to continue using the puppet (86%), and very/somewhat likely to recommend puppets (86%). There was no change in BPCIS pre-post scores (10.9 vs. 10.1, p=0.1).

Conclusions: PUPPETalk was feasible and acceptable to disseminate through existing DPL early literacy programs with high parental and librarian satisfaction. The intervention was especially accessible, with a wide variety of family members using it in the home environment.

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Iterative Prototyping of a Primary Care Referral Process to Cancer Rehabilitation and Exercise Services

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Background: Cancer rehabilitation and exercise services (CaRES) improve physical function and survival. Yet, CaRES remain underutilized by survivors, despite the availability of ≥ 2,000 CaRES nationwide. To date, CaRES referrals have originated primarily from oncologists. Primary care providers (PCPs) are an untapped potential referral source, particularly for older cancer

survivors (≥65 years) who often have long-term PCP relationships. This study aimed to explore multi-level perspectives on primary care referrals to CaRES and to co-create a prototype referral process.

Setting/Population: Interviews were conducted with three groups: 1) older cancer survivors (≥65 years), 2) PCPs across general internal medicine, geriatrics, and family medicine clinics, and 3) directors of CaRES programs within Colorado.

Methods: Individual semi-structured interviews were conducted via Zoom or phone. Semi-structured interview guides were developed with guidance from the Pragmatic Robust Implementation and Sustainability Model (PRISM), to understand factors that could influence PCP referrals to CaRES. Two rounds of iterative feedback on a prototype CaRES referral process were also obtained. Interviews were recorded, transcribed, and deidentified. Transcripts were analyzed using rapid matrix analysis with domains mapped onto PRISM. After the completion of all interviews, the research team distributed the final refined prototype referral process to all participants for member-checking.

Results: PCP-initiated CaRES referrals were acceptable across survivors (n=5), PCPs (n=6), and CaRES directors (n=7). However, PCPs in this study were not aware of CaRES, "…you'd have to make sure that providers are aware of it... I wasn't aware of it," (PCP-3). Two key needs for the referral process were: 1) initial PCP education about CaRES and 2) embedding the referral process into existing workflows. CaRES directors stated successful existing referral processes had been adapted to individual clinics, "We talk about and discuss what their referral process is internally, and how we can fit this referral with what's already going on in their workflow" (Director-11). Iterative feedback on the referral process resulted in a wireframe prototype of a clinical decision support tool for CaRES referrals.

Conclusions: An acceptable PCP-initiated CaRES referral process was iteratively developed with input from cancer survivors, PCPs and CaRES directors, but will require tailoring to individual clinic workflows for successful implementation. PCP-initiated CaRES referrals may expand the reach of CaRES by providing another opportunity, in addition to the oncology care team, for patients to learn about and connect with CaRES. This study's blend of qualitative methods with iterative prototyping allowed for rapid refinement of the prototype referral process. This innovative approach warrants consideration for use in future research, particularly when addressing varied contexts across different settings.

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Implementation of a novel decision aid for early-stage breast cancer patients: a randomized prospective trial

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Introduction: Shared decision making is an increasingly important consideration, especially in early-stage breast cancer (BC) where surgical options have equivalent long term survival. Decisions Aids (DAs) facilitate patient-centered exploration of treatment options and elicitation of preferences. Our group developed a novel decision aid that incorporates longitudinal quality of life projections compared between breast conserving therapy (BCT) and mastectomy.

Methods: Adult female patients with a first-time diagnosis of invasive BC deemed candidates for BCT were recruited to this prospective multi-site study. Participants were stratified by surgeon and randomized 2:1 to receive the novel DA (intervention) versus an established DA listed on the Ottawa registry (control). Outcome measures were collected following initial surgical consultation. Descriptive statistics were reported, and student's two-tailed t tests and chi-square tests were used for continuous and categorical variables, respectively.

Results: To date, 35 eligible patients were contacted, 30 of which agreed to participate (recruitment rate 85.7%). 22 patients were randomized to receive the intervention and 8 were randomized to receive the control. Most patients (72.2%, n=13) reported using the decision aid

prior to clinic. Of patients in the intervention group who completed the Ottawa DA acceptability survey (n=17), 82.4% (n=14) found the length of presentation to be "just right", 75.0% (n=12) reported the amount of information was "just right", and 82.4% (n=14) found the presentation "balanced" with regards to BCT versus mastectomy. 70.6% (n=12) of patients found the DA useful when making their decision about surgery, and the same proportion reported that the DA included "enough information to help a woman decide on surgery for BC". There were no significant differences in decision quality knowledge or process scores between groups. Surgeons reported that 91.7% (n=11) of clinic visits for patients in the intervention group were "about the same" in length compared to non-study initial visits.

Conclusion: Preliminary results suggest this novel DA is feasible to implement and does not increase clinic visit duration. Most patients find the amount and content of information acceptable, and patient-reported decision conflict, self-efficacy, and quality are comparable to the current standard listed in the Ottawa inventory. Recruitment is ongoing and decisional regret will be assessed at 3 and 6 months after surgery.

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Delivering the Right Care at the Right Time in Suicide Prevention

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Background: Youth experiencing suicidal thoughts and behaviors face significant barriers accessing care, including high costs, lack of trained mental health professionals, and long waitlists. Many youth first access care through emergency departments or other pediatric healthcare settings. Yet these settings often lack the resources and supports, contributing to inconsistent screening, limited interventions, and provider uncertainty in managing risk. When youth present in crisis, they are frequently either admitted to inpatient psychiatric hospitalization or discharged home to navigate a mental healthcare system with minimal support.

Setting/Population: To better support youth and pediatric healthcare providers, our team adopted and implemented a rapid access and time-limited program designed for youth experiencing suicidality. Core components include clinical interventions, skills training for youth and caregivers, psychoeducation, lethal means safety counseling, safety planning, medication management, and care coordination. The program is staffed by a multidisciplinary team and delivers evidence-based co-clinician approaches, with established referral pathways from emergency departments, inpatient units, and hospital departments.

Methods: This project will present on early outcomes of the Crisis Clinic among patients receiving services from May 2024 to December 2025. We will evaluate adoption, implementation, and maintenance of the referral and care delivery pathways from the emergency department and inpatient units. Reach will be assessed through demographic, clinical, and referral profiles of participating youth. We will evaluate effectiveness by examining changes in suicidal ideation, broader mental health symptoms, coping strategies, and caregiver- and youth-reported satisfaction from intake through discharge.

Results: We will present findings across RE-AIM domains, including patient-level effectiveness, reach, adoption, and implementation. Analyses are ongoing to characterize the clinic population, examine changes in suicidal ideation and broader mental health symptoms, and assess adoption and use of the structured clinical flowsheet. Since its launch in May 2024, the Crisis Clinic has served over 60 youth and their caregivers, completing an average of 5.1 sessions per case, providing a unique opportunity to evaluate both implementation outcomes and preliminary patient-level effectiveness.

Conclusions: The Crisis Clinic is a feasible and acceptable model for rapid, family-focused, suicide-specific care in pediatric healthcare settings. Early outcomes indicate engagement in care, session completion as intended, and potential reductions in reliance on inpatient hospitalization while facilitating timely transitions to community-based services. Ongoing secondary

data analyses will further clarify the clinic's impact on RE-AIM outcomes, including repeat ED visits, suicidal ideation, coping strategies, and caregiver engagement.

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Integrating Programs to create a Streamlined Practice-based Network to Conduct Research, Innovation, and Practice Improvement in Colorado Primary Care: A CAMPHIRE Story

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Background: Practice-based research networks (PBRN) historically serve as laboratories for primary care, providing real-world settings to answer pragmatic research questions. Practice innovation (PI) programs focus on implementing evidence-based interventions, new models of care, and quality improvement. PBRN and PI programs have typically functioned separately; however, current contexts require new approaches to best meet the needs of those involved and advance pragmatic primary care work.

Setting/Population: The Colorado Ambulatory Partnership for Health Innovation and Research Excellence (CAMPHIRE) was created in 2025 as a novel integrated program comprised of the former Practice Innovation Program (PIP) and State Networks of Colorado Ambulatory Practices & Partners (SNOCAP) practice-based programs, out of the University of Colorado Department of Family Medicine. CAMPHIRE was created to bring practice innovation, research, and statewide partnership development together to best serve primary care and family medicine practices, respond to ever-changing needs of practices and patients, and enhance innovative and collaborative approaches to the success of pragmatic research.

One thousand practices are engaged, with around 49% located in urban/suburban counties, and 51% in rural/frontier counties. Participating practices are spread statewide, allowing populations across Colorado to be represented and impacted by this work. CAMPHIRE also engages community members, patients, practice support organizations, community agencies, state and local public health agencies, and governmental organizations, bringing a diversity of expertise, knowledge, and experiences to its initiatives.

The CAMPHIRE structure includes eight functional teams: Communications, Community Engagement, Data & Analytics, Field Operations for Research & Transformation, Government Relationships, Practice Relationships, Research Design Scientific Leadership & PBRN Methods, and Workforce Development & Medical Education. These teams collaborate to enhance how research and quality improvement work is done and to strengthen practice- and community-based research and innovation in Colorado and beyond.

Results: Currently, CAMPHIRE is working within 31 funded grants or projects, and has 15 proposals accepted for collaboration. Proposal development efforts, supported by newly formed grant-writing groups, are focused on behavioral and mental health in primary care, diabetes technology integration, chronic pain management, and fall prevention, among other topics.

Conclusions: CAMPHIRE is a new model for how practice engagement in research and quality improvement can come together to emphasize real-world solutions and action. Future directions include expanding large-scale projects in response

to community priorities, developing pragmatic clinical trial capacity, and advancing cross-sectoral partnerships.

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Clinical Decision Support Improves HIV Screening & Pre-Exposure Prophylaxis Initiation in the Emergency Department

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Background: The emergency department (ED) is an important setting to identify vulnerable individuals for HIV screening and pre-exposure prophylaxis (PrEP) initiation. EHR-embedded Clinical Decision Support (CDS) is an established implementation strategy with potential to close quality gaps in HIV prevention.

Methods/Setting/Population: Using the REAIM implementation science framework and with AETC technical assistance, we iteratively designed CDS to facilitate nurse HIV screening and provider PrEP initiation in a high-volume urban ED. The Denver HIV Risk Score (DHRS) was used to identify at risk adults for HIV screening and PrEP. Rates of DHRS HIV screening, HIV testing and positivity, and PrEP were compared 4 months pre- and post- CDS implementation.
Results: Between 8/21/2025 and 12/4/2025, 8,067 ED patients (30%) received DHRS screening, as compared to 1,748 patients (5.7%) pre-implementation. 1,454 HIV tests were performed with a 1.3 % positivity rate (vs 1.2% pre-implementation). Of patients testing negative for HIV, 35 were offered PrEP resulting in 2 successful ED initiations (vs 0 pre-implementation), both were linked to care, one remains on PrEP. ED Providers surveyed (n = 29) rated the CDS as acceptable, feasible, and identified opportunities for additional education.

Conclusions: CDS was well received and associated with increased HIV screening and PrEP initiations but identified opportunities for improvement.

Barriers to ED PrEP initiation include low rates of HIV testing among those screened at-risk and low adoption by providers. Next steps include an RN survey and additional provider education. Further research is needed to improve implementation strategies for same day ED PrEP.

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Opioid Use Disorder Treatment in Outpatient Clinical Care – Outreach Efforts in Changing Landscapes

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Background: Opioid use disorder (OUD) treatment is evolving. Limited access to and availability of treatment, changes to policies and regulation of medications for OUD, and fluctuations in the unregulated drug supply, create challenges. Current treatment with medication includes buprenorphine in office-based settings and methadone at outpatient treatment programs (OTPs). A multi-site pragmatic clinical trial aims to compare outcomes for patients randomized to buprenorphine or methadone in an office-based setting. We report on one site's experience with study launch in an integrated health system's substance use disorder program and two outpatient pharmacies.

Setting/Population: Kaiser Permanente Colorado (KPCO) is a site for this trial, with participants who are members of KPCO, aged 18 or older, have a diagnosis of OUD, and are initiating treatment.

Methods: Study launch procedures involved collaborating with operational leadership in behavioral health, nursing, and pharmacy services, training study clinicians and pharmacists, and developing local standard operating procedures to implement the protocol. Outreach includes identifying potential participants seeking

treatment in the Rapid Start Clinic, KPCO's substance use disorder treatment point-of-entry and collaborating with other KPCO departments and the community. Within KPCO, efforts include distributing flyers and postcards, sending emails to KPCO clinicians who see OUD patients, announcing in newsletters and on websites, and meeting with KPCO departments. In the community, efforts include meeting with inpatient treatment facilities, community-based programs, OTPs, and support groups, identifying community advocates, and advertising on Craigslist.

The clinic staff has supported recruitment and research assistants assess eligibility, screen, and randomize if the patient agrees and is eligible. Study clinicians inform participants about their study arm and initiate treatment according to the protocol. Participants are followed for six months with research assistants contacting enrolled participants via text message and phone calls.

Results: To date, we have successfully launched the first clinical trial within the Rapid Start Clinic at KPCO and continue efforts to enhance recruitment and retention.

Conclusions: Collaboration across departments and the support of lead team for this study was instrumental to study launch. Possible stigmatization of methadone, changing patterns in opioid use, chaotic life situations, changing contact information, disruptions of treatment, and lack of transportation to clinic sites acted as barriers to study recruitment and follow-up.

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Advancing the Science of Engagement: Developing guidance for co-creation engagement in research with multi-sectoral partners.

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Background: Active community, patient, and clinical partner engagement is a cornerstone of dissemination and implementation research but there is limited scientific understanding of how engagement works across partner groups, why it is effective, and which multi-sector engagement approaches lead to better outcomes. Co-creation as a partner engagement method strives for active collaboration among all partners. We offer guidance on a co-creation engagement of community, patient, and clinical partners. To illustrate this approach, we present a use case for a digital health intervention: the Colorado My Own Health Report (CO-MOHR), a health-risk assessment and goal-setting patient portal tool for primary care patients.

Setting/Population: This collaboration will inform a planned trial (2026-2028), with primary care clinics, in the PEACHnet practice-based research network in Western Colorado (n=5) and in the UCHealth quaternary care health system (n=9). The partners involved were:
1) Patient advisors recruited in Western Colorado,
2) Patient advisors recruited in UCHealth,
3) UCHealth clinicians and staff, 4) Bilingual community advisors in Aurora, 5) Bilingual community health worker organization (Vuela for Health) in Denver.

Methods: Each partner group has been involved during planning and intervention design, using an iterative process in which their feedback was incorporated by the research team and then reviewed by the partners again. We used co-creation styled semi-structured interviews, workshops, and focus groups to gather input on patient and clinical-facing components of the intervention. Groups were built progressively, and they met separately due to differing availability.

Results: Participants provided feedback on the look, content, and phrasing of patient-facing components of the CO-MOHR 1) patient health assessment questions, answers, and risk score displays; 2) health goals; 3) intervention mobile messages; 4) patient portal section of MOHR; 5) recruitment strategies; 6) a survey, and 7) a consent form. Overall, partner groups #1-3 reported that the questions/answers, risk score displays and health goals were engaging and valued including these as part of a wellness-focused clinic visit. Partner group #4 recommended the following for recruitment messaging: a clear statement of the ask and that resources provided would be free. Partner group

#5 recommended messages to be empathetic – a challenge given the brevity required for in-app notifications.

Conclusions: This project explored a systematic approach to engage multi-sector partners using a co-creation engagement to inform the design, planning, and implementation phases of CO-MOHR – a digital health intervention embedded in clinical care. Each group's input provided opportunities to tailor and integrate with distinct contextual perspectives. For next steps, we will compare the results of the REST Survey, an engagement measure, across our different partner groups.

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Affective Forecasting in Breast Cancer Surgery - Assessing the Accuracy of Patient Predicted Quality of Life After Surgery

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Background: Treatment decisions for breast cancer are complex and often depend on patients' ability to predict their future feelings and quality of life, a process known as affective forecasting. While breast-conserving therapy (BCT) and mastectomy offer similar oncological outcomes for early-stage breast cancer, mastectomy is more invasive, involves a longer recovery, and often requires additional cosmetic procedures. Despite being eligible for BCT, more patients are choosing mastectomy, often due to fear of recurrence and possibly without full awareness of the differences in long-term quality of life (QoL) between procedures. This study aimed to examine how well patients with breast cancer predict future QoL after lumpectomy or mastectomy, with the goal of supporting shared, informed decision-making that aligns with patients' values and optimizes long-term survival.

Setting/Population: Participants were women receiving treatment for breast cancer at a national comprehensive cancer center in the Denver Metro Area between March 2019 – December 2025.

Methods: Two groups of women with stage 0-III breast cancer were surveyed longitudinally across four BREAST-Q survey QoL domains (0-100 scales): (1) satisfaction with breasts, (2) psychosocial well-being, (3) physical well-being, and (4) sexual well-being. The "breast cohort" (N = 202) consisted of women who had already undergone BCT, mastectomy without reconstruction, or mastectomy with reconstruction and reported their actual QoL outcomes at 6 months and 1-year post-surgery. The "affective forecasting cohort" (N = 35) included women who had not yet undergone surgery and were asked to predict their future QoL in these domains at 6 months and 1 year if they underwent breast-conserving therapy (BCT), mastectomy without reconstruction, or mastectomy with reconstruction. Mean QoL scores between the affective forecasting and breast cohorts were compared using two-tailed t-tests across all four domains.

Results: We found no significant difference in the BCT or mastectomy without reconstruction groups between affective forecasting and actual QoL across the four domains at 6-month or 1-year time points. At 6 months, women predicting outcomes for mastectomy with reconstruction overestimated their future satisfaction with breasts (predicted: 63.17 v actual: 48.40, $p = 0.01$). At 1-year women predicting outcomes for mastectomy with reconstruction overestimated their future satisfaction with breasts, psychosocial well-being, and sexual well-being.

Conclusion: Women considering mastectomy with reconstruction may benefit from preoperative counseling that provides a more realistic perspective on QoL outcomes, especially regarding body image, psychosocial well-being, and sexual well-being. Incorporating affective forecasting into pre-surgical discussions may facilitate informed decision-making and align patient expectations with realistic post-surgical experiences.

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Intraoperative Navigation in Orthognathic Surgery: Mitigating Iatrogenic Complications

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Introduction: Orthognathic surgery requires precise manipulation of skeletal structures in close proximity to highly sensitive nerve, vascular, and airway anatomy. Rare iatrogenic injuries including hemorrhage and neurovascular compromise are reported and can have devastating sequelae including stroke, blindness, and death. Established technologies have primarily focused on positional accuracy rather than enhancing patient safety. This review investigates the adoption of intraoperative navigation in orthognathic surgery to reduce the risk of iatrogenic complications.

Setting/Population: This investigation is relevant to any patient undergoing orthognathic surgery for congenital dentofacial abnormalities including Class I-III malocclusion and syndromic conditions including cleft patients, craniofacial microsomia, craniofacial dysostosis syndromes (Crouzon, Apert, Pfeiffer), and Treacher Collins syndrome.

Methods: Following PRISMA guidelines, a systematic search of PubMed, Embase, Web of Science, and Cochrane Library was conducted to identify studies reporting on the application and outcomes of intraoperative navigation in orthognathic surgery. Data were extracted on indications, surgical procedures, navigation technologies, primary purpose for use, and outcomes.

Results: Thirty studies met inclusion criteria, and most were published after 2015 (63.3%). The majority (96.7%) employed navigation to enhance accuracy of skeletal segment positioning; only 6.7% of studies reported use of intraoperative navigation to identify and avoid critical anatomical structures. BrainLab systems were most frequently used (40.0%), followed by Stryker (13.3%) and Aurora/Northern Digital Inc. (10.0%). Extensive evidence across multiple surgical specialties validates the efficacy of intraoperative navigation in reducing injury to critical structures and in limiting blood loss, operative time, and reoperation rates.

Conclusions: This is the first study, to our knowledge, to directly investigate the use of intraoperative navigation in orthognathic surgery specifically to enhance patient safety. Current literature supports intraoperative navigation to enhance accuracy in orthognathic surgery but rarely addresses its potential to mitigate severe iatrogenic complications. Evidence from other surgical disciplines substantiates its role in enhancing safety, underscoring the need for high-level studies focused on complication prevention in orthognathic surgery.

Although navigation has improved the precision of orthognathic surgery, the specialty remains heavily dependent on surgeon experience when operating in close proximity to critical anatomy. By identifying this gap between common practice and available technology, the present review clarifies an urgent opportunity to repurpose navigation as a safety-driven adjunct. Establishing this focus has direct implications for patient safety, guiding technology integration, and shaping future high-level investigations.

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Large language models for rapid qualitative analysis of provider comments within clinical decision support

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Background: Electronic Health Record (EHR) embedded clinical decision support (CDS) is an established implementation strategy shown to increase adoption of evidence-based interventions within routine workflows. Providers commonly enter free text comments within CDS alerts. This qualitative data from end-users has potential to meaningfully improve workflows and CDS value; however, qualitative analyses are uncommon due to time and resource demands. We describe a novel application of AI for rapid qualitative evaluation using free-text comments entered during interaction with a CDS alert, offering a scalable approach to evaluate provider CDS feedback.

Setting/Population: Data was abstracted from EHR for patients seen at a single, large academic emergency department (ED).

Methods: We used ED provider generated free-text from the comment section of an existing medication for opioid use disorder (MOUD) CDS alert to conducted a retrospective, rapid qualitative thematic analysis using a university-approved large language model (LLM; Co-Pilot). The MOUD CDS was implemented at a large, urban academic ED in 2023 and data on user actions, including free-text comments, were abstracted via an EHR analytics report covering the first 24 months of use. We iteratively engineered concise text prompts in collaboration with qualitative experts for LLM-derived thematic analysis of provider comments. To evaluate validity, members of the research team independently conducted manual reviews on a subset of the full dataset.

Results: Among 29,849 CDS alert fires, 19,418 (65%) contained a free-text comment. 10,807 (56%) of comments were categorized as non-useful (placeholders, keyboard mash, meaningless symbols and numbers, etc.). Analysis of the remaining 8,611 comments identified key CDS alert themes: interruptiveness, appropriateness, and timing relative to patient stay and ED workflows. Independent review of AI-generated results confirmed that findings were reasonable and accurately reflected the dataset.

Conclusion: This novel approach to CDS evaluation demonstrates that LLMs can accurately, efficiently and quickly analyze large amounts of provider feedback. AI-assisted qualitative analysis enables rapid, scalable synthesis of provider feedback that would otherwise go unused or require time-intensive manual qualitative methods. Future studies are needed to further examine AI-augmented qualitative methodologies to improve CDS and evaluate the rigor of this form of rapid qualitative analysis.

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Evaluating Immunization Information System Data Use Across Public Health, Policy, and Media Partners

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Background: Recent policy changes affecting vaccine access, alongside reported increases in vaccine hesitancy, have reshaped the roles of state and local public health agencies, nonprofit and policy-focused organizations, and the media in vaccine delivery and communication. Immunization Information Systems (IIS) are uniquely positioned to provide accurate, timely, and actionable immunization data to support their work. However, there is a limited understanding of how diverse partners utilize IIS data in practice. This gap limits the ability to iteratively evaluate, adapt, and refine IIS products in response to stakeholder needs. Public health-academic partnerships provide an opportunity to study the real-world application of data while supporting

continuous improvement of IIS tools. This work-in-progress describes a research-public health partnership with Colorado's IIS to evaluate existing data reporting offerings and understand data needs.

Setting/Population: Local public health agencies (LPHAs), nonprofit and policy-focused organizations (NPOs), and media organizations engaged in immunization-related work in Colorado.

Methods: Focus group discussions with key stakeholders who use, interpret, or report on immunization data in Colorado. Focus groups were organized by stakeholder type. We employed user-centered design elements to guide discussions, including structured review of existing IIS dashboards and reporting products, and elicitation of desired data elements, formats, and use cases.

Results: Six of seven focus groups have been completed. Participants identified concerns about the completeness and accuracy of IIS data, which impact usability, particularly in small counties with variable vaccination provider reporting. Existing dashboards were seen as useful but limited, with participants requesting additional contextual data elements (e.g., Medicaid coverage, ZIP code vs. county). Dashboard maps were valued for identifying potential access gaps, but were perceived as insufficient for distinguishing between access barriers and motivation barriers, such as vaccine hesitancy, which was deemed to by some to be a difficult data point to use. LPHAs emphasized the need to obtain raw or customizable data to support local analysis and reporting, and need for functionality to be easily identified. NPOs identified need for lower data literacy if sharing with constituents. Recruitment of media focus groups is ongoing.

Conclusions: Partnerships between IIS programs and researchers can support the development of more responsive and usable data products, while enabling the time-intensive, iterative evaluation necessary to align IIS offerings with the needs of external partners. Such collaborations may help ensure that IIS data shared with organizations engaged in immunization work are actionable, appropriately contextualized, and feasible to maintain without overburdening IIS staff.

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Translating Vaccine Communication Evidence Into Practice Through a National ECHO Program

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Background: Vaccine hesitancy and misinformation have intensified in recent years, increasing the complexity of pediatric vaccine communication and placing new demands on clinicians. Clinicians report limited formal training to address hesitancy while preserving trust. To rapidly translate evidence on best practices for communicating about vaccines into practice, the American Academy of Pediatrics (AAP) implemented the Communicating about Vaccines ECHO, using the Project ECHO model to deliver scalable, evidence-based communication training to pediatric clinicians nationwide.

Setting/Population: Pediatricians and pediatric care team members from diverse clinical settings across the United States, including academic medical centers, private practices, outpatient clinics, hospitals, and federally qualified health centers.

Methods: The program consisted of three 90-minute virtual ECHO sessions combining brief didactics, interactive polling, interactive small group sessions, role-play, and applied learning assignments. Curriculum content directly reflected formative research findings and emphasized presumptive vaccine recommendations, motivational interviewing (MI) micro-skills, empathy-first framing, myth-response strategies, and navigation of credible vaccine resources. Data sources included registration surveys, real-time session polling, qualitative observations of breakout-rooms, and a post-program evaluation assessing satisfaction, knowledge, confidence, and self-reported practice change.

Results: A total of 240 clinicians registered, and 139 attended at least one session, representing 45 U.S. states and a wide range of professional roles and practice settings. Post-program evaluation demonstrated statistically significant increases in

clinician knowledge and confidence across all measured skills, with the largest gains observed in motivational interviewing (mean confidence increased from 2.7 to 4.1 on a 5-point scale). The adoption of key communication strategies was high, with 89% reporting the use of presumptive recommendations and 100% reporting the use of MI techniques with hesitant families. Observational data documented a shift from rote myth rebuttal toward relationship-centered communication emphasizing empathy, permission-based information sharing, and trust-building. Participants rated the program highly, with nearly three-quarters reporting that it provided greater value than other professional development opportunities.

Conclusions: The AAP Communicating about Vaccines ECHO demonstrates how evidence-based communication practices can be rapidly disseminated and taught at a national scale. This approach provides a replicable model for accelerating evidence-to-practice translation in rapidly evolving national health contexts, particularly when misinformation and policy uncertainty threaten the delivery of care.

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Co-Designing and Implementing Team HPV Vaccine Communication Supports in Rural Primary Care Clinics

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Background: Rural communities experience persistent inequities in HPV vaccination uptake, influenced by parental hesitancy fueled by community-level misinformation and limited communication training for frontline primary care staff such as nurses and medical assistants (MAs). While effective evidence-based vaccine communication strategies exist, their adoption by the entire care team is limited. Implementation strategies tailored to rural clinics and frontline roles may address these barriers and improve vaccine confidence and uptake.

Setting/Population: Two rural Colorado health systems, comprising five pediatric and family medicine clinics that serve medically underserved populations, including large Hispanic and Spanish-speaking communities. Participants included medical assistants (MAs), nurses, clinicians, front-office staff, and clinic administrators involved in patient care.

Methods: We conducted six virtual clinic-engaged workgroups using co-design and participatory translation methods to adapt HPV vaccine communication trainings and materials. A vaccine communication expert performed onsite observation and process mapping to identify contextual barriers and facilitators. The iPRISM web tool supported iterative feedback. All clinic staff received a brief communication mini-trainings. Clinics co-developed culturally tailored materials (posters, rack cards, magnets, fact sheets, digital displays) in English and Spanish. Pre- and post-surveys assessed self-reported confidence and consistency in evidence-based communication skills. Staff feedback, surveys, and meeting documentation evaluated feasibility, acceptability, and workflow fit.

Results: Eighteen clinic staff participated in six co-design workgroups (3 pediatricians, 1 family physician, 8 MAs/nurses, two administrators, two front-office staff) and ≥75% of eligible staff attended four trainings across clinics. Following the training, staff reported increased confidence in recommending HPV vaccination and improved comfort communicating with hesitant families. Clinics successfully co-developed and deployed media materials throughout exam rooms, waiting areas, health fairs, and hospital display screens. Social media materials were developed but minimally used due to staff perceptions that digital outreach was ineffective in their population. Staff emphasized the importance of culturally relevant messages and Spanish-language resources.

Conclusions: Co-designed, whole-team HPV communication training and materials were feasible, acceptable, and perceived as valuable in rural primary care settings. Targeted implementation strategies enhanced self-efficacy, role clarity, and consistency of evidence-based communication. Findings underscore the importance of rapid adaptation, pragmatic tailoring, and multilingual resources to fit rural

workflows and cultural context. Future work will assess sustainability, dissemination, and the ability to scale.

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Multi-Phase Mixed-Methods Development and Evaluation of a Leadership Toolkit for Rehabilitation Implementation

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Background: High-intensity resistance rehabilitation (HIR) improves functional outcomes for medically complex older adults but remains underutilized in Skilled Nursing Facilities (SNFs). Prior implementation strategies improved clinician adoption but identified leadership support as critical for success. This study describes the development and evaluation of a leadership-focused toolkit designed to operationalize day-to-day leadership behaviors that complement an existing multicomponent implementation strategy.

Setting/Population: The project was embedded within a 3-year quality improvement initiative in rural Veterans Health Administration SNFs. Participants included rehabilitation clinicians (physical and occupational therapists) and first-level leaders (Directors of Rehabilitation) across four SNFs.

Methods: This mixed-methods descriptive case study was conducted across three sequential phases. Phase 1 synthesized qualitative data from two prior implementation years to identify leadership needs and draft toolkit components. Phase 2 engaged prior leaders to rank items for feasibility and importance, informing refinement. Phase 3 piloted the toolkit alongside the multicomponent implementation program across four new SNFs. The toolkit included electronic resources, a facilitation guide, and structured meetings with an external implementation facilitator. Evaluation used a convergent mixed-methods design, incorporating quantitative measures (Implementation Leadership Scale [ILS], adoption, implementation extent [PRESS]) and qualitative interviews and focus groups. Data were analyzed descriptively and through directed content analysis, with data integrated using joint displays.

Results: Eighteen clinicians and five leaders participated. Leaders endorsed toolkit feasibility and acceptability, citing flexibility and utility for tailoring strategies to team needs. Toolkit use varied by leader experience and context. Clinicians and leaders reported improvements in implementation leadership behaviors, with the largest gains in knowledgeable and perseverant domains. Clinician adoption was high (mean commitment score = 91.3 ± 10.0) and implementation occurred to a “great extent” (PRESS mean = 3.0 ± 0.5). Qualitative findings highlighted toolkit role in supporting leader championing of HIR, operational support, and responsiveness to team needs, fostering trust and shared ownership.

Conclusions: This study advances pragmatic implementation research by applying a multi-phase mixed-methods approach to leadership-focused toolkit development and evaluation in real-world SNF settings. Findings highlight the interaction between leadership behaviors and organizational context, and underscore the importance of flexible, tailored leadership supports that enable relational work alongside technical implementation tasks. Although conducted in SNFs, these leadership mechanisms are likely relevant across rehabilitation settings facing similar pressures and challenges.

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Pragmatic Strategies to Improve Recruitment and Engagement in HIV Research in Colorado

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Background: Research studies among people with HIV (PWH) in Colorado frequently enroll individuals who are already well engaged in care, limiting generalizability and reducing relevance for those at highest risk for poor retention and non-adherence to HIV medications. This creates a translational science roadblock for pragmatic HIV research conducted in real-world settings.

Setting/Population: This study was conducted in Colorado in partnership with a pre-established 12-member Community Advisory Board (CAB) composed of PWH, healthcare providers serving PWH, and University of Colorado faculty, with representation from three rural and urban community-based organizations. CAB members reflected diverse lived experiences, professional roles, and connections to communities disproportionately affected by HIV.

Methods: We used a community-based participatory research approach to develop a pragmatic recruitment and engagement plan for future HIV-related research studies in CO. Following one consultation with the CU Clinical Research Recruitment Program and local community stakeholders, CAB members participated in three facilitated 90-minute Zoom sessions conducted between September and December 2025. We used structured visioning and brainstorming exercises to identify trusted recruitment channels, culturally appropriate messaging strategies, engagement facilitators, and barriers to participation, with emphasis on reaching PWH not consistently engaged in care. Sessions were audio-recorded, summarized using structured templates, and analyzed using rapid qualitative methods to generate actionable strategies suitable for dynamic research contexts.

Results: Across CAB sessions, participants emphasized trust-centered, community-driven strategies as essential for effective recruitment. Trusted messengers (promotoras, peer leaders, and respected community figures) were identified as key to rapidly disseminating information through existing social networks. Participants highlighted the need for flexible engagement modalities, noting that social media platforms facilitated timely outreach to younger populations, while face-to-face approaches remained critical for older adults. Embedding HIV-related content within broader health and wellness messaging was viewed as a strategy to reduce stigma in public settings. Non-traditional venues (e.g., neighborhoods, workplaces, consulates) and practical incentives (e.g., food, transportation support, gift cards) were identified as feasible and scalable facilitators of participation.

Conclusions: Pragmatic, community-engaged methods can generate adaptable recruitment and engagement strategies responsive to rapidly changing real-world contexts. Leveraging trusted messengers, flexible outreach approaches, and culturally responsive messaging provides feasible tools to improve inclusion and scalability in HIV research, yielding more representative samples included in research.

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Veteran-Informed Development of an Early Dementia Occupational Therapy Intervention

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Background: Older Veterans with dementia face functional challenges that may be lessened by assistive technology-based interventions, such as checklists, calendars, or automated reminders. Technological strategies introduced in early dementia offer great opportunity to support daily functioning when capacity for new learning is still retained. Most functional activities impaired in early dementia include instrumental activities of daily living (IADL), such as managing medications, finances, and chronic conditions, so assistive technology that offloads some cognitive demands and supports completing these tasks is an ideal intervention target. However, little is known about willingness of older Veterans with early dementia to incorporate technological supports in IADL. To better understand the Veteran perspective, as part

of user-centered design, we engaged the Older Veteran Engagement Team (OVET) at the Rocky Mountain Regional VA Medical Center.

Methods: For this project, we presented our proposed idea at two OVET meetings, one in June 2025 and one in November 2025, to seek feedback prior to intervention development. Following standard OVET procedures, a form introducing the presenter, project, and discussion questions was distributed to OVET members prior to each meeting. The meetings included eight to nine OVET members, one OVET program staff member, and the presenter. Key topics discussed included the relevance of the intervention from the perspectives of both care recipients and care partners, logistical considerations, and positive and negative experiences with technology. The OVET program staff and presenter took detailed notes during the meeting.

Results: OVET feedback was grouped by common ideas and integrated into the intervention design. Suggestions included offering choices in assistive technology intervention session structure (favoring shorter, more frequent sessions to try/refine strategies), ideas for identifying and incorporating care partners into the process, and ideas for introducing assistive technology early to be well-received by Veterans. Veterans emphasized the value of simple, user-friendly high- and low-tech options that do not look like medical devices. They shared specific examples of helpful technologies they purchased or that were provided by the VA, such as tablets and medical devices with embedded safety features.

Discussion: Engaging OVET early in the development process provided actionable guidance that shaped the intervention to better align with Veteran needs and preferences. Next steps include presenting a more detailed intervention protocol to OVET for further feedback and trialing components to continue iteratively and collaboratively developing the intervention.

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Cesarean Birth Outcomes Following Induction vs. Expectant Management in Midwifery Care

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Background: Reducing births by cesarean section (CS) is an important quality metric to prevent adverse maternal outcomes and induction of labor has been associated with higher CS rates. Within midwifery care, IOL is more selectively considered. Elective IOL at 39 weeks is increasingly identified as the standard of care, despite conflicting evidence IOL is associated with increased CS rates. This study replicates recent studies exploring CS and other birth outcomes following IOL by gestational age. The purpose of this study is to evaluate outcomes of IOL compared to expectant management among low-risk women receiving midwifery-led care.

Setting/Population: Patients receiving midwifery care at a large, urban, academic hospital were included in this retrospective analysis. Patient data were collected by the midwife during routine intrapartum care.

Methods: In this retrospective cohort replication study of (N = 7,345) patients receiving midwifery care between 2018-2023, we compared rates of cesarean in nulliparous and multiparous parturients with IOL versus expectant management (EM) at each week of gestational age beginning at 37 weeks. An adjusted odds ratios (OR) was computed for the likelihood of CS following IOL or EM by gestational age, accounting for co-variates.

Results: The overall CS rate was 18.49% for nulliparous and 5.22% for multiparous patients. Among nulliparous patients, the CS rate following IOL was 17.31% at 37 weeks GA and 38.46% at 42 weeks GA, compared to between 12.18% at 37 weeks GA to 33.33% at 42 weeks GA following spontaneous labor onset. The only statistically significant difference in CS was among nulliparas at 41 weeks gestation.

Conclusions/Implications: Our findings, consistent with the replicated study, indicate low cesarean rates in both spontaneous and induced labor in low-risk patients receiving midwifery care. Replication is essential for validating existing results and developing generalizability in research;

this study builds on existing published research to support continued implementation of evidence-based practice. Additional data is needed to develop precision-based strategies to identify patients for whom early induction may optimize outcomes.

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Immersion to Action: A Researcher's Reflections on Community Engagement Training in Colorado's San Luis Valley

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Background: Community-based participatory research (CBPR) offers a foundational framework for increasing the relevance, equity, and practical impact of clinical and translational research. Engaging community members in research planning and design strengthens methodological rigor and facilitates the development of findings that are both generalizable and implementable. The Colorado Clinical and Translational Sciences Institute created the Colorado Immersion Training (CIT) program to equip researchers for effective statewide community engagement. In this report, I examine my experience with Colorado Immersion Training and discuss its influence on advancing more equitable, community-driven approaches in clinical and translational research.

Methods: Participants in the CIT program receive foundational training on the community engagement continuum and the principles of community-based participatory research (CBPR) prior to a five-day immersion in local culture. During this period, researchers establish relationships with community members, gain insight into contextual and historical factors affecting health, and improve their communication and engagement skills. After the immersion, participants attend four sessions with CIT program leaders to reflect on their experiences and discuss strategies for integrating these insights into their research.

Results: In the summer of 2025, I traveled to the San Luis Valley as part of the program. Although local communities have historically participated in research, they have often been excluded from implementing research findings. Interacting with individuals diagnosed with neurologic conditions revealed a substantial gap in neurologic community involvement in the development of exercise research. This issue is especially relevant in physical therapy research, where movement and function are influenced by social and environmental factors. Despite growing emphasis on real-world application in physical therapy, engagement with communities and participants remains limited. My experience underscored the need for greater neurologic community involvement in research development. In response, I established an advisory board through the Parkinson's Foundation patient engagement program to serve as a key partner in designing, completing, and presenting the results of my current adaptability research.

Conclusions: The CIT model demonstrates the critical importance of community engagement throughout the research continuum. Initiating research with community-centered questions and maintaining engagement throughout implementation fosters equitable partnerships and supports sustainable, community-informed improvements. My participation in the program directly influenced my research approach, prompting me to integrate an advisory board at the outset of my PhD dissertation project to ensure that community perspectives inform every stage of the research process.

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On-Ramps to Engagement: Insights for Overcoming Barriers to Collecting Community Input as Revealed by Family and Household Linkage Ethics Engagement

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Background: Recently, investigative teams have developed the ability to conduct research that links medical data for multiple family and household

members to better understand the impact of family and household factors on health at scale. There are no guidelines that exist for the ethical use of these family and household linkage (F&HL) methods in research. The advisory panel developed and tested guidance materials grounded in human subject research ethics principles for use with these novel methods. Our objective was to identify how researchers used these materials to engage with community members, and what strategies researchers used that helped community members to overcome barriers to participation with, and comprehension of, the subject material.

Setting/Population: Our advisory panel of 12 members: patient partners, Institutional Review Board (IRB) representatives, ethics experts, and health researchers developed the guidance materials. During user testing, we interviewed a purposive sample of 6 health researchers, 5 IRB representatives, and 6 community members to refine and increase engagement with the materials. We will focus on the community member perspective.

Methods: The multi-stakeholder advisory panel used multiple co-design processes to develop the F&HL guidance materials that were grounded in the ethical principles of autonomy, respect for persons, beneficence, non-maleficence, justice and equity. To test these materials, we conducted individual semi-structured interviews with researchers, IRB representatives, and community members to assess their perspectives on the materials. To analyze the data, we used content analysis to identify themes and insights by using an inductive approach to code. Interpretative analysis was used to create a descriptive overview of the overall data.

Results: Our analysis demonstrated numerous key "on-ramps" or strategies that facilitated community member engagement in the context of providing F&HL ethical guidance. These included: 1) exposure to key concepts; 2) education of research principles; 3) use of accessible language; 4) creation of accessible materials with varying formats (i.e., discussion, visuals, video, and text); 5) focus on potential benefits and relevance to communities; 6) alignment of material detail for community audiences; and 7) inclusion of community members as presenters.

Conclusions: In the context of providing F&HL ethical guidance, the application of the various tools and strategies facilitated engagement from community members. Although this was a small and specialized sample particular to F&HL ethical guidance, the insights gained could be applied in other contexts to facilitate and improve the accessibility and experience of engagement between researchers and community members.

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ClarifAI: Modular LLM-Augmented Qualitative Feedback Workflows

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Background: Qualitative researchers face persistent challenges in collecting and interpreting end-user feedback, especially from time-constrained or geographically dispersed participants such as clinicians. Existing tools partially automate follow-up interviews or LLM-based qualitative analysis, but lack reproducibility, unified workflow integration, or support for resolving vague or ambiguous comments. We introduce ClarifAI, a modular, LLM-enabled Asynchronous Online Focus Group (AOFG) platform designed to accelerate pragmatic qualitative feedback workflows while enabling method reproducibility.

Methods: ClarifAI includes four modules: (a) Telemetry: an LLM classifier that filters responses for contextual relevance; (b) Flight: an LLM classifier and extractor that flags responses needing clarification and identifies substrings for follow-up interview initialization; (c) CapCom: an

adaptive, topic-conditioned LLM interviewer; (d) Payload: an LLM summarizer/rewriter that generates refined, actionable feedback. The 'Telemetry' module was validated on the SimpleQA (n=15) and SimpleQA-2 (n=25) datasets, labeled for ground truth by an individual annotator. Three commercial LLMs (ChatGPT – version 5, Google Gemini – version Flash 2.5, Anthropic Claude – version 4.5 Sonnet) annotated each QA pair 5 independent times. We report accuracy vs. ground truth and cross-model inter-annotator agreement (Cohen's Kappa) for reliability.

Preliminary Results: On SimpleQA, all three LLMs achieved 100% classification accuracy vs. ground truth. On SimpleQA-2, ChatGPT-5 and Claude maintained 100% accuracy, and Gemini achieved 96.8% accuracy. Cohen's Kappa among LLM annotators indicated high cross-model agreement across 5 repeated annotation rounds, supporting early evidence of classification consistency for contextual relevance.

Novel Contribution: ClarifAI is, to our knowledge, the first AOFG platform unifying reproducible LLM-based QA contextual relevance classification, topic-conditioned follow-up clarification interviews, and LLM-enabled feedback rewriting, while explicitly documenting module boundaries for reproducibility. This work is also the first to evaluate LLM contextual relevance classification performance under repeated annotation loops for reliability, and to propose structured support for laddering seed substring extraction, including detection of vague or ambiguous laddering seeds that will drive future adaptive interviews.

Conclusion & Next Steps: Early results demonstrate feasibility for consistent contextual relevance classification via repeated LLM annotation. We next aim to scale evaluation to larger, clinically grounded datasets and validate laddering seed extraction for reproducible adaptive clarification interviews in healthcare feedback settings.

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Outcomes from the Glycemic Excursion Minimization (GEM) Intervention in Primary Care Patients with Prediabetes

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Background: Over 38 million people in the United States have diabetes, with 1.2 million people diagnosed every year. Lifestyle interventions can play a key role in slowing the progression of prediabetes to diabetes. The Glycemic Excursion Minimization (GEM) intervention is shown to improve clinical, psychosocial, and behavioral improvements in type 2 diabetes population in previous studies. However, its effectiveness in prediabetes remains unknown. This partial randomized control trial (RCT) study will assess whether GEM combined with continuous glucose monitoring (CGM) and an activity monitor improves glycemic, psychosocial, and behavioral outcomes in adults with prediabetes in primary care settings.

Setting/Population: Primary care patients that have been diagnosed with prediabetes with an HbA1c between 6.0 and 6.4, between the ages of 25-70 years, and possessing a device capable of running the CGM software are recruited by the University of Colorado.
Methods: 2 between (groups) X 2 within (pre-post) partial cross-over RCT. Participants were randomized 2:1 to routine care (RC) or the GEM intervention for 4.5 months. Eligible RC participants were able to cross over to GEM at the end of the RC arm. GEM participants followed a structured, self-directed, and personalized program (GEM guide) and received a Libre 2 continuous glucose monitor (CGM) and Fitbit.
Results: 36 participants that were recruited and were randomized to RC (n=21) or GEM (n=14), with (n=15) proceeding to crossover to GEM upon completing RC. Participants are 84% female and 90% white and non-Hispanic. The primary outcome was reduction in percentage of CGM readings >120mg/dL from blinded pre-post CGM. Secondary outcomes included CGM variance, HbA1c, BMI, psychosocial (e.g. modified diabetes distress scale) and behavioral outcomes (change in total steps and active minutes of physical activity at different intensity levels). Compared with routine care, the GEM intervention showed improvement in glycemic outcomes relative to RC

in glucose variability as measured by CGM standard deviation (p=0.012) and coefficient of variation (p=0.0128), and A1c (p=0.0212), with a clear trend toward improved CGM glucose percent time above 120 mg/dL(p=.058).

Conclusions: Combining GEM with CGM improved glycemic outcomes in patients with prediabetes, highlighting its potential as a preventive strategy against type 2 diabetes in high-risk populations. Further research with a larger sample size is warranted. These findings provide pragmatic evidence supporting the feasibility and effectiveness of continuous glucose monitoring and behaviorally informed lifestyle interventions into routine primary care.

More than a method: ethics-driven guidance for family and household linkage

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Background: Family and household linkage (F&HL) methods are computational methods to identify and link family members and their relationship (e.g., parent-child) or household members using clinical and claims data. Currently, no guidelines exist for ethical use of F&HL methods in research. Our objective was to develop and disseminate guidance materials, for investigators and Institutional Review Boards (IRB) representatives, grounded in human subject research ethics principles for use with novel F&HL methods.

Setting/Population: Our advisory panel included 12 members: patient partners, IRB representatives, ethics experts, and health researchers. During user testing, we incorporated feedback from 6 health researchers, 6 community members, and 19 IRB representatives to refine the guidance materials.

Methods: We used multiple co-design processes to engage a multi-stakeholder panel in developing the guidance materials. First, we held 10 facilitated discussions using the Liberating Structures 1-2-4-All approach to iteratively apply the ethical principles of autonomy, respect for persons, beneficence, non-maleficence, justice and equity to research using F&HL methods. These discussions informed the creation of separate guidance materials for investigators and IRBs. We refined the materials through 3 phases of user testing, which included interviews and presentations to solicit feedback and assess the implementation outcomes: acceptability of intervention measure (AIM), intervention appropriateness measure (IAM), and feasibility of intervention measure (FIM).

Results: Through co-design, the panel developed two resources: an investigator worksheet and IRB supplement. The worksheet helps investigators plan F&HL research by identifying risks and mitigation strategies. The IRB supplement supports protocol review for studies using F&HL methods. Guidance refinement occurred in 3 phases. Interviews revealed researchers found the material useful for planning and engaging stakeholders; IRB representatives recommended reducing redundancy with existing IRB content and focusing on specific F&HL items; and community members valued the side-by-side comparison of the risks and risk mitigation strategies. Key user recommendations included: 1) prompting investigators to use the worksheet, 2) clarifying the importance of addressing data privacy and risk mitigation, 3) requiring justification for F&HL methods in the IRB application, and 4) identifying community-level risks and mitigation strategies. Average implementation survey scores for roundtable participants were AIM (3.8), IAM (3.6), and FIM (3.7); and AIM (4.2), IAM (4.0), and FIM (3.9) for the conference session.

Conclusions: The co-design process produced guidance materials grounded in ethical principles that integrated diverse perspectives, resulted in comprehensive recommendations for F&HL specific issues, and users reported an increased ability to incorporate materials into their existing workflows.

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Running the Gauntlet to Attain Sustainable Impact by Embedding Digital Interventions into Health Systems

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Background: A cornerstone of pragmatic research is to align delivery of programs with the context of real-world settings and recipients. This requires balancing fidelity to core functions for research rigor with local adaptations. Digital health interventions within the electronic health record (EHR) have the potential to improve sustainability through workflow integration and automation; however, EHR-embedded interventions face additional feasibility constraints and organizational approval chains that influence a health system's decision to adopt. Drawing on a case example of an EHR-embedded intervention, we illustrate how the form-and-function approach guided our work. Our objectives were to 1) align with health system decision maker priorities and characteristics while also addressing frontline clinician and patient needs and meeting research deliverables; and 2) identify implementation strategies to overcome feasibility challenges associated with EHR integration.

Setting: Large academic health system

Methods: We describe our experience integrating My Own Health Report (MOHR), a digital health intervention, into the EHR of a large health system. Core functions of MOHR were to: 1) screen for health risks, 2) flag identified risks, and 3) prompt patients to set goals for priority risks. Using the Practical, Robust Implementation and Sustainability Model (PRISM), we examined how multi-level factors, and the contextual infrastructure, influenced the decision to adopt and integrate MOHR. We also detail fidelity-consistent adaptations (forms) implemented to ensure contextual alignment.

Results: Four existing institutional organizational teams and approval processes, and oftentimes their associated subcommittees, were critical to MOHR's adoption and EHR integration: 1) Clinician leaders in primary care (e.g., Executive Committee, Governance Group), 2) Information Technology (e.g., security review, informatics), 3) Learning Health System, and 4) Digital Patient Experience. While clinician leaders recommended MOHR adoption, they could not prioritize implementation due to the informatics team's limited bandwidth, competing demands, and challenges to approval of digital interventions not part of the existing system. We identified a new partner based on MOHR's alignment with their priorities to increase Wellness goal setting for patients: the Health System's Digital Patient Experience team. To meet their requirement for non-clinical, Wellness-focused domains, MOHR was adapted from 17 to six health risks, while still maintaining the core functions of MOHR.

Conclusions: Integrating interventions into the EHR has tremendous potential for impact by supporting system-wide implementation and sustainability. For successful implementation, researchers must align interventions with health system priorities, navigate sometimes lengthy and unclear approval processes, and adapt to partner preferences and constraints, while maintaining fidelity to the core functions.

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Adapting the AIM-HI Program to the Needs of the Rural Healthcare Workforce

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Background: The rural healthcare workforce faces unique challenges to providing care. The Acute Inpatient Medicine – High Reliability, Learning Environment and Workforce Development Initiative (AIM-HI) sought to understand these issues within the changing context of the Veterans' Health Administration (VHA). AIM-HI is focused on the growth and development of the clinical workforce through implementation of evidence-based interventions. The AIM-HI team utilized Customer Discovery, an approach developed in the business sector to uncover the needs, experiences, and "pain points" of end users. Our objective was to identify and understand the current context and "pain points" faced by the rural healthcare workforce within the VHA and to inform adaptations to the AIM-HI program. This evaluation is crucial, as the VHA context has evolved (e.g. hiring freezes, reductions in force, and return-to-office mandates).

Setting/Population: Rural healthcare leaders were identified from a national list of Chiefs of Staff and Chiefs of Hospital Medicine. Associate chiefs of patient care services (Chief Nurse) and designated learning officers were added to the list from online registries.

Methods: An AIM-HI team member led an e-mail-based recruitment strategy to invite identified leaders to participate in a 20–30-minute interview. At the conclusion of each interview, participants were asked to recommend additional staff members for inclusion (snowball sampling) to achieve data saturation. Recruitment concluded once data saturation was achieved, and no new themes emerged. Interview data were summarized and deductively analyzed using a rapid analysis matrix structured by the interview guide, with rows indicating participant responses and columns representing interview questions.

Results: Twenty-two leaders were interviewed from 19 rural VHAs across the United States. Interviews explored themes of roles and responsibilities to promote workforce development and growth, current challenges faced by the rural healthcare workforce, and resources needed to address challenges. Participants felt everyone is responsible to recruit, retain, and grow the healthcare workforce. The rural healthcare workforce needs more networking, continuing education, and the creation and maintenance of communities of practice where clinicians and interdisciplinary staff can learn from one another. Clinicians are overloaded with administrative tasks and perform multiple roles due to staffing shortages. Clinicians working in rural communities and providing home-based care face unique circumstances, such as the safety within a Veterans' home and traveling distances with limited communication.

Conclusions: To address these challenges and needs, the AIM-HI team planned adaptations to the FY26 program. AIM-HI's monthly Learning and Leadership Collaboratives will be adapted to support continuing education and foster communities of practice across clinical teams. AIM-HI will expand support.

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Development and Validation of a National Surveillance Survey for Over-the-Counter Medication Use

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Background: Limited data exists on over-the-counter (OTC) medication use prevalence, behaviors and outcomes in the general population. With the ubiquitous use and availability of these products and increasing self-care trends, ongoing research is essential. Rocky Mountain Poison & Drug Safety developed a novel surveillance survey, based on published methodology, to understand use of prevalent single-ingredient (SI) and combination OTC medications.

Setting/Population: US adults (aged 18+) and adolescents (aged 15-17) were recruited through a commercial online survey panel. Those who used an OTC medication of interest within the preceding three months were asked follow-up questions.

Methods: This cross-sectional retrospective study employed a 15-minute online survey from June 5-July 8, 2025 collecting data on medications used, reasons for use, frequency, comorbidities, dosing, effectiveness, and knowledge utilizing validated instruments where appropriate. Quota sampling ensured proportional geographic and demographic distribution comparable to census populations.

Among adults, careless responses were assessed by analyzing time spent per demographic question, even/odd correlation, and evaluating outliers for days reporting use. Cutoffs were evaluated using unrelated benchmarks including total products endorsed, outliers for days reporting use, maximum pills taken daily, and mean mahalanobis distance. Once optimized, exclusion criteria were implemented to remove inattentive responses. Calibration weighting was applied to produce nationally representative estimates.

No additional methodology was applied to adolescent data due to small sample size.

Results: Among adults, 766 careless responders were removed resulting in 14,234 final analytical surveys. The variables in the final calibration weighting model included: Patient Health Questionnaire-4, home size, government assistance, gender, race, ethnicity, state and age. Absolute difference from census population decreased from 9.9% pre-weighting to 5.6% post-weighting. After these adjustments, over half reported using SI acetaminophen (55.2%, 95%CI: 53.9-56.4) and SI ibuprofen (51.5%, 95%CI: 50.2-52.8). Combination cough products (37.2%, 95%CI: 36.0-38.4), SI diphenhydramine (34.0%, 95%CI: 32.8-35.1), and SI aspirin (31.7%, 95%CI: 30.5-32.8) were also commonly used.

Among adolescents, SI acetaminophen (59.4%, 95%CI: 52.8-64.3) and SI ibuprofen (57.1%, 95%CI: 52.2-62.0) were most frequently used followed by combination cough products (46.2%, 95%CI: 41.2-51.1), SI diphenhydramine (40.6%, 95%CI: 35.7-45.5), and SI dextromethorphan (30.2%, 95%CI: 25.6-34.8).

Conclusions: This methodology provides robust nationally representative estimates of OTC medication use, characterizing demographics, usage patterns, behaviors, and motivations. SI pain relievers demonstrated the highest utilization among the OTCs examined for both adults and adolescents though important differences exist between populations.

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Integrating Sexual Health Care into Breast Oncology One Year Outcomes from an Embedded Clinic

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Background: Sexual health (SH) concerns are common among breast cancer (BC) patients and can significantly affect quality of life. Although many of these symptoms are treatable, they are frequently overlooked in standard oncology care.

Setting/Population: To improve access to specialized support, a dedicated sexual health clinic (SHC) was embedded within a breast clinic at a comprehensive cancer center in March 2024.

This study evaluated the SHC's first year, focusing on clinic utilization, patient characteristics, and early outcomes.

Methods: The SHC was staffed by an experienced Nurse Practitioner and offered counseling, treatment, and referrals for a range of SH issues in a convenient, integrated setting. We retrospectively reviewed clinic data collected from March 2024 through February 2025. Patient-level data included demographics, BC history, referral source, reported SH concerns and treatments provided. Sexual health services addressed symptoms such as vaginal dryness, dyspareunia, and low libido. A subset of patients also completed patient-reported outcome (PRO) measures, which are currently under analysis to further characterize symptom burden and outcomes.

Outcomes: Over the 12-month period, 54 SH appointments were completed by 37 patients (mean age 54 ± 10 years), with 27% returning for follow-up. Most referrals came from providers (78.4%), though 21.6% were self-initiated. The most frequently reported concerns were vaginal dryness (67.6%), dyspareunia (62.2%), and low libido (40.5%). Appointment demand was high, with over 90% of available SHC slots filled and an attendance rate of 90.7%. Barriers included limited awareness during clinic rollout and breast center scheduling constraints, particularly for follow-up visits.

Implications: Embedding SH services within a breast cancer clinic is a feasible and effective strategy to address an often-neglected aspect of survivorship care. High utilization and patient engagement suggest substantial unmet need for SH support among BC and high-risk patients. Integrating SH care into routine oncology settings may reduce stigma, improve access, and promote sexual well-being. Further promotion and expanded capacity will be essential to meet demand and ensure equitable care access. Ongoing analysis of PROs will inform efforts to tailor and scale SH services to better support women's health needs across the cancer care continuum.

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Designing Patient-Centered Visualizations of Predicted Quality-of-Life Outcomes to Enhance Shared Decision Making in Oncology Surgery

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Background: Advances in breast cancer (BC) detection and treatment have increased survivorship. Many BC survivors experience long-term quality-of-life (QoL) challenges, particularly younger women - a growing proportion of newly diagnosed - who may live decades post-treatment. Lumpectomy and mastectomy, two common BC surgeries have similar survival rates. Decisions are often made during a period of information overload and without clear expectations of recovery, yet these decisions carry long-term implications for QoL. Patient-reported outcomes (PROs) capture critical QoL domains that traditional clinical metrics overlook. Existing tools supporting shared decision making (SDM) often present generalized, text-heavy content, failing to meet best-practice guidelines for accessibility readability. Further, existing PRO research tends to center on communicating risk recurrence.

Methods/Objectives: This is multi-phase mixed-methods user-centered design (UX) study to co-design and validate forecasted QoL PRO displays tailored to patient-clinical and demographic characteristics. Our goal is to create a scalable, patient-centered visualization framework that enhances decision-making, reduces expectation–experience gaps, and minimizes decisional regret.
Phase I (wrapping up): Iteratively design beta-longitudinal predictive PRO QoL displays with focus group and gather additional data on format preference. Rapid qualitative analysis was used to summarize themes within and across focus groups and iteratively update beta-displays in preparation for Phase II.

Phase II (preparation): a) Assess comprehension and usability of beta displays through iterative testing with BC survivors using surveys, think-aloud protocols, and cognitive interviews. b) Refine displays via UX A/B testing and real-time co-design, incorporating patient feedback and medical illustrator input to optimize clarity, emotional resonance, and accessibility.
Phase III: Validate comprehension and interpretability of refined displays, explore preference variation by demographic and clinical characteristics using structured assessments and quantitative modeling. Analyses will combine descriptive statistics, multivariable regression, and rapid qualitative methods.

Conclusion: This is one of the first studies to incorporate UX methodology to develop individualized patient-centered forecasted longitudinal PRO visualization that supports BC patient surgical decision-making. By involving patients early and iteratively refining displays, we will produce evidence-based, reusable prototypes for integration into patient tools and clinical workflows. Findings will inform scalable strategies to improve SDM, align treatment with patient values, and enhance survivorship outcomes across cancer care.
This work is ongoing, and initial results from Phase I and II will be reported.

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Integrating Relationship Education and Violence Prevention in Early Home Visiting in Colorado and Utah

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Background: Becoming first-time parents in the U.S. is associated with sudden deterioration of couple relationship functioning, insensitive parenting, high parenting stress, and even death. Couple relationship education has been in high demand on the transition to parenthood through the federal Healthy Marriage and Responsible Fatherhood Program since 2006. It is also an evidence-based practice in the 2017 technical package on preventing intimate partner violence (IPV) from the National Center for Injury Prevention and Control.

Setting/Population: Early home visitation is a service delivery model and a vital health promotion strategy for low-income families in the U.S. Relationship education increased from 41% to 58% but has not been comprehensive or standardized across models of early home visiting. Reauthorized in 2022 to invest $3.1 billion over 5 years to serve vulnerable families, the federal Maternal, Infant, and Early Childhood Home Visiting (MIECHV) Program needs innovative activities. Among four federally funded trials, the Feder trial in Oregon (2007-2010) was the first and only attempt to integrate relationship education into home visiting workflows as the IPV primary prevention strategy. The program impacts on IPV in the full sample (Feder et al., 2018) and among Latinx mothers were reported (Li et al., 2022). We design pragmatic research to address the gap of the integration of relationship education and violence prevention in early home visiting in Colorado and Utah.

Methods: We performed secondary data analyses of a three-wave longitudinal randomized controlled trial of the Nurse-Family Partnership (NFP)

program. In Oregon, 238 low-income, first-time pregnant mothers were randomized to a standard or augmented program where trained nurses integrated the Within My Reach curriculum and IPV screening and referral with the NFP workflow one-on-one at home visits at pregnancy, 1-year, and 2-year follow-ups. Next, we plan to apply the PRISM framework that incorporates RE-AIM outcomes and offers guidance on how to conceptualize, assess, and address contextual domains with a focus on systems thinking, participatory engagement, and health equity principles to foster an ongoing and iterative engagement process using a co-creation approach.

Results: The augmented program was effective to prevent IPV among 63 aged 15-17 mothers. Compared with 105 mothers in the standard program, the augmented program with 133 mothers indicated stable partner relationships and reduced depressive symptoms at the 1-year follow-up only. The champions from Utah Marriage Commission identified the steps with Utah's MIECHV program. Counterparts in Colorado were identified before the National Alliance for Relationship and Marriage Education conference in Denver in July.

Conclusions: Strategies to develop innovative programming, apply pragmatic research, and engage the stakeholders to address the integration and implementation gaps in Utah and Colorado will be discussed.

The Role of Medicare Plan Type in the Treatment of Advanced Cancer: Evidence from National Electronic Health Records

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Background. Medicare Advantage (MA) now enrolls more than half of all Medicare beneficiaries, yet evidence on how MA influences treatment choices for high cost, high need advanced diseases remains limited. MA plans operate under capitated payment models and often use narrower provider networks, which may create incentives for cost control. In contrast, Traditional Medicare (TM) reimburses providers on a fee for service basis, potentially encouraging different patterns of care. Understanding whether insurance design affects access to high-cost therapies is particularly important in oncology, where treatment decisions are clinically complex and financially consequential. In this study, we leverage nationally representative electronic health record data as an alternative data source to examine treatment differences between MA and TM among patients receiving care in practices that serve both Medicare plan types. We examine whether Medicare plan type influences the receipt, timing, and cost of first line systemic therapy among patients with metastatic colorectal cancer (mCRC).

Methods. We used Flatiron Health electronic health record data to identify 20,988 patients aged 65 years or older diagnosed with mCRC between 2013 and 2024. Flatiron is a longitudinal oncology database derived from a nationwide network of community oncology practices and academic cancer centers across the United States. After excluding patients with unidentifiable Medicare enrollment and those treated in practices serving only MA or only TM patients, the analytic cohort included 10,176 patients, of whom 7,187 were enrolled in TM and 2,989 in MA. We compared treatment initiation and receipt of high cost first line therapy using measures validated by Flatiron. High-cost therapy was defined using multiple expenditure thresholds based on estimated monthly prices for chemotherapy drugs derived from allowable Medicare charges. We also examined treatment patterns across practices with varying volumes of MA patients.

Results. Treatment initiation rates were similar between MA and TM beneficiaries, at approximately 74% in both groups. MA patients were modestly more likely to receive moderately high cost first line therapy, with an absolute difference of approximately 4% points at the $6,500 threshold, while differences at higher cost thresholds were small. At the practice level, facilities with higher MA patient volumes exhibited slightly lower treatment initiation and modestly higher use of moderately high cost regimens, although differences at the highest cost thresholds were minimal.

Conclusions. These findings suggest that Medicare plan type alone may not drive substantial differences in access to or selection of systemic cancer treatment. Instead, practice level characteristics, particularly the proportion of

patients enrolled in MA, appear to play a more influential role in shaping treatment decisions. These results have implications for network design and payment regulation.

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Documentation of Maternal Incarceration by Home Visiting Programs: Specificity is Needed to Improve Care

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Background: About 58,000 pregnant women in the U.S. experience incarceration each year. Incarceration poses numerous risk factors to maternal-child health, which may be mitigated by participation in home-visiting programs. Maternal Infant and Early Childhood Home Visiting Programs (MIECHV) are federally funded programs serving low-income families. Recently, MIECHV programs have focused on addressing the needs of mothers who have experienced incarceration. However, it is unknown whether these programs document information on a mother's past or current incarceration. Using one MIECHV program, Nurse-Family Partnership (NFP), as an example, we sought to explore whether and how maternal incarceration is documented.

Setting/Population: We explored all past NFP clients with the goal of identifying those who experienced incarceration prior to or during their enrollment in NFP. NFP is a MIECHV program for first-time, low-income mothers and their children spanning from pregnancy to the child's second birthday.

Methods: We conducted an exploratory secondary data analysis of the extant national NFP data. This dataset contains home visiting records on n = 365,678 past NFP clients spanning from 1996 to 2024. Enrollment, encounter, and discharge forms were screened for indicators of incarceration. These indicators were 1) the location of home visit was listed as "residential treatment center/incarcerated" on the enrollment and/or encounter form and/or 2) the client dismissal form indicated reason for dismissal from program as "client is incarcerated". We also searched records for keywords such as "jail", "prison", or "incarcerated" in the text fields for each timepoint.

Results: After removing duplicates, we identified n = 1261 (0.34%) clients with indicators of incarceration in their records. Of these, n = 985 (78%) had residential treatment center/incarcerated as their indicator; the remaining n = 276 (22%) had "client is incarcerated" as their indicator. No clients had information on incarceration prior to enrollment in NFP or had the keywords of interest in their records.

Conclusions: Documentation of maternal incarceration is limited in NFP records and few past NFP clients had indicators of incarceration in their records. The true number is likely higher, however, NFP does not routinely this information. These estimates are limited by the combined residential treatment center/incarcerated variable. There was no way to distinguish between a client residing in a residential treatment center or being incarcerated, as this is a combined variable in the dataset. While some residential treatment centers are court-ordered, and therefore, considered a form of incarceration, others are voluntary. Including discrete measures of maternal incarceration will help document the prevalence of this population more accurately. This will help MIECHV programs tailor their interventions to address threats to maternal-child health that are associated with maternal incarceration

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Emerging Challenges and Tensions when Conducting Pragmatic Research: Lessons Learned from the R2P2 Program

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Background: Implementation science generally, and pragmatic research specifically is challenging,

especially because they often attempt to apply rigorous scientific methods to produce practical results that contribute to a generalizable understanding of the world. The Anschutz Acceleration Initiative, Rapid and Rigorous Patient-centered Program (R2P2) aims to design, test, and disseminate patient-centered tools rapidly using rigorous research methods.

Methods/Results: Using specific examples from R2P2, we share our perspectives on two key tensions within pragmatic research:
1. Basic vs. Applied Science: Basic science attempts to understand how the world works and asks: "What is true, and why?"; Applied science attempts to solve real world problems and asks, "What works, for whom, and under what conditions?" Pragmatic studies often attempt to both (Basic and Applied) by aiming to improve key outcomes important to stakeholders while also advancing a deeper understanding of the basic mechanisms driving the research. Both lines of inquiry can be generalizable to other settings, but the methods and questions are different. Reviewers often expect both clean mechanistic inference and immediate health system or community impact. We argue that it's virtually impossible to do both dimensions well and that studies should make explicit their focus. Further, we argue that funders of implementation science would better serve the field by explicitly recognizing two distinct categories of implementation science. Basic implementation science should emphasize questions like theory testing, mechanistic inference, contextual determinants, cognitive processing. Applied implementation science should emphasize feasibility, replication costs, adaptations, scalability, and equity. Both are indispensable.

2. Speed vs. Rigor. A second tension is how to do rigorous science but do it more rapidly. Implementation science was developed to help address the infamous '17 year gap' between research discovery and application, but this promise has not been fulfilled. If implementation science is to be relevant to health systems and decision makers, it needs to happen more quickly. Historically, research is a slow, meticulous process of careful discovery. As such, implementation science has been hesitant to conduct rapid research for fears it will be perceived as lower quality or not scientific. We argue that it is possible to be both rapid and rigorous. Honing methods of engagement and innovative experimental designs such as roll-out studies, rapid qualitative and ethnographic approaches, and utilizing big data and artificial intelligence are all tools that can be leveraged to do rigorous research more rapidly.

Conclusions: In summary, we argue that it is possible to be simultaneously rapid and rigorous, but not to do a strong job of simultaneously being basic and applied. Using examples, we will provide a summary table highlighting the key characteristics of each approach.

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Connection to Adult Primary Care after ED Sexual Assault evaluation: A Quality Improvement Project

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Background: According to CDC data (2023), the ED visit rate for sexual assault (SA) is 4.5 per 1000 people. The ED visit provides essential acute care, including trauma-informed care and support, treatment to prevent pregnancy/STIs, and forensic evidence collection. Timely follow-up care (2-5 days) is critical. Yet, patients face many barriers in receiving prompt connection to primary care. This project aims to: improve connection to primary care among adults (> age 21) presenting to the ED following SA, creating a streamlined pathway for follow up care with a goal of achieving 50% follow-up rate in primary care for these patients

Setting/Population: A large, urban, academic, safety net, level one trauma center ED in New England, with annual volume > 130,000; annual volume of adult acute SA is approximately 120. Follow-up care will be focused on adults (> age 21) of varied racial/ethnic/linguistic, sexual orientation, and gender identities, and is offered by a team that routinely provides trauma-informed primary care to violence-affected populations (e.g. refugees), and LGBTQ+ patients, and work within Women's Health.

Methods: This project includes two components. The first is a scoping review of international literature in English over the last decade on primary care follow up for SA survivors post-ED visit. The review includes PubMed, Embase, and CINHAL to synthesize current international evidence base regarding best practices for SA follow-up in primary care. The scoping review is being implemented alongside a PDSA (Plan-Do-Study-Act) quality improvement project aimed at improving timely connection to follow-up care. The "Plan" phase included engaging stakeholders, mapping current operational processes, and collaboratively developing a new pathway to connect patients to 12-week follow up protocol with primary care. The "Do" phase involves an initial 6-week pilot implementing the new process for care connection with the follow up protocol. Data collected for the "Study" phase will include the percentage of patients scheduled for follow-up and seen at each visit (2-5 days, 3,6,12 weeks). A questionnaire aimed at identifying unmet needs will be administered at 3 weeks. During the "Act" phase, we will review follow up rates, and update workflows and protocols. We will then start a second PDSA cycle, informed by initial findings and feedback.

Conclusion: This project strives to improve SA follow up care by contributing to evidence-based practice for post-acute SA follow-up care and offers adaptable process models and protocols beyond the pilot setting.

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Improving Asthma Navigation for Language other than English Populations via Community-Engaged Tailoring

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Background: Children in families with healthcare communication in languages other than English (LOE) are at increased risk of poor asthma care and outcomes. Asthma navigators provide education and care coordination, resulting in improved outcomes and decreased healthcare costs but programs may not enroll LOE families. To address asthma navigation gaps for LOE families we completed community-engaged tailoring of evidence-based asthma navigation delivered via telehealth for LOE families based on EXHALE, the Centers for Disease Control and Prevention National Asthma Control Program.

Setting/Population: We engaged community members in tailoring via Community Engagement Studios (CES) in Spanish, French, Swahili, Somali, Amharic, and Oromo held in Denver or Aurora, CO and conducted in partnership with Latino and African immigrant serving organizations.

Design/Methods: CES took place in person over two half day or one full day session in Spanish or with simultaneous interpretation for other languages. Research staff took detailed notes and summarized each session. Study team members conducted structured reviews of all notes to generate tailoring recommendations. Recommendations were discussed with our Partner Advisory Board and those they endorsed were incorporated.

Results: CES included 46 participants. Tailoring that was incorporated according to EXHALE included: 1) Asthma self-management EDUCATION -focus on asthma as a chronic disease requiring consistent management. Across language groups participants reported limited knowledge of chronic disease in children, reticence to provide medication without symptoms, and interest in knowing if home remedies may be used; 2) ACHIEVEMENT of guidelines-based management-Participants reported a lack of available materials in LOE to help them understand guidelines-based care thus they recommended visits incorporate detailed review of asthma action plans, how to properly use medications, and support for obtaining medications from the pharmacy; 3) LINKAGES and coordination of care -Participants reported support for addressing asthma-related social needs (e.g. transportation, insurance continuity) and assistance with scheduling recommended care; and 4), ENVIRONMENTAL policies & best practices to reduce asthma triggers-Participants reported limited knowledge of triggers and that specific education was needed and provided information on potential culturally-specific triggers to discuss in visits. Participants endorsed intervention delivery via telehealth.

Conclusions: A community-engaged process identified specific tailoring applicable across many language groups. This tailoring may increase effectiveness of asthma navigation to improve asthma outcomes for LOE children and families.

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Adapting a Nested Model Structure to Inform Housing Services and Policy Decision-Making

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Background: Over 770,000 people experience homelessness on a given night in the United States and this population has increased in recent years. Individuals experiencing homelessness may be unsheltered, sheltered, or in supportive housing programs. Homelessness is associated with increased rates of HIV, substance use disorders and an average life expectancy that is, on average, 30 years lower when compared to housed individuals. Evidence-based programs to improve health and housing outcomes exist but are underutilized due to capacity constraints, administrative burden, and more. Simulation models can serve as virtual laboratories to identify and pull various "levers" (be they policy or practice) to optimize service delivery and rapidly test novel approaches, but there is a lack of comprehensive policy models of the housing continuum.

Setting/Population: We developed the Improving Health and Housing Outcomes through a Simulation and Economic (iHOUSE) model, an agent-based model of the population of people along the spectrum of homelessness in urban settings in the US.

Methods: Agent-based models, which represent individuals as autonomous, heterogeneous agents who interact with each other and their environments, are well-equipped to incorporate aspects of housing systems which influence health. The iHOUSE model includes people experiencing homelessness, case workers, and medical and non-medical outreach professionals as key agents constituting housing service systems. On a weekly timestep, individual attributes such as housing status, income, gender, substance use and HIV status along with probabilistic interactions determine individuals' traversal through these systems and subsequent health states. Model structures were developed through stakeholder engagement, and parameters are informed by linked administrative data.
The iHOUSE model includes four housing states– unsheltered homelessness, congregate shelter, non-congregate shelter, and supportive and affordable housing–subdivided into housing archetypes. The supportive/affordable housing state includes archetypes of permanent supportive housing and voucher-supported housing, each governed by unique rules for eligibility and multifaceted processes to access. We adapted Susceptible, Exposed, Infected, Recovered (SEIR) models, a common structure of infectious disease transmission models, to model PSH and voucher housing as social service systems, a novel application of this framework. Over time, simulations may reveal emergent patterns under various policy scenarios (e.g., expanding voucher programs or providing long-acting HIV medication at shelters).

Conclusions: The iHOUSE model demonstrates a novel structure to integrate health and social system dynamics into a flexible, comprehensive policy simulation tool . Future research could adapt this nested structure to other public health systems to more efficiently identify bottlenecks, allocate resources, and make policy decisions.

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Implementing Group-Based Lifestyle Medicine: The Role of the Healthcare Practitioner

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Background: Group-based lifestyle medicine programs present a promising path to preventing and managing chronic diseases and supporting patient wellbeing. Establishing effective implementation strategies can enhance the scalability of comprehensive lifestyle medicine programs in practice.

Methods: This convergent mixed methods study investigated the role of the program deliverer in the feasibility and effectiveness of a group-based program: PAVING the Path to Wellness. Semi-structured qualitative interviews were used to explore differences in perceived feasibility between physician and non-physician (e.g., allied health professionals) practitioners trained to deliver the program. Mixed linear models assessed differences in program effectiveness by type of healthcare practitioner (physician and non-physician practitioner) delivering the program.

Results: Qualitative results supported that the PAVING program was feasible to implement, but that overall feasibility was greatly influenced by factors such as billing capabilities and practitioner experience. Quantitative results revealed that the program's impact differed significantly based on the type of healthcare practitioner, with participants in non-physician-led groups seeing more improvement in health behaviors following the program. Data integration revealed that training and experience in lifestyle medicine and administrative infrastructure (e.g., billing, recruitment) were crucial to program effectiveness.

Conclusion: There is a need to scale practice-based training, promote policies for reimbursing preventive care, and build the administrative infrastructure to support lifestyle medicine group visits in real world practice.

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Championing Care Coordination & Integrated Case Management (CCICM) for Complex Rural Veterans

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Research Objective: The Care Coordination and Integrated Case Management (CCICM) Enterprise-Wide Initiative (EWI), funded by the Dept. of Veterans Affairs (VA) Office of Rural Health (ORH), addresses disparities in care coordination and integrated case management by implementing a structured, evidence-based framework. This approach strengthens

interprofessional collaboration, optimizes resource use, and ensures Veteran-centered care planning across VHA and community settings.

Study Design: The Seattle-Denver Center of Innovation (COIN) Evaluation Team provides comprehensive evaluation of implementation and sustainability of the CCICM rural initiative to understand impact and outcomes. The overall objective is to evaluate the implementation and sustainability of the CCICM rural initiative. This partnered evaluation is conducted using concurrent multi methods. The Evaluation Team works in collaboration with site Co-Coordinators, VA Central Office (VACO) CCICM ORH EWI Liaison Team, and the CCICM Consortia Leads.

Setting/Population: Rural Veterans with complex medical and/or behavioral health conditions are identified and assigned a lead coordinator (LC) registered nurse (RN) or social worker (SW) to provide case management and care coordination across the continuum of care, within and external to the VA, to optimize health care outcomes.

Principal Findings: A total of 1,039 Veterans, 861 of whom were rural, were served by the initiative in 1,837 encounters across the six Fiscal Year 2025 CCICM EWI sites. Veterans who received a LC at one of the six CCICM EWI sites experienced a mean decrease in emergency department visits from 9.6 in a 6-month period down to 0.8 in the 6 months post LC engagement. These same Veterans also experienced a mean decrease in hospitalizations from 2.4 hospitalizations in a 6-month period to 0.2 hospitalizations in the 6 months post LC engagement.

The six rural VA sites trained 2,481 clinicians and conducted 210 educational sessions, targeting staff within Patient Aligned Care Teams (PACTs), Mental Health, Community Care, and Specialty Care.

Qualitative analyses of interviews and focus groups revealed three factors as facilitators to CCICM implementation: having dedicated CCICM staff, strong communication, and ongoing support. Conversely, barriers to implementation span operational, cultural, and resource-related domains, influencing staff engagement, program integration, and Veteran access to care. Understanding these factors is essential for leadership to guide strategic decisions, allocate resources effectively, and ensure program resilience.

Conclusions: The inaugural year evaluation of the CCICM initiative demonstrates its effectiveness across multiple dimensions, including Veteran outcomes, staff engagement, facility-level processes, and organizational impact. These findings provide evidence that CCICM is a valuable and sustainable model for improving care coordination and enhancing health outcomes for rural Veterans.

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Not Just a Disease of the Young: Rising Syphilis in Older Adults and the Need for Dermatologic Vigilance

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Background: Syphilis has reemerged as a major public health concern in the United States, with increasing attention focused on congenital and reproductive-age infections. However, recent surveillance data reveal a concurrent and under-recognized rise in syphilis among older adults.

Setting/Population: This analysis examines trends in primary and secondary syphilis among adults aged 65 years and older in Texas, comparing state-level patterns within national epidemiologic data.

Methods: Surveillance data were obtained from the Centers for Disease Control and Prevention (CDC) National Center for HIV, Viral Hepatitis,

STD, and Tuberculosis Prevention (NCHHSTP) AtlasPlus platform and the Texas Department of State Health Services (DSHS) Sexually Transmitted Disease Surveillance Report.

Results: Between 2012 and 2023, cases of primary and secondary syphilis among adults aged 65 years and older increased substantially at both the national and state levels, representing one of the steepest proportional increases across age groups. Despite this rise, syphilis in older adults remains underrecognized, and cutaneous manifestations may be misattributed to age-related dermatoses or medication reactions. Because secondary syphilis often presents with characteristic skin findings, dermatologists are uniquely positioned to serve as frontline diagnosticians in this population.

Conclusions: This work demonstrates how publicly available surveillance tools can be applied to identify underrecognized infectious disease burden and inform clinical decision-making. Increased awareness of syphilis epidemiology in older adults and maintenance of age-inclusive differential diagnoses may improve early detection, reduce progression to systemic disease, and help address a growing but overlooked reservoir of infection.

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Identifying Family Relationships from Electronic Health Records: A Machine Learning Approach

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Background: Family health history remains one of the strongest predictors of disease risk, yet systematically capturing familial relationships in clinical data has been historically intractable. While EHRs contain rich demographic data, traditional record linkage methods are designed for identifying duplicate individuals—not detecting complex familial connections. This methodological gap limits our capacity for population-scale hereditary disease surveillance, multi-generational outcome tracking, and family-centered pragmatic research. We developed and validated a machine learning framework to automatically identify mother-child, father-child, sibling, twin, and partner relationships using only routinely collected EHR demographic identifiers.

Setting/Population: Indiana Network for Patient Care (INPC), a regional health information exchange comprising over 45 million patient records, linked to Indiana Natality Dataset birth records to establish gold-standard verified family relationships for model training and validation.

Methods: We developed five relationship-specific random forest (RF) classifiers using 14 engineered features: age difference, categorical age ranges (junior under 18, adult 18-50, elder over 50), Levenshtein edit distances for last name, middle name, phone number, mailing address, city, and ZIP code, sex encoding, sex match indicator, state match indicator, and SSN match indicator. Comparing all pairs among 45 million individuals would generate over 100 billion comparisons. To create a manageable set of negative class pairs (non-relationships), we implemented a three-tier blocking strategy (name, address, demographic), reducing comparisons to 121 million pairs. These were combined with verified positive cases (true family linkages) from the gold-standard dataset for training and testing. We optimized RF hyperparameters using randomized search with 5-fold cross-validation, evaluating 100 configurations per model and selecting parameters that maximized F1-score on validation folds.

Results: Evaluated on hold-out test sets of 1.5 million record pairs per model, with only 2% of predictions resulting in false positives and false negatives. All five models achieved F1-scores between 93-99%: Mother-Child (95%), Father-Child (96%), Sibling-Sibling (93%), Twin-Twin (99%), and Partner-Partner (94%), with precision and recall consistently above 93%. F1-score is the harmonic mean of precision and recall. Temporal robustness testing (20-year backward shift of birth dates) maintained 99% precision, confirming generalizability beyond training cohorts.

Conclusions: This work establishes the first comprehensive automated machine learning framework for family relationship identification

from EHR data. By extending traditional record linkage beyond individual-level matching, this approach enables population-level studies of hereditary disease transmission, multi-generational health outcome tracking and family-centered study design.

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Leveraging annual retreats to support program evaluation and adaptation: A collaborative, rapid mixed methods approach

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Background: Asthma is the most prevalent chronic pediatric condition, associated with substantial health disparities, and is a leading cause of school absenteeism. The Better Asthma Control for Kids (BACK) program aims to reduce asthma disparities and improve asthma control for children in Colorado. BACK is an asthma navigator-school nurse collaborative program providing tailored education, care coordination and social needs resources for students and families. Using an annual retreat, we leveraged partner and participant perspectives to evaluate and inform program adaptation and planning for future implementation.

Setting/Population: The BACK program is in its third implementation year (2023-24, 2024-25, 2025-26) and delivered in four regions across Colorado: Colorado Springs, Lower Arkansas Valley, Morgan/Weld counties, and Mesa/Delta counties. We obtained data from key program partners (asthma navigators, school nurses) and recipients (children with asthma and their caregivers).

Methods: We used a mixed methods approach, synthesizing findings from qualitative interviews and periodic reflections between December 2023-July 2025 with quantitative time-cost, and health outcomes metrics. Data collection was informed by the Practical, Robust Implementation and Sustainability Model (PRISM). Our research team convenes annually for a retreat to review annual data from qualitative and quantitative sources, evaluate program implementation including previous adaptations, identify priority recommendations for subsequent adaptation, and plan for implementation in the following program year.

Results: Qualitative data (n=107 interviews) reviewed in the retreat were from 40 school nurses, 52 caregivers, and 15 navigators. Quantitative data reviewed in the retreat included a time-cost measure and caregiver-reported health outcomes of enrolled participants (Y1: n=112, Y2: n=151). High priority recommendations for future adaptations targeted key PRISM outcomes of reach and implementation. These included: 1) improve and expand enrollment resources to highlight the value of BACK from participating caregivers , 2) create a one-page program summary for families to give to health care providers to increase care coordination capacity 3) bolster connections to social determinants of health organizations by updating resource lists with top regional resources, and 4) simplify asthma newsletter content and streamline distribution to families.

Conclusion: Conducting an annual retreat and leveraging natural gaps between implementation years (e.g. summer vacation from school) presented an opportunity to comprehensively examine data collected throughout the year, identify challenges, and prioritize and plan adaptations. Having this defined process in place for iterative evaluation and planning helps to advance pragmatic research for complex interventions requiring iterative adaptions to fit changing contexts.

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Measuring co-creation during the engagement process in research: A pathway forward

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Background: Co-creation in research engagement, a collaborative process among all partners (e.g., patients, healthcare providers, community members, and researchers), is foundational to equitable and community-engaged health research. Despite its growing use, the field lacks a pragmatic and validated measure to assess the quality of co-creation engagement among Spanish-speaking partners who play an increasingly central role in research. This PCORI-funded fills this gap with a validated measure for cultural and linguistic appropriateness using a rigorous transcreation process (i.e., creative process of adapting content from one language to another, not just word-for-word, but to evoke the same feeling, impact, and cultural resonance as the original).

Setting/Population: Representing diverse racial and ethnic identities, backgrounds, and geographic locations, a national sample of Spanish-speaking patients, caregivers, community members, healthcare professionals, and researchers, with prior patient-centered experience, informed the validation of a new co-creation measure.

Methods: Following finalization of the English survey, qualitative research team members translated the instrument into Spanish using a professional translation service. Bilingual members of the core study team, including a Spanish speaking Co-I, participated in weekly meetings over a two-month period to adapt this translation using transcreation principles. A bilingual qualitative analyst from the core team subsequently conducted cognitive interviews in Spanish to evaluate item clarity, comprehension, and interpretation. We recruited intended users of the measure (n=20) for cognitive interviews with balanced representation: patients/caregivers (n=6), community members (n=6), healthcare professionals (n=4), and researchers (n=4). We used an iterative coding process to analyze data and refine survey content. Interview findings were reviewed by a national group of bilingual experts (n=8) who provided recommendations for revisions. The co-creation measure was then released for national field testing using an online and paper-based system.

Results: The participatory transcreation process resulted in developed list of best practices. Changes were made to 32 of 39 survey items based on expert, research team and interviewees' input to increase language clarity, culturally relevance, and enhanced comprehension (e.g., the addition of examples and clearer definitions of key concepts). The finalized Spanish survey is undergoing national field testing (n=120-150) until

January of 2026. The measure will be disseminated in May/June 2026.

Conclusions: This Spanish validated engagement measure will advance the Science of Engagement by strengthening the inclusion of Spanish-speaking partners in engagement research, and assessment of their experiences as partners. In addition, this study offers a rigorous and comparable evaluation of co-creation engagement processes in research across diverse settings.

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A Pragmatic Tool for Assessing Cognitive Flexibility: The Flexibility Inventory Questionnaire (FIQ)

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Background: Cognitive flexibility, or the ability to adapt thinking and behavior in response to change, is a critical component of executive functioning (EF). Difficulties in flexibility are common in neurodivergent children and can interfere with learning, relationships, and daily functioning. However, most existing caregiver-report measures, such as the Behavior Rating Inventory of Executive Function (BRIEF), that measure behaviors such as cognitive flexibility include over 60 items and are time-consuming to complete. There is a need for brief, pragmatic measures that are sensitive to change and can be used both in clinical research and educational settings. Short, reliable tools can reduce respondent burden, facilitate repeated assessment during intervention, and support data-driven decision making in schools where time and resources are limited.

Setting/Population: Participants were 140 caregivers of 8-11-year-old children with autism or ADHD enrolled in a comparative effectiveness trial of two evidence-based EF interventions in schools. The sample was ethnically and linguistically diverse (32.1% Hispanic, 32.1% non-Hispanic White, 20.7% Black); 80% completed measures in English and 20% in Spanish.

Methods: The Flexibility Inventory Questionnaire (FIQ) was developed as a 7-item caregiver-report measure assessing the frequency and impact of flexibility difficulties in everyday life. The measure also includes a brief introductory description of what is meant by flexibility and a couple of relevant examples. Items addressed domains such as independence, social interaction, and task completion, rated from 0 (no interference) to 3 (severely interfering). Items are summed for a total score range from 0 to 21. Psychometric analyses examined internal consistency, convergent validity with the BRIEF Global Executive Composite, and pre-post intervention sensitivity to change.

Results: Baseline FIQ scores were approximately normally distributed without severe skew, or evidence of floor or ceiling effects ($M = 10.88$, $SD = 5.29$). The FIQ demonstrated excellent internal consistency (Cronbach's $\alpha = .91$). Scores correlated strongly with BRIEF Global Executive Composite scores ($r = .65$, $p < .001$), supporting convergent validity. The FIQ was sensitive to pre-post changes following both EF interventions, with a significant effect of time ($F = 33.06$, $p < .001$) but no effect of time by intervention ($p = .746$). There was a medium effect size for pre-post change in the combined sample (Cohen's $d = 0.52$).

Conclusions: The FIQ is a brief, reliable, and valid tool that captures meaningful changes in cognitive flexibility over time. Its efficiency and sensitivity make it well suited for both clinical trials and school-based monitoring of intervention progress. Future directions include evaluating its use across diverse populations and translation for broader dissemination.

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Early Identification and DKA Avoidance in Type 1 Diabetes: Implications for Long-Term Glycemic Outcomes

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Background: Diabetic ketoacidosis (DKA) at type 1 diabetes (T1D) diagnosis is associated with poorer long-term glycemic control, measured by hemoglobin A1c (HbA1c). Early detection through autoantibody screening and monitoring dramatically reduces the risk of DKA, but it is unclear if avoiding DKA improves long-term outcomes or reflects differences in disease phenotype. Understanding the causal impact of avoiding DKA could change the cost/benefit ratio for T1D screening programs.

Setting/Population: Colorado children diagnosed with T1D at the Barbara Davis Center between 2005-2021 who were enrolled in screening and monitoring programs (screened cohort) and community-diagnosed children presenting with and without DKA (community cohort).

Methods: This study uses longitudinal HbA1c data to compare three groups: screened patients, community-diagnosed patients without DKA, and community-diagnosed patients with DKA. By including screened patients across phenotypes, we aim to isolate the effect of DKA avoidance on glycemic trajectories. Outcomes are analyzed to evaluate HbA1c trajectories over time.

Results: The screened cohort rarely presented with DKA (4.9% vs 48.5% in the community cohort). At diagnosis, A1c differed significantly across cohorts, with the lowest values observed among screened-active patients (7.34 ± 2.15%), higher values among screened-inactive patients (9.40 ± 3.26%), and the highest values among community patients not enrolled in studies (11.86 ± 2.34%). Tukey-adjusted pairwise comparisons confirmed significant differences between all baseline cohort pairs (all $p < 0.05$). At 9–15 months post-diagnosis, mean A1c values were similar across cohorts, including screened-active (7.88 ± 1.54%), screened-inactive (8.00 ± 2.15%), and community patients (8.10 ± 2.18%), with no significant pairwise differences on Tukey testing. In unadjusted linear regression models of 12-month A1c, no significant differences were observed between screened-active patients and either screened-inactive patients (β = +0.06%, 95% CI −0.74 to +0.86) or community patients (β = +0.22%, 95% CI −0.13 to +0.58), and cohort membership explained minimal variance in 12-month A1c ($R^2 \approx 0$).

Conclusions: At 12 months post diagnosis, there was no significant difference in A1c between screened and community patients. Initial findings support the hypothesis that avoiding DKA through early identification and monitoring may confer improved long-term glycemic outcomes. These results have implications for pragmatic screening approaches and policies, highlighting the potential for targeted early interventions to improve pediatric diabetes outcomes. Further analyses adjusting for possible confounding variables and incorporating longer follow up are needed.

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Qualitative Analysis of Interviews with School Leadership Regarding Maintenance of a School-Based Asthma Program

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Background: The Better Asthma Control for Kids (BACK) program is a school-based intervention designed to improve asthma management in children with poorly controlled asthma. BACK sends community health workers into schools to educate students with asthma and coordinate care with school nurses and the students' caregivers. Currently grant funded, our objective was to determine what factors are likely to impact the sustainment of BACK at the school level once grant funding ends.

Setting/Population: BACK was delivered in four regions across Colorado in under-resourced and/or rural schools with high free or reduced lunch rates: Greeley-Weld-Morgan, Lower Arkansas Valley, Mesa-Delta-Montrose, and Pikes Peak. At BACK school sites, we recruited members of school leadership including principals and vice principals or school administrators upon referral.

Methods: We recruited school leadership via email for a 30-minute virtual interview following a semi-structured guide informed by the PRISM framework. Interviews focused on administration perspectives on the program and explored background knowledge of BACK, its perceived value within schools, school budgets and decision-making regarding program continuation, and the likelihood of program sustainment following research funding. Data was analyzed using a rapid analysis matrix and presented to the research team for internal use and program development.

Results: School leaders (n = 9) showed inconsistent familiarity with the BACK program, as school nurses are typically responsible for program delivery. Although they noted the value of BACK for individual students, leaders expressed concerns about the limited scope of the project relative to required resources, including school nurse capacity and financial burden. A majority stated that they doubted their ability to maintain the program without external support, due to financial pressures and declining budgets. Funding decisions are the purview of school leadership, as principals have authority over resource allocation and goal-setting within schools. Commonalities emerged between interviews, with participants citing a desire for more communication with the research team, annual reports on their students' progress, and resources to train themselves.

Conclusions: Program maintenance is likely to be dependent on individual school budgets and availability of outside funding. Establishing direct communication with school leadership is critical, as they have financial discretion that impacts program sustainment. Resources such as guidebooks and training may facilitate long-term incorporation of asthma management into schools. With variable resources and needs, BACK may also be adapted to better align with school budgets and staffing constraints while maintaining core programmatic functions.

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Enhancing Veteran Care through Relational Facilitation: Strategies and Mixed Methods Outcomes

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Background: Veterans receiving care in Veterans Health Administration (VA) and non-VA settings often face fragmented care coordination, leading to adverse outcomes. This study aimed to enhance Veteran care coordination through implementing three evidence-based interventions. Relational Coordination (RC) theory emphasizes enhancing communication and relationships to strengthen team dynamics, which improves care quality. This study evaluated whether RC guided facilitation (relational facilitation) enhanced collaboration and coordinated care within and between clinical teams during intervention implementation.

Setting/Population: Participants included nurses, social workers, VA leadership, managers, and specialty care providers at 15 geographically diverse VAs.

Methods: From 2021-2025 trained facilitators used relational facilitation to support intervention implementation across 15 VAs. Relational facilitation activities include team role identification, relational map development, RC Survey deployment, and RC-related SMART (specific, measurable, attainable, relevant, time-based) goal setting. Relational facilitation impact was assessed using convergent sequential mixed methods integrating survey data and participant interviews.

Results: Nine sites (n=138/1017 participants) completed pre/post surveys, with an 8.3% average RC Index score increase post-implementation for most sites (n=7/9). This increased trend suggests a positive impact of relational facilitation on communication and collaboration within and between clinical teams. Interview data indicated relational facilitation fostered team resilience, strengthened team dynamics, and improved care coordination.

Conclusion: Relational facilitation promoted pragmatic research in real-world settings by enhancing teams' collaboration and intervention implementation. Relational facilitation can improve research implementation, teamwork, and patient outcomes.

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Application of Brainwriting Premortem to Enhance Sustainment of a Veterans Health Administration Nationwide Practice Change

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Background: Studies indicate only 14% of evidence-based practices (EBP) are implemented in clinical settings. Implementation strategies expedite the translation of knowledge into practice by enhancing EBP implementation and sustainment. Brainwriting is a method where people silently write ideas and share them with group members to embellish or contribute new ideas. Premortem methods involve predicting potential failures and specifying causal factors. A novel implementation strategy, brainwriting premortem, combines these two methods to increase EBP delivery and sustainment. Brainwriting premortem is a rapid activity that involves a group of people who know the EBP implementation context silently brainstorming potential reasons why an EBP might fail. The activity is followed by developing and executing solutions to proactively address potential failure points. The objective of this study was to use brainwriting premortem to enhance implementation and sustainability of Care Coordination and Integrated Case Management (CCICM), an EBP in the Veterans Health Administration (VHA).

Setting/Population: Participants included nurses, social workers, specialty care providers, leadership, and non-clinical support staff from nine geographically diverse rural VHAs implementing CCICM.

Methods: In 2024 and 2025, the study team virtually conducted brainwriting premortem with year 1 sites (n=6) and year 2 sites (n=3) implementing CCICM. Brainwriting premortem sessions with sites were completed in one existing CCICM virtual meeting each year. Brainwriting premortem involved seven steps: 1) Brainwriting premortem education (5-10 minutes); 2) Diverse partners used a site-specific link to an anonymous web-based platform to write potential reasons why CCICM might fail at their site (10 minutes); 3) Three qualitative analysts conducted deductive content analysis of possible failure points with emergent categories; 4) Failure points were designated into one or more categories as agreed upon by analysts; 5) Categories were ranked in descending order based on number of failure points tallied in each category; 6) Results were presented to sites via standardized reports and discussion; and 7) The study team and National CCICM staff supported sites with actionable plans targeting the top three categories with the most failure points.

Results: Top three categories with the most failure points for both years included lack of buy-in/change readiness, demanding workloads, and misperceptions of CCICM. Actionable plans to mitigate these included monthly lunch and learns, sharing quantifiable impact data, disseminating CCICM newsletters, and enhancing educational efforts.

Conclusions: Brainwriting premortem promoted CCICM implementation and enhanced sustainment by prompting sites to preemptively address contextually relevant failure points. All sites are successfully in CCICM sustainment phase. Future studies can use brainwriting premortem to enhance EBP implementation and sustainment.

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Outcomes for labor induction compared to expectant management among women receiving hospital-based, midwifery-led care

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Introduction: Use of labor induction has increased rapidly for medical and non-medical reasons, raising questions about its impact on cesarean birth rates. With growing incidence of elective induction of labor (IOL) at 39 weeks, uncertainty remains about how care practices associated with induction influence outcomes. Observational studies have reported varied cesarean birth rates following induction. This issue is particularly relevant for midwives, who prioritize physiologic labor and recognize benefits of spontaneous labor in achieving vaginal birth. This study evaluated cesarean birth rates after labor induction in midwifery-led practice settings.

Methods: We conducted a retrospective cohort study (2017-2023) of term births (N=7345) with midwifery-led intrapartum care in 4 practice groups across 3 hospitals. Outcomes were stratified by parity and gestational age. We compared cesarean birth rates between labor induction and expectant management for each week of gestation, replicating prior methodology. Logistic regression was used to calculate odds ratios for cesarean following induction, adjusting for relevant covariates.

Results: The overall cesarean birth rate was 10.7%; the nulliparous, term, singleton, vertex cesarean birth rate was 18.4%. Labor induction occurred in 28.8% of births. Cesarean birth rates following induction ranged from 10.5% at 39 weeks to 31.1% at 42 weeks. No significant differences in cesarean birth rates were observed between induction and expectant management groups across gestational ages in adjusted analyses. Secondary outcomes, including postpartum hemorrhage, APGAR scores, and NICU admission showed no significant differences across groups. Time from admission to birth was significantly longer following induction, averaging 31.5 compared to 12.6 hours for spontaneous labor at 37 weeks.

Discussion: Among patients receiving exclusive midwifery care, labor induction did not increase cesarean birth rates. Findings suggest that clinical context, including midwifery-led care and collaborative practice environments, may influence outcomes. Further research is needed to explore impact of induction practices on risks for cesarean birth.

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RAND Appropriateness Panel for Management of Screening-Identified Celiac Disease Autoimmunity

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Background: Celiac disease (CeD) is one of the most common autoimmune diseases, with a rising worldwide prevalence and incidence impacting at least 1% of the population. Although guidelines support targeted screening for those at higher risk of CeD, general population screening remains controversial, and studies are currently in progress. Therefore, CeD screening is already occurring in research and clinical settings, yet there remains no current clinical guidance on how to best manage screening-identified individuals. A multidisciplinary, international RAND/University of California Appropriateness Method (RAM) panel of 22 CeD experts was conducted to identify areas of agreement and disagreement in the clinical approach to management of screening-identified CeD.

Setting/Population: Round One was held at the first annual Celiac Disease Screening Symposium (November 2024) in Aurora, CO. The subsequent round was conducted virtually.

Methods: Statements focused on the management of celiac screening-identified positive individuals based on tissue transglutaminase IgA (tTGA) testing specifically with respect to the role of gastroenterology referral, endoscopy, serologic confirmation, gluten challenge, and monitoring on a gluten-containing diet (watch and wait approach) were considered. Two rounds of REDCap surveys were completed with modification of the survey items between rounds based on feedback from the expert panel through pair and share and world café exercises after Round One. The statements were rated on a 9-point Likert scale where 1=highly inappropriate and 9=highly appropriate. Statements were classified as inappropriate, uncertain, or appropriate based on the median appropriateness rating. Statements were further classified based on the presence of disagreement, which was defined based on the classic RAND criteria of having at least one-third of the ratings in each extreme 3-point range of the rating scale (1–3 and 6–9) and/or a disagreement index parameter of greater than 1.

Results: In Round One, panelists rated 152 statements appropriate, 32 statements inappropriate, and 48 statements uncertain. There was agreement that any screening-identified individual should be offered consultation with a gastroenterologist. Statements regarding the clinical gluten challenge and serologic confirmation yielded the most uncertainty and disagreement. In Round Two, following refinement of statements, panelists rated 126 statements appropriate, 67 statements inappropriate, and 75 statements uncertain. Statements regarding serologic confirmation and the watch and wait approach yielded the most uncertainty and disagreement in Round Two.

Conclusions: The RAND panel results from the first annual Celiac Disease Screening Symposium offers a structured approach to inform management of screening-identified tTG IgA positive children and adults in the clinical setting.

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Implementation and Feasibility of Technology-Augmented Psychotherapy for Anxiety and Depression

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Background: Anxiety and depression are common health conditions that frequently go untreated or undertreated due to limited access to effective treatments. Technological innovations present exciting opportunities to increase access to and improve quality of mental health care. In this pilot study we tested the feasibility and acceptability of adapting a previously established technology-augmented psychotherapy model to a new setting and population.

Setting/Population: Participants were 50 adults endorsing mild-moderate anxiety and/or depressive symptoms who were interested in participating in skills-based psychotherapy and willing to utilize a phone-based mental health App.

Methods: Participants utilized the open-source mindLAMP mental health App that encouraged them to complete daily surveys and reflections about their wellbeing, provided opportunities to practice coping skills learned in psychotherapy and collected passive-data on habits and wellbeing (e.g. sleep, activity level). While using the App, participants engaged in up to 6 sessions of structured Cognitive-Behavioral Therapy (CBT) by telehealth with a trained clinician and met with Digital Navigators who helped them review insights from their data and troubleshoot technical issues. Quantitative data on mood, anxiety, sleep and wellbeing were collected at multiple time points across study participation. Qualitative interviews to assess acceptability of the model were conducted at study end.

Results: The mean age of participants was 36.6 years (SD = 10.6) and participants were 82% female, 80% White and 82% non-Hispanic. Attrition was low with 89% of participants completing all 6 sessions of psychotherapy and 93% completing 3 or more sessions. Preliminary linear mixed-models show reductions over time in

depressive symptoms (PHQ-9 estimate = −0.25, SE = 0.09, p = .007), anxiety symptoms (GAD-7 estimate = −0.51, SE = 0.10, p < .001), and sleep disturbance, (PROMIS sleep disturbance estimate = −0.33, SE = 0.12, p = .007) as well as increases in therapeutic alliance with therapists (Working Alliance Inventory-Short Revised estimate = 1.51, SE = 0.19, p < .001) and the mindLAMP App (Digital Working Alliance Inventory estimate = 0.41, SE = 0.07, p < .001). T-test post hoc comparisons showed significant improvement comparing Visit 1 to Visit 6 for anxiety symptoms, therapeutic alliance with therapist and therapeutic alliance with the mindLAMP App (all p's < .001). Linear mixed models also show improvements over time on perceived stress, disability, social support, flourishing, perceived health and self-efficacy (all p's < .01). Qualitative data coding and analysis is ongoing.

Conclusions: Mental health care models that leverage technology can be feasibly adapted for implementation in varied settings and are acceptable and effective for patients.

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Short Courses in Scientific Writing for Health Services and Pragmatic Researchers

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Background: Academic researchers need to write clearly and persuasively. However, many pragmatic health researchers begin their careers with little formal training in scientific writing and varied writing experience. Researchers often move from writing original, highly technical research papers toward papers directed to broader audiences and more contextual explorations of trends and developments in their fields. In particular, pragmatic health services researchers (HSR) need to write for non-technical audiences to translate research into practice.

Setting/Population: In 2024, we informally assessed interest in additional instruction for professional writing among early- and mid-career researchers in the ACCORDS program at the CU Anschutz Medical Center. In spring 2025, we offered an early-career course that enrolled 5 fellows and postdoctoral trainees from career development programs. In fall 2025 we conducted a mid-career course that included 7 successful HSRs, including program directors who provided writing mentorship.

Methods: The early-career course consisted of 9 biweekly sessions. Each session emphasized a component of an original research paper (introduction, methods, tables and figures, results section, discussion, abstract). Final sessions addressed topics like managing coauthors and responding to peer review. The mid-career course consisted of 8 biweekly sessions on writing "reflective essays" such as editorials and commentaries. Two sessions focused on mentoring early-career writers.

In both courses, session 1 focused on goal-setting and "writing stories" from each participant. 90-minute sessions included two 20-minute segments in which participants reviewed a component of their writing in progress; comments ranged from thematic feedback to word choice and paragraph structure. We evaluated using in-person, qualitative discussions during the final session.

Results: Early-career participants reported they disliked the writing process and felt poorly trained to write. Mid-career participants reported that lack of time and unfamiliarity with writing reflective papers were major barriers to writing. Mid-career participants felt a responsibility to provide writing mentorship for their trainees but expressed frustration that their mentees lacked writing skills and training. Both groups rated the course and individual sessions highly, ratified the importance of the content, felt that the course was a novel offering, and found the sessions enjoyable.

Conclusions: Early experience confirms that writing courses fill important gaps in the professional development of health services researchers. The attitudes of these selected participants may not reflect broader attitudes toward writing among early and mid-career researchers. Despite this reservation, we believe

professional writing is a neglected component of professional development that can be addressed in short course formats.

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Caregiver Engagement with a Digital Autism Intervention: Cross-Sample Evidence for Pragmatic Trials

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Background: Autism prevalence has increased substantially, while shortages of specialized providers have led to long delays in accessing evidence-based treatments (EBTs). Over half of autistic youth exhibit externalizing behaviors, which drive service utilization and contribute to caregiver stress. Self-guided digital health interventions offer a scalable approach to increasing access to EBTs, but caregiver engagement remains a major limitation to real-world impact.

Attend|Behavior is a self-guided mobile intervention adapted from the Research Units in Behavioral Intervention Parent Training (RUBI) program, designed to equip caregivers with behavioral strategies to reduce dysregulated behavior and improve adaptive skills. Although caregivers report high acceptability and feasibility, engagement patterns and differences between research and real-world implementation are not well understood.

Setting/Population: Caregivers of youth with autism or developmental disabilities in the state of Maine were provided access to Attend|Behavior through a state-funded dissemination effort targeting families waiting for behavioral services.

Methods: All families who received Attend|Behavior clinically were invited to participate in research. Secondary analyses of caregiver engagement was characterized using the Connect, Attend, Participate, Enact (CAPE) framework. The sample included 212 caregivers (242 children); one child per caregiver was retained, prioritizing selection of a research-enrolled child when applicable and otherwise randomly selecting among eligible children. Engagement outcomes were summarized descriptively, and Wilcoxon rank-sum, Pearson's chi-squared, and Fisher's exact tests compared clinical and research groups.

Results: No significant differences were observed between groups in child age or gender. There were no group differences regarding engagement as it relates to connecting with the digital app (i.e., approximately ¾ of caregivers completed the first lesson within 2 days). There were group differences in Attend and Participate engagement outcomes: The research group completed more lessons overall ($p < 0.001$; 9 versus 3, out of 42). The research group also demonstrated more days until last activity ($p = 0.002$; 103 versus 34 days), more check-ins ($p < 0.001$), and more incidents logged ($p < 0.001$).

Conclusions: Caregiver engagement with Attend|Behavior was significantly higher in a research sample than in real-world implementation for two out of three engagement outcomes. These findings underscore the need for pragmatic trials that better reflect real-world conditions and expectations when evaluating digital health interventions for families of autistic youth, especially after families connect with the digital tool.

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Clinician-perceived patient determinants shaping high intensity rehabilitation delivery and recovery in skilled nursing facilities

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Background: More than 64% of older adults are discharged from skilled nursing facilities (SNFs) at functional levels that predispose them to adverse events.1,2 Although improving physical function can reduce this risk;3,4 rehabilitation is often underdosed.5 High intensity resistance training improves physical function of community-dwelling older adults,1,6-8 but is underused in medically

complex populations.3,4,9 A recent multi-site cluster randomized hybrid type I effectiveness-implementation study evaluated whether a high intensity rehabilitation approach (i-STRONGER) improved functional outcomes as compared to usual care while examining factors influencing intervention delivery in real-time to inform adaptations to the i-STRONGER implementation approach and future implementation efforts. This study performed during the recent trial aimed to (1) describe the use of real-time formative feedback to adapt implementation strategies during intervention delivery, and (2) use summative data to identify clinician-perceived patient characteristics influencing intervention delivery and physical function response to i-STRONGER to inform program sustainability and scalability.

Setting/Population: Rehabilitation clinicians (N=146) representing 15 intervention-arm i-STRONGER SNFs across 8 states, including Directors of Rehabilitation, physical therapists, physical therapist assistants, occupational therapists, and certified occupational therapist assistants.

Methods: Semi-structured, virtual interviews and focus groups were conducted with rehabilitation clinicians at three timepoints. Interview guides and analyses were informed by the Practical, Robust Implementation and Sustainability Model, or PRISM framework.10 Audio-recorded data were professionally transcribed and analyzed using a rapid qualitative analysis approach.11,12 Rapid analysis was conducted in real-time to inform the study team's adaptations of implementation strategies. To identify clinician-perceived patient characteristics influencing intervention delivery and response, factors were organized using the International Classification of Functioning, Disability and Health Framework.13

Results: Rapid qualitative analysis informed two implementation strategy adaptations during the trial: (1) development of a patient-facing education document available in English and Spanish, and (2) clinician mentorship for patients with cognitive impairment or lower functional status. Summative qualitative analyses are underway to characterize clinician-perceived patient factors influencing delivery of i-STRONGER.

Conclusions: Clinician-identified patient characteristics informed implementation adaptations in real-time to optimize delivery of high intensity rehabilitation for medically complex older adults in SNFs during a multi-site randomized controlled trial. Ongoing summative analyses will inform future strategies for broader implementation of high intensity rehabilitation.

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Comprehensive Perspectives of a Multidisciplinary Intraoperative Margin Assessment Protocol

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Introduction: Breast-conserving surgery (BCS) has oncologic outcomes equivalent to mastectomy, with lower post-operative morbidity and higher patient-reported satisfaction. We previously conducted a feasibility study of a multidisciplinary intraoperative assessment protocol as an alternative to a traditional cavity shave margins in BCS. To facilitate implementation, we aimed to understand barriers and facilitators among the multidisciplinary

participants and explore concerns among team members who did not participate in the feasibility study.

Setting/Population: Clinician participants were recruited from a single comprehensive cancer center within an academic hospital in Aurora, Colorado.

Methods: Breast surgery team members from surgery, radiology, pathology, and the operating room (OR) were invited to participate in semi-structured interviews to assess perspectives on the intraoperative margin assessment protocol. The interviews were audio-recorded and transcribed verbatim. Rapid qualitative methodology was employed to identify common themes.

Results: From May – August 2024, thirteen participants were interviewed: three breast surgeons, two radiologists, five pathologists, and three OR nurses. Six interviews were conducted with individuals who participated in the feasibility study and seven with individuals who did not. Major themes included adopting this protocol across new institutions as a standard of care, development of a standardized training process for involved personnel, supporting ongoing collaboration between multidisciplinary team members, and overall positive outcomes for the patient. Minor themes include barriers related to staffing shortages and reducing overall OR time.

Conclusion: Our results demonstrate that involved participants view widespread implementation as both feasible and a great potential benefit to patients. Those who were not involved in the procedure expressed reservations for implementation, identifying inadequate staffing and equipment malfunctions as the primary barriers. Both involved and not involved study participants ultimately think widespread implementation is possible with appropriate education and instruction. This feedback will be used to further inform change management strategies and facilitate implementation of the intraoperative margin assessment protocol at other institutions.

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Empowering Veterans and Care Partners: Pragmatic Approaches to Enhance a VA Home Health Research Study

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Background: Effective patient-centered care and engagement are crucial for driving meaningful research outcomes and meeting immediate real-world needs. Within the Department of Veterans Affairs (VA), Veteran engagement groups integrate Veterans and their caregivers (i.e., care partners) as active partners in the design, implementation, and dissemination of the research study. We detail the role of patient and care partner engagement in the Post-Acute Home Health Care for Veterans (HEROES) research study.

Setting/Population: Participants included Veteran patients (n=14), care partners (n=9), clinicians involved in the VA home health care process (n=36), and home health agencies that provide care to VA Veterans (n=23). Additionally, we engaged the VA Eastern Colorado Geriatric Research Education and Clinical Center's Older Veteran Engagement Team (OVET), comprising of 10 older Veterans (ages 65-95) including five men and five women (two of whom are care partners).

Methods: We examined multiple perspectives on VA-contracted home health care services and the processes for selecting a home health agency and payor. A total of 57 semi-structured interviews with 82 unique participants were conducted between August 2023 and November 2024, each lasting approximately 45 minutes via Microsoft Teams. We employed a team-based, content analysis approach, utilizing inductive and deductive coding methods to analyze the transcripts. The OVET was engaged in all stages of the research process through four facilitated 90-minute sessions held between 2020 and 2025. Additionally, OVET collaborated on the dissemination of abstracts and presentation slides.

Results: During grant preparation, OVET identified the need to include caregiver interviews, as they often make home health care decisions. During the study, OVET provided feedback on interview protocols and guides (e.g., questions to add, suggested language). To address recruitment challenges, OVET recommended changing the term “caregiver” to “care partner”, clarifying a care partner’s role, and respecting Veteran’s autonomy by seeking their permission before engaging care partners. These efforts resulted in a patient-facing skilled home health care brochure, with OVET providing valuable iterative feedback on content and design.

Conclusions: The HEROES-OVET partnership exemplifies the value of engaging patients and care partners throughout the research lifecycle. Involving patients in the design, implementation, and dissemination of research drives meaningful outcomes and improves the relevance of findings for specific patient populations. By making Veterans’ and care partners’ voices central to the research, this model led to iterative improvements and impactful results. Engaging these partners fosters trust, enriches research relevance, and enhances real-world impact. The OVET-HEROES model offers a reproducible framework for other study teams aiming to enhance research rigor and impact.

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Rapid and Rigorous Co-creation of Novel Heart Transplantation Decision Aid for a Pragmatic Pilot Trial

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Background: Patients with advanced heart failure often face complex treatment decisions. Currently, there is no formal decision aid (DA) designed specifically for patients considering heart transplantation (HTx). Developing a patient-centered HTx DA addresses an important gap in decision support, and testing it in clinical practice provides insights on how to effectively implement the tool widely.

Setting/Population: This project focuses on patients being evaluated for HTx and their caregivers. The DA was created in collaboration with patients, caregivers, and clinicians, all whose diverse experiences and backgrounds informed the development and design of the tool.

Methods: Our team at the University of Colorado iteratively developed the HTx DA through

collaborating with two national advisory panels (clinician panel, n=7; patient/caregiver panel, n=7) and conducting qualitative interviews (n=9). The initial prototype was informed by clinical expertise in advanced heart failure and the lived experiences of patients and caregivers. We followed a rapid, iterative approach grounded in decisional science standards and refined through a decade of experience developing evidence-based tools at the University of Colorado. The HTx DA draws significantly from our team's prior work with a durable left ventricular assist device (LVAD) DA.

Findings from interviews and advisory panels informed revisions to improve the DA's effectiveness in addressing the complexities of HTx decision making, with the goal of preparing it for pilot testing in early 2026. This pragmatic pilot trial at UCHealth will integrate where the DA into the HTx evaluation workflow to assess acceptability, feasibility, and fit within routine clinical care.

Results: Clinicians emphasized the need to clarify patient eligibility criteria and ensure adaptability for unique patient circumstances. Patients and caregivers highlighted the need to properly reflect the emotional, physical, and psychological complexities of HTx. Across groups, members conveyed the need to balance optimism and hope with realistic expectations of risks and lifestyle changes following HTx. These insights informed adaptations to the DA to prioritize clarity and clinical relevance.

The pilot trial will enroll approximately 20-30 patients undergoing HTx evaluation and their caregivers, who will complete surveys before and after reviewing the DA. The primary goal of this trial is to understand how the DA is received in its intended clinical setting and identify opportunities for refinement before broader implementation.

Conclusions: This project addresses a critical gap in decision-making resources for patients considering HTx. By delivering clear, accessible, and patient-centered information, this DA offers new materials to support patient-centered care and serves as a foundation for future feasibility trials.

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Clinicians' Perceptions of Using old Data in Shared Decision Making

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Background: In the United States, shared decision making has been mandated for implantable cardioverter-defibrillators (ICDs). However, the major randomized trails that support the use of ICDs in heart failure are nearly 20 years old and heart failure care has evolved since then. This qualitative study explores responses from clinicians when asked how they approach using old data (from 2005) when engaging in a shared discussion about ICDs.

Setting/Methods: As part of the DECIDE-ICD trial (n=22) and TRACER-ICD trial (n=18), 40 clinicians from 11 medical centers were qualitatively interviewed about content for ICD decision aids. One of the questions explored how clinicians deal with data from the 2005 SCD-HeFT trial being the primary data still used for ICD discussions.

Results: Three major themes emerged. First, clinicians often believed the SCD-HeFT data was out-of-date due to newer medications, better procedures, and better defibrillator devices. However, they stated that no better data existed, and SCD-HeFT data was often the data they still used. Second, there was variability in how the data was used in decision making. Some clinicians approach shared decision discussions by referencing the risk stats from SCD-HeFT, but quickly move into tailored discussions about age,

comorbidities, and activity level. Others completely avoid SCD-HeFT data and refuse to cite numbers, since they seem irrelevant. Third, many clinicians wished that more recent data could be published on ICD risks and benefits, but lamented that such a study seems infeasible.

Conclusions: Old data such as ICD risks and benefits from the SCD-HeFT trial may be relevant for giving directional trends and for helping numerical people understand, but more personalized discussion is still needed to accurately convey risks. Patient decision aids developers should balance using old data if it is the best available, while highlighting its shortcomings and pointing the patient to a discussion with their clinician.

Table 1: Qualitative responses from clinicians on 3 themes

Theme Quotes
1) Data is out-of-date, but no better data exist. "The risk of these events is dropping modestly compared to many years ago when a lot of the trials upon which the current guidelines are based. There are no relevant current data." – Study 1: S1P1

The data is so old, and it came out at a time when we didn't do a lot of the things we do now…You have to use SCD-HeFT because it's the best data, and there's not really anything more recent. – Study 2: S4, P2

2) Variability in how clinicians use the data. "I try to use the SCD-HeFT data and decision aid as a general framework and foundation, and then I take it a step further and explain to a patient how it may not apply and ways where I think their individual case is different." – Study 1: S7, P3

"This general population number from SCD-HeFT may not necessarily apply to every patient population, especially some of those that we see here." -Study 2: S3, P3

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Leveraging Large Language Models to Automate Chart Review in an R01 Pragmatic Trial

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Background: Chart review is a critical but resource-intensive component of pragmatic and implementation trials, commonly used to determine eligibility and construct analytic datasets. In multisite rehabilitation trials, manual review of clinical documentation creates substantial challenges, including reviewer burden, cost, time delays, and inter-reviewer variability. These challenges are amplified for trials evaluating complex rehabilitation interventions, where eligibility determination requires the synthesis of diagnoses, functional status, and contraindications documented in free-text notes. Large language models (LLMs) offer a potential approach to automating and standardizing chart review while maintaining methodological rigor. The purpose of this work is to describe the development, implementation, and outputs of an LLM-based chart review process embedded within a large pragmatic trial and to present preliminary findings.

Setting/Population: This work is embedded within an R01-funded Hybrid I Effectiveness-Implementation trial (ClinicalTrials.gov ID: NCT05492240) conducted across 32 skilled nursing facilities (SNFs) in the United States. The study population includes over 9,000 older adults receiving post-acute rehabilitation services in SNFs, with electronic documentation generated by licensed physical and occupational therapists during routine clinical care.

Methods: An LLM-based system was developed for automated chart review with two objectives: (O1) determining high-intensity rehabilitation eligibility, and (O2) determining whether patients met inclusion and exclusion criteria for the primary analytic dataset. Eligibility decisions were decomposed into 17 distinct exclusion criteria. The LLM was augmented with deterministic tools for objective criteria while LLM-based evaluation handles clinical judgments requiring temporal reasoning or severity assessment. Criterion-specific prompts were developed, and the system was iteratively tuned on a training set (486 records), with decision thresholds selected on a

validation set (1000 records) and final evaluation on a held-out test set (1753 records). Performance was measured against manually adjudicated labels using accuracy, precision, recall, F1-score, and AUPRC. This work is ongoing, with planned expansion of the LLM to support extraction patient-level variables for secondary analysis.

Results: Across the two eligibility questions, the LLM-based system achieved strong performance on held-out data with agreement comparable to human reviewers. On a held-out test set (N=1,753), F1 was 0.97 for O1 and 0.91 for O2 with AUPRC = 0.98/0.94, and LLM-reviewer agreement closely matching inter-reviewer agreement for both questions.

Conclusions: Preliminary findings suggest that LLMs offer a scalable and efficient approach to automating chart review in large rehabilitation trials. This approach has the potential to reduce reviewer burden, improve consistency, and accelerate analytic workflow.

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Perceptions and Experiences of Patients at High-Risk for Breast Cancer

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Background: Compared to patients at average risk for developing breast cancer (BC), high-risk patients have greater healthcare needs. These needs may include earlier and more frequent BC screenings, higher likelihood of requiring breast biopsies, consideration of risk-reducing surgery, and increased risk for other malignancies. A family history of BC has been associated with higher levels of distress compared to the general population, yet factors contributing to this distress and how it intersects with their experience of high-risk screenings and care remains poorly understood. This qualitative study explores perceptions and experiences of high-risk BC patients to inform improvements in breast care.

Setting/Population: Adult female patients seen in a specialty high-risk BC clinic allocated in a comprehensive cancer center in Colorado who completed a study questionnaire were invited to participate.

Methods: Semi-structured interviews were audio-recorded and transcribed verbatim. Thematic analysis using a grounded theory approach was employed to identify common themes.

Results: From May to August 2024, nine participants completed interviews. All participants were non-Hispanic/Latina White and college educated. Most were employed (77.8%) with an annual income >$90,000 (77.8%) and married (66.7%). Six major themes and one minor theme were identified (Table 1). These major themes included recognizing the value of management, impacts on interpersonal relationships, psychological impact, facilitators and barriers of management, introduction to high-risk status, considerations for surgery, and variability of their experience. The minor theme was motivation for management of high-risk status.

Conclusions: This study demonstrates the complex and multifaceted experiences of patients at high-risk for BC, revealing psychological, interpersonal, and practical challenges associated with their breast care. While participants recognize value in managing their high-risk status, many make personal sacrifices or cope with the emotional burdens related to their care. Ultimately, being high-risk for breast cancer is an experience requiring personalized approaches to improve communication, enhance support systems, reduce barriers to care, and improve overall well-being. People at high-risk for breast cancer are an overlooked population despite evidence showing increased symptoms of depression or distress. These finding will be used to develop resources specific for this patient population and change the way that treatment is provided to improve patient care. These findings may have limited generalizability due to the financial and social characteristics of the study population that facilitate access to care and regular screening, as well as the small sample size.

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