Designing values elicitation technologies for mental health and chronic care integration: an iterative co-design study

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Table of Contents

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Abstract

Background: Individuals with multiple chronic conditions (MCC) and mental health challenges like depression or anxiety have complex health needs and experience significant challenges with care coordination. Approaches to enhance care for patients with MCC typically focus on eliciting patients' values to identify and align treatment priorities across patients and providers. Yet these efforts are often hindered by both systems- and patient-level barriers, which are exacerbated for patients with co-occurring mental health symptoms. Technology-enabled services (TES) offer a promising avenue to facilitate values elicitation and promote patient-centered care for these patients, yet TES have not yet been tailored to their unique needs.

Objective: This study aimed to identify design and implementation considerations for TES that facilitate values elicitation among patients with MCC and depression or anxiety. We sought to understand the preferences of both clinicians and patients for TES that could bridge the gap between mental and physical health care.

Methods: Using human-centered design methods, we conducted seven co-design workshops with 18 participants, including primary care clinicians, mental health clinicians, and patients with MCC and depression or anxiety. Participants were introduced to TES prototypes that utilized various formats (e.g., worksheets, AI chatbots) to elicit and communicate patients' values. Prototypes were iteratively refined based on participant feedback. Data from these sessions were analyzed using reflexive thematic analysis to uncover themes related to service, technology, and implementation considerations.

Results: Three primary themes were identified. Service Considerations: TES should help patients translate elicited values into actionable treatment plans and include low-burden, flexible activities to accommodate fluctuations in their mental health symptoms. Both patients and clinicians indicated that TES could be valuable for improving appointment preparation and patient-provider communication through interpersonal skill-building. Technology Considerations: Patients expressed openness to TES prototypes that used AI, particularly those that provided concise summaries of appointment priorities. Visual aids and simplified language were highlighted as essential features to support accessibility for neurodiverse patients. Implementation Considerations: Clinicians and patients favored situating values elicitation in mental health care settings over primary care, and preferred self-guided TES that patients could complete independently before appointments.

Conclusions: Findings indicate that TES can address the unique needs of patients with MCC and mental health challenges by facilitating values-based care. Key design considerations include ensuring TES flexibility to account for fluctuating mental health symptoms, facilitating skill-building for effective communication, and creating user-friendly technology interfaces. Future research should explore how TES can be integrated into healthcare settings to enhance care coordination and support patient-centered treatment planning. By aligning TES design with patient and clinician preferences, there is potential to bridge gaps in

care for this complex patient population.

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Abstract

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appointment priorities. Visual aids and simplified language were highlighted as essential features to support accessibility for neurodiverse patients. Implementation Considerations: Clinicians and patients favored situating values elicitation in mental health care settings over primary care, and preferred self-guided TES that patients could complete independently before appointments. **Conclusions:** Findings indicate that TES can address the unique needs of patients with MCC and mental health challenges by facilitating values-based care. Key design considerations include ensuring TES flexibility to account for fluctuating mental health symptoms, facilitating skill-building for effective communication, and creating user-friendly technology interfaces. Future research should explore how TES can be integrated into healthcare settings to enhance care coordination and support patient-centered treatment planning. By aligning TES design with patient and clinician preferences, there is potential to bridge gaps in care for this complex patient population.

1. Introduction

Approximately 42% of adults in the U.S. have multiple chronic conditions (MCCs), commonly including diabetes, heart disease, and hypertension.[1] Managing MCCs is a persistent challenge for both patients and their healthcare providers due to the complex healthcare needs of these patients. Care approaches that target one condition at a time have been deemed ineffective in addressing the complexities of competing health priorities,[2,3] which leaves patients susceptible to gaps in care.[4] Specifically, recommended treatments and clinical workflows for each condition may conflict, causing patients to feel overwhelmed and unsupported in managing their complex health conditions. Patients with MCCs are also burdened with tracking and sharing medical information between providers, which complicates their ability to effectively communicate their health needs and priorities across their various care team members.[5] These challenges are intensified when patients' chronic conditions include mental health challenges such as depression or anxiety. Symptoms such as amotivation, low mood, and concentration difficulties associated with depression or anxiety can often interfere with care management, necessitating coordinated care from both physical and mental healthcare providers—areas that have traditionally been siloed.

Approaches like the Patient Priorities Care model[6] have been developed to enhance care for patients with MCCs. Such approaches focus on identifying and aligning health priorities between patients and providers to better address their respective needs.[7] Common strategies include eliciting patients' values—what they consider most important for their health and well-being[8,9]—to facilitate patient-provider discussions about priorities and inform patient-centered care management. Structured communication tools have shown promise in supporting patients with MCCs in incorporating their values into their treatment plans, including technology-enabled Acceptance and Commitment Therapy and self-efficacy-enhancing interviewing techniques.[10] Yet despite this progress, current interventions still fail to meet the unique requirements of patients who also suffer from depression/anxiety. For instance, existing interventions do not adequately account for the ways

in which mental health symptoms may impact patients' capacity to engage with values elicitation activities.[11] Prior research in eliciting patients' values among primary care physicians has also revealed significant communication barriers due to patient-level constraints (e.g., overlapping symptoms, capacity to engage, etc.) and the perceived irrelevance of values in health care.[9] Structural barriers, such as time constraints and competing clinical priorities, have also led to low intervention uptake among providers,[12] which signals the need for values elicitation interventions that are designed for implementation.

These barriers underscore the need for efficient interventions that 1) can be implemented within clinicians' workflows, 2) are tailored to patients with MCCs and depression/anxiety, and 3) establish the relevance of values to health care. Recent work that explored the challenges faced by patients with MCCs and depression/anxiety in communicating their values to providers highlighted the need for user-friendly, flexible technology-enabled services (TES)—digital tools and platforms that enhance healthcare delivery by integrating technology into care—that facilitate values elicitation across both mental health and primary care settings.[11] Research is needed to further clarify patients' and providers' design preferences for values elicitation TES tailored to this population. Building on insights from past work focusing on patients' preferences and needs in utilizing technology-enabled services for values elicitation,[11] this current study expands the scope to incorporate providers' preferences and needs with respect to TES for values elicitation.

Human-centered design processes iteratively engage key parties (e.g., patients, providers) through interactive methods like co-design workshops to understand their goals, challenges, and motivations, and produce TES that adequately address key parties' needs.[13] Given that implementation challenges have often limited the real-world impact of TES,[14] implementation considerations should also be centered throughout design processes. The Accelerated Creation to Sustainment (ACTS) Model[14] is a framework for expediting and improving the development and implementation of digital health solutions by integrating insights from human-computer interaction,

implementation science, and clinical trial methodologies. The ACTS Model aggregates design considerations into three groups: service, technology, and implementation. “Service” encompasses the behavioral strategies facilitated by digital tools and the expected roles of providers and patients; “technology” refers to the technologies that enable service delivery; and “implementation” involves methods to integrate digital tools into clinical practice, as well as broader contextual factors.

The present study used a human-centered design approach, informed by the ACTS Model, to define design and implementation considerations for TES that help patients articulate their values and support providers in identifying and acting upon those values collaboratively.

2. Material and methods

2.1. Recruitment

Participants included both providers and patients. English-speaking providers with experience in primary care or mental health settings were recruited from Northwestern Medicine, a large medical-academic center in the Midwest United States, via study advertisements and emails. Additional providers were reached through snowball sampling via personal contacts. Demographic information relevant to the foci of the present study, such as role and department, was collected from providers. However, other demographic data were not gathered, as this analysis did not intend to analyze demographic characteristics and their relationship to clinicians’ preferences regarding values elicitation TES. Patient participants were English-speaking adults with at least two self-reported chronic medical conditions and depression and/or anxiety. Eligible patients were identified via institutional research recruitment registries and invited to participate in the study. Twelve providers and six patients verbally granted informed consent and participated in workshops. They were compensated $50 for their participation. This study was approved by the Northwestern University Institutional Review Board.

2.2.1 Workshops & Prototypes

Five provider workshops (Workshops 1-5) and two patient workshops (Workshops 6-7) were

conducted via Zoom between February 2023 and March 2024. Researchers can identify themes and evaluate the most and least promising design directions with as few as 5-6 qualitative interviews.[17] To learn about constituents' preferences for TES design and implementation, each workshop involved discussing and critiquing prototypes of TES for values elicitation. Prototypes represented various values elicitation methods, and are described in **Figure 1**, with examples in **Appendix A**. They were intended as "thinking tools" to elicit design considerations, rather than high fidelity prototypes to be optimized.[11]

Figure 1. Values elicitation technology-enabled service prototype summary.

Workshop displayed	Prototype name and summary
W1–W3	**Values bullseye worksheet.**[18] Established tool from Acceptance and Commitment Therapy to help patients reflect on their values via a mobile interface.
W2	**Inbox storyboard**. Workflow prototype in which patients complete values elicitation activities pre-appointment and mental health providers (MHP) receive an inbox message with the results.
W4	**Pre-visit summary**. Document available in patients' electronic health records listing patients' personal values and appointment-related questions.
W4	**Workflow diagram**. Graphic displaying workflows to facilitate collaborative care management across mental and primary health care.
W5	**Pre-meeting with an MHP.** Patients review self-care behaviors and assess their alignment with their values before meeting with an MHP; results electronically transmit to MHPs.
W5–W7	**Story-sharing.** Patients are emailed an exercise to complete pre-appointment, then meet with an MHP to reflect on their values and appointment priorities.
W6–W7	**PCP Simulator.** Patients use an artificial intelligence (AI) chatbot, playing the role of their PCP, to practice communicating their values to a dismissive PCP and receive takeaways (e.g., communication tips, appointment priorities).

The research team met weekly to discuss and enumerate the insights garnered through each workshop, align them with the research questions and workshop objectives, and use these insights to guide prototype development for pursuant workshops. Accordingly, prototypes shown in later workshops responded to the input and critique from participants in earlier workshops.

Following the five provider workshops, the research team refined two prototypes that were then presented to patients in two workshops to understand how their preferences aligned with

providers' preferences. These two prototypes integrated insights from provider workshops and previous research with this patient population,[11] which found that patients were open to values elicitation activities facilitated by mental health practitioners (MHPs), as well as self-guided values elicitation. This prior work additionally found that while patients generally know what they want to discuss with providers, they often lack the communication skills to convey these priorities effectively. Accordingly, we created two prototype options, listed in *Appendix A*: 1) a story-sharing prototype with an MHP and 2) a "PCP Simulator" focused on building patients' communication skills. The AI tool within the PCP simulator was well-suited to this task, as it generated text tailored to different patient-provider scenarios, helping patients practice communicating their values and priorities with a range of provider responses.

2.3. Analyses

Workshops were recorded via Zoom and transcribed. Transcripts were then de-identified and edited for accuracy. Finalized transcripts were qualitatively analyzed for themes using reflexive thematic analysis.[20,21] Lead co-authors IRR and WL reviewed the transcripts and workshop insights to create an initial codebook. Five coders applied this codebook to one transcript and met to resolve coding differences, leading to a refined codebook. Next, each coder independently applied the new codebook to two transcripts and wrote memos to capture emerging themes. Codes were applied using Dedoose (SocioCultural Research Consultants) software for qualitative analysis. After coding was completed, the study team met weekly to discuss results and formulate the themes. Applying the ACTS Model, findings were grouped into design considerations for service, technology, and implementation. The research team analyzed the design preferences of providers and patients, yielding insights that can inform future prototype development. During theme development, the analysts' reflexivity was shaped by their personal expertise in health education, the design of mental health technologies, work in both primary care and mental health care settings, and lived experience managing multiple chronic conditions. These diverse perspectives strengthened the rigor of the

reflexive thematic analysis, enhancing the depth and nuance of the findings.

3. Results

From the primary care domain, participants included four physicians, one internal medicine physician's assistant, and one primary medicine nurse practitioner, hereafter referred to as "PCPs." From the mental health domain, participants ("MHPs") included two clinical psychologists, three behavioral care coordinators, and one medical social worker. Full sample characteristics are provided in **Table 1.**

3.1. Service considerations

Service considerations reflect the unique experiences and goals of patients with MCCs and depression/anxiety. Patients and providers preferred service models for values elicitation that addressed concerns about anxiety, agenda setting, and time pressure during clinical visits. For instance, patients described how managing MCCs leads to anxiety before appointments with their PCP because they feel pressure to maximize their limited time together and had poor previous experiences with dismissive providers. To alleviate this anxiety, patients wanted support preparing for appointments. Specifically, patients said values elicitation TES should produce a tangible outcome (e.g., list of questions) supporting preparedness and serving as memory aids. This goal reflected that their anxiety could interfere with their ability to remember information during appointments, as one participant described:

> *A tool like this* [the PCP simulator] *would help me, especially if I forgot to put some stuff in. It'll make sure I don't miss anything that I need to share with my primary care physician*. (P16, Patient)

Likewise, providers said balancing MCCs makes agenda-setting challenging for some patients, so TES should be designed to help patients clarify their agenda for the appointment by reflecting on their health concerns and establishing priorities to address with providers.

Communication challenges were cited by providers (e.g., due to patients' mental health symptoms) and patients, who said values elicitation TES could offer specific language to use during

appointments, allowing patients to refer to pre-generated language instead of finding the right words in the moment, which can be challenging when experiencing anxiety. MHPs and patients said TES that facilitate interpersonal skill-building (e.g., practicing effective communication strategies) could improve pre-appointment anxiety and preparation, as well as provider-patient communication during appointments.

Participants reacted to TES prototypes using service models that were self-guided (i.e., completed independently by a patient) versus provider-facilitated (i.e., collaboratively completed by a patient and facilitator). Both patients and providers preferred self-guided over facilitated TES due to appointment time constraints. They said patients needed sufficient time and capacity to engage with values elicitation. Patients appreciated how self-guided TES could be completed on their own schedules.

> *Best case scenario, I would prepare about a week before a physician visit. My schedule means that may or may not happen. So, having the ability to do it at whatever time, but save that information would be incredibly important for me.* (P18, Patient)

Additionally, patients described how it would be challenging for them to engage with values elicitation when their mental health symptoms are high, indicating that self-guided TES, provided well in advance of appointments, may address patients' fluctuating needs and abilities.

> *My days are very different in that my level of anxiety and depression in some days dictate what I can and can't do. So, on good days,* [values elicitation] *is something that I would definitely be interested in doing. But on not-so-good days, probably not so much.* (P13, Patient)

Providers agreed that, if facilitated, TES should be led by MHPs due to the relevance of values to mental health care and perceived constraints of PCPs, extrapolated in *Section 3.3.* One MHP said that in addition to mental health, clinicians facilitating values elicitation should understand *physical* health, in order to best support patients managing multiple chronic conditions. They recalled an instance where lack of knowledge about a patient's physical health condition was a barrier to their care:

> *The Crohn's Disease was super important to improving the depression. But I had very little insight into what her treatment was for the Crohn's Disease,* [which] *stunts my ability to work with her.* (P12, MHP)

Across these findings, patients and providers suggested a flexible service model that accommodates patient-directed or clinician-facilitated values elicitation, and emphasized the need to support pre-visit communication skill-building.

3.2. Technology considerations

The majority of providers' feedback focused on service considerations (*Section 3.1*). In terms of technology, PCPs emphasized constraints of short appointment times and competing clinical priorities, meaning that any provider-facing TES interfaces must present concise, at-a-glance information about patients' values to be acceptable. The primary requirement is to enable PCPs to identify and address the highest priority health issues in limited time. When viewing the pre-visit summary prototype, one provider commented:

> *I would say there's too much information there*. [...] *Because remember, this guy has diabetes, but also is obese, and also* […] *we need to talk about medication for the depression. So, I'm grateful I have a 40-minute appointment, but how can we address this in a 20-minute?* (P9, PCP)

PCPs also said the interface should provide clear instructions for interpreting the "results" of values elicitation, such that those results could be applied to patient care.

Providers said the technology should integrate into a patient's electronic health record and facilitate information-sharing between providers. For instance, an MHP said they would not have time to translate a patient's values into a message to the patient's PCP, so the technology would need to facilitate that information-sharing process.

> *I don't know that I would look at a screening tool, assess it, and then filter that information for the PCP. I wouldn't have that time. So, if it's available, I would think they can look at it or not.* (P8, MHP)

Patients were shown prototypes that differed in the inclusion of AI. Patients expressed varying levels of openness to the use of AI in values elicitation TES. Participants found the use of conversational AI for skill-building and appointment preparation (as in the "PCP Simulator" prototype) helpful and were generally unconcerned with the AI delivery method, though one participant expressed mistrust of AI and said they would prefer that a person facilitate the same process. Another participant described a lack of familiarity with the technology.

> *I have not had a lot of personal experience with AI. But conceptually, I'm not opposed to it. And I would not be opposed to it in this particular scenario.* (P13, Patient)

Across designs, patients expressed concerns that technologies enabling values elicitation must be accessible, particularly for neurodivergent patients and those with conditions such as depression and anxiety, which can affect cognitive processing and communication. For example, incorporating emoticons was suggested to simplify complex emotions and support users in expressing their values more easily. When asked if they preferred the story-sharing prototype or the AI chatbot, all patient participants chose the "PCP Simulator" for its skill-building and appointment-preparation functionalities.

3.3. Implementation considerations

Providers said values elicitation should be implemented in mental health care (rather than primary care) and preferred that patients use TES pre-visit to avoid wasting valuable appointment time. They identified specific barriers, unique to the primary care domain, that reduce the feasibility of implementing a values elicitation TES therein.

PCPs said patients' values were more relevant to MHPs than PCPs. Due to their training and focus on physical health, PCPs did not feel equipped or well-positioned to elicit patients' values. Generally, PCPs also perceived values as non-actionable, meaning they did not view patients' values as information they could apply in patient care. Accordingly, they preferred not seeing their patients' values enumerated, unless those values were explicitly connected to a patient's primary physical health concern.

> *To me, it's just too nebulous and complex for me to use that information* [...] *or know what it actually means. And how it relates to their current chief complaint. And how I'm going to take their value and their chief complaint and validate it in a way that I wouldn't otherwise do.* (P10, PCP)

Compared to MHPs, who defined values in alignment with values elicitation literature (i.e., what patients consider most important for their health and well-being[8,9]), PCPs conceptualized values in non-specific and variable terms, at times conflating values with goals and social history.

> *I actually have done this* [values elicitation] *for the last 25 years; I've always been big on social history.* […] *'where did you go to high school?' Because immediately that opens up so many conversations and goes in*

> *different directions that you start to understand people's values.* (P1, PCP)

While this comment shows the provider's commitment to building relationships with patients, their misunderstanding of values elicitation complicates its implementation. It creates a false impression that PCPs are effectively identifying patients' care priorities, when in fact, the potential of values elicitation to enhance patient care has not yet been fully realized.

Conflating values and goals similarly undermines the purpose of values elicitation, as goals are typically specific and shorter-term, while values represent the deeper, longer-term priorities guiding patients' overall care decisions. For example, a goal might be 'to lower blood pressure,' while the underlying value could be 'to maintain independence and live an active life.' By focusing on clinical goals without addressing these broader values, providers risk delivering care that aligns with immediate clinical targets but neglects what truly matters to patients. As a result, patients may feel that their overall well-being is overlooked, compromising the effectiveness of patient priorities-aligned care.[22]

Regarding implementation processes, providers highlighted the many moving pieces that must be accounted for when implementing TES within existing healthcare systems. For example, a PCP cited workflow integration concerns and said that it is difficult to implement requisite workflows to refer patients to TES and review resulting information when TES are new and infrequently utilized.

> *If it's only one in 12 patients, the doctor's workflow isn't going to be used to that kind of a process. And it might be less accepted by the doctor.* (P10, PCP)

PCPs and MHPs also said structural barriers, such as short appointments, meant that implementing a new TES during an appointment would be infeasible. However, some providers were open to reviewing patients' values before an appointment, so long as the patient completed the TES independently outside their appointment time and the presentation of those values matched providers' other requirements (e.g., actionability).

4. Discussion

This study employed iterative prototyping of values elicitation TES to identify the needs and preferences of providers and patients managing multiple mental and physical health conditions. Our findings largely supported the Patient Priorities Care approach,[6] in that participants generally perceived identifying and aligning health priorities across clinicians and patients as useful. Findings also yielded important service, technology, and implementation considerations to extend the Patient Priorities Care model to apply to patients with comorbid mental and physical health conditions. In particular, these patients' mental health symptoms and related needs have not yet been well-represented in values elicitation research. This population can benefit from clarifying and communicating their values to promote patient-centered care. Per these results, design recommendations are organized in accordance with the ACTS Model and summarized in **Table 2**.

Service: Results indicate that TES should assist patients in preparing for difficult conversations during appointments and provide specific language to use during consultations, both of which help to alleviate their pre-appointment anxiety. We identified an opportunity to enhance Patient Priorities Care approaches by addressing a critical skill gap: participants expressed a need for support not only in generating values-aligned priorities, but also in developing self-advocacy skills to communicate those priorities effectively during appointments. This finding highlights that TES outputs (e.g., a list of questions) alone do not guarantee effective communication; rather, participants suggested that TES should actively support patient-provider communication by strengthening patients' self-advocacy skills. This finding aligns with previous work showing mental health symptoms can make patient-provider communication particularly difficult among patients with MCCs.[23] Yet these findings contrast with earlier work that found patients with MCCs and depression/ anxiety preferred values elicitation facilitated by an MHP, given their credentials and the potential therapeutic benefits.[11] In this study, despite presenting an MHP-directed TES prototype, patients preferred a self-directed service model, which addressed their need to prepare for difficult conversations with providers during appointments by accounting for interpersonal dynamics with

providers, including dismissiveness. This preference aligns with previous research indicating that interactions with dismissive PCPs can heighten anxiety and complicate communication about health-related values and priorities.[19] Participants may therefore have prioritized this issue over deeper therapeutic conversations about values with MHPs. Given that this patient population already experiences unique barriers to communicating their health priorities (e.g., due to their overlapping symptoms), addressing these communication challenges through skill-building is a promising area for future design work and a strategy that can empower patients to engage more actively in their appointments, leading to better care coordination and collaboration.[24]

Findings illustrated the need for values elicitation service models to incorporate expertise from clinicians who understand the interplay between mental and physical health. Many MHPs lack access to PCPs' medical notes that detail patients' ongoing physical health issues, which are important for understanding how symptoms may overlap.[25] This gap places the burden on patients with MCCs to clearly articulate their complex health needs to both PCPs and MHPs, a task that is particularly challenging for those experiencing depression/anxiety. Literature suggests that patients with MCCs and mental health conditions often face cognitive and emotional barriers that make it difficult to convey the full picture of their health to providers.[26] This communication gap can hinder care coordination and increase the risk of fragmented or inadequate care. To address this, it is essential for TES to not only support values elicitation, but also to empower patients with tools that help them communicate their physical and mental health concerns across care teams and settings. Future research should explore these tools, particularly in promoting better care collaboration and interprofessional communication between providers in managing complex care needs.

Technology: Results from this study underscore the diverse technology preferences among patients and providers, highlighting the need for a multifaceted approach to designing TES for values elicitation. Patients and providers emphasized that the technology interface must be concise and user-friendly, accommodating the limited time available during appointments. PCPs also said they needed

clear instructions for interpreting values elicitation results. These findings align with Patient Priorities Care approaches, which emphasize the need for values to be actionable to providers. Further, these findings are consistent with literature showing that technology interfaces in healthcare must present clear, actionable information to be effective,[27] as providers often face information overload, where the volume and complexity of available information exceed their capacity to process and utilize it.[28] In the context of values elicitation, interfaces that provide at-a-glance summaries of values and care priorities, and straightforward instructions for responding to those, can help alleviate the challenges of managing complex patient information within constrained appointment times. This finding aligns with design recommendations for eliciting patient values in clinical conversations, which emphasize that providers must be able to easily access and interpret patient values for effective care planning.[29]

Patient feedback revealed that technology design must consider the cognitive and sensory needs of users, particularly those with mental health challenges or intellectual disabilities. Previous work found that cognitively and emotionally demanding values elicitation activities can be particularly challenging for individuals with depression/anxiety, suggesting that designs should balance requisite effort against potential benefits by making activities shorter, more enjoyable, and less taxing to encourage patient engagement.[11] The present findings expand upon this to include accommodating diverse communication needs among patients with intellectual disabilities, as highlighted by suggestions to include visual aids like emoticons in the interface. Existing literature on eHealth interventions for people with intellectual disabilities calls for more intentional participatory development and iteration with end-users,[30] emphasizing the importance of seeing the "whole picture" of both mental and physical health when designing values elicitation TES. As individuals age with MCCs, the complications of these conditions—combined with cognitive challenges like depression, anxiety, and intellectual disabilities—may contribute to increased difficulty in engaging with health technologies. Future design work should therefore involve patients

with intellectual disabilities and those managing MCCs to co-create inclusive technologies that address the interconnected nature of physical and mental health, promoting accessibility for this historically underrepresented group.

While patients expressed general openness to using a generative AI tool to build communication skills, responses were mixed when it came to identifying and effectively communicating their values, particularly when dealing with dismissive providers. Some participants expressed uncertainty or mistrust of AI, preferring human facilitation. This hesitation is consistent with studies indicating that, while AI has potential in healthcare, its acceptance is often tempered by concerns about trust and transparency,[31,32] emphasizing the need for AI-based tools to be carefully designed and transparently integrated into patient care in order to build trust and acceptance.[31] This finding underscores the importance of clearly communicating the rationale and benefits of values elicitation TES, as patients prefer assurance about how their values will be used.[11] In the context of AI-based tools, transparency about the elicitation and application of these values becomes even more critical.

Given these varied preferences, a suite of tools may be indicated that address relevant behavioral targets (e.g., appointment preparation, pre-appointment anxiety) using varied technology-based approaches (e.g., skill-building, virtual worksheets, meeting with a values elicitation facilitator). Future design work should continue mapping this array of preferences and iterate TES to accommodate them.

Implementation: Our approach to implementing values elicitation TES reflects a broader perspective than typical Patient Priorities Care conceptions, as we sought to understand the various touchpoints that patients encounter across their care journeys, given their engagement with multiple providers across different settings. By expanding our viewpoint beyond single conditions or discrete interactions, we identified new design directions, particularly in understanding how to bridge the conceptualizations of values held by both patients and providers. Establishing a common

understanding of values is essential to successfully implement values elicitation TES; otherwise, challenges may arise due to knowledge gaps regarding how and why to engage patients into TES for values elicitation. Future work is therefore needed to help PCPs identify the relevance of patients' values to patients' health, and potentially, to reframe values elicitation to more clearly resonate with their practice. Indeed, PCPs in this study highlighted the importance of linking patients' values to patients' health concerns to make those values actionable. This finding aligns with patients' perspectives as well, in that patients may withhold values from providers that they perceive as irrelevant to their health care.[33] Because these varied conceptualizations of values and their perceived relevance to health care pose an implementation barrier, designing TES for values elicitation requires navigating and aligning these conceptualizations. Co-designing values elicitation educational materials with providers may help improve their perceptions of the relevance of values elicitation to this patient population, as well as prepare them to articulate its purpose to patients.

Further, TES must reflect real-world challenges, such as the lack of care coordination infrastructure in many healthcare systems. Providers in this study said values elicitation TES should integrate seamlessly with existing electronic health records and facilitate efficient information-sharing between providers, which aligns with literature indicating the importance of interoperability and streamlined communication in improving care coordination. Yet they also cited structural barriers that prevent interprofessional communication, which means that in the current system, patients must directly communicate their values to their PCP. Patient Priorities Care services—a common, evidence-based approach to values elicitation for patients with MCCs[6]—often assume that staff, such as medical assistants, are available and trained to support PCPs in this process. However, not all health systems are equipped with the resources or staffing models to integrate these roles effectively, limiting the feasibility of this approach in certain settings. In practice, the absence of such interprofessional communication infrastructure means that patients bear the burden of conveying their values themselves, a task made complicated when their mental health symptoms limit their

ability to engage with values elicitation. The applicability of Patient Priorities Care tools to patients with MCCs and depression/anxiety could therefore be improved by accounting for these implementation challenges (e.g., via self-guided instead of facilitated approaches that require staff resources), as well as this patient population's unique service requirements (e.g., tool responsiveness to high mental health symptoms).

Building on our engagement with patients and providers, future efforts should expand to include stakeholders who shape systems-level decisions around adoption and implementation. Engaging hospital administrators, policymakers, and other system influencers can help address the structural barriers identified in this study, particularly in care coordination. This broader stakeholder involvement will be essential for integrating TES into healthcare systems effectively, ensuring these tools are supported by the necessary resources and workflows.

4.1. Reflections on the ACTS Model

The ACTS Model provided a vital framework for generating these findings, particularly in addressing the complex needs of patients with multiple mental and physical health conditions. By focusing on service, technology, and implementation, the model helped identify the design and implementation needs of values elicitation TES. It emphasized the importance of empowering patients in their healthcare interactions, creating user-friendly tools that accommodate diverse needs, and addressing the structural barriers that hinder care coordination. The ACTS Model's structured approach ensured that TES design is both practical and effective, facilitating seamless integration into the existing healthcare landscape, and ultimately, meeting the needs of this complex patient population.

4.2. Limitations

Because this work principally engaged providers from a large medical-academic center, the implementation considerations identified (e.g., lack of interprofessional communication, workflow integration concerns) may not apply to other clinical contexts. Per the ACTS Model, future work

should continue designing TES with institution-specific implementation considerations in mind, which other designers can identify by employing similar methods to the present study. Additionally, the providers who participated in these workshops were interested in values elicitation; their preferences may therefore not be transferable to other contexts.

Due to the small sample size and highly iterative prototypes, consensus was not achieved regarding preferred TES design features or approaches. Despite this, our findings offer distinct, novel, and significant insights to inform future TES design.

Sample characteristics pose another limitation. Demographic data were not collected from providers. Future work must collect providers' demographics to address the potential influence of misalignments between patient and clinician identities on care delivery, as these differences may affect how values are perceived and prioritized in clinical interactions. Additionally, most patient participants self-identified as White and non-Hispanic. The lack of racial and ethnic diversity among patients limits the generalizability of these results and must be addressed in future work.

5. Conclusion

This study offers novel insights into the design and implementation of TES for values elicitation among patients with MCCs and depression/anxiety. Findings demonstrate a clear patient and provider preference for self-guided TES that support communication skill-building, enabling patients to articulate and advocate for their values, particularly when engaging with dismissive providers. Additionally, this study underscores the practical challenges of integrating TES into existing healthcare workflows, highlighting the need for tools that work within time constraints and respond to structural barriers, such as limited care coordination resources. These insights provide a foundation for future TES development aimed at improving care coordination and patient-centered care for this complex patient population, emphasizing the importance of designing tools that are both scalable and sensitive to mental health symptoms. Future research should further explore co-design processes and strategies for overcoming real-world implementation challenges.

Table 1. Sample characteristics.

ID	Domain	Role	Workshop
1	Primary Care	Primary Care Physician	W1
2	Mental Health	Patient Care Coordinator	W1
3	Mental Health	Patient Care Coordinator	W1
4	Mental Health	Patient Care Coordinator	W1
5	Primary Care	Internal Medicine Physician Assistant	W2
6	Primary Care	Primary Medicine Nurse Practitioner	W2
7	Mental Health	Psychiatrist	W3
8	Mental Health	Medical Social Worker	W3
9	Primary Care	Primary Care Physician	W4
10	Primary Care	Primary Care Physician	W4
11	Mental Health	Clinical Psychologist	W5
12	Mental Health	Clinical Psychologist	W5

ID	Gender	Race	Hispanic	Age	Chronic Conditions	Role	Workshop
13	Male	White	No	66	Cancer, Glaucoma, Hyperlipidemia	Patient	W6
14	Female	White	No	82	Arthritis, Kidney or bladder problems, Macular degeneration, Hypertension	Patient	W6
15	Female	White	No	66	Hyperlipidemia, Restless leg syndrome, IBS, Arthritis	Patient	W6
18	Female	White	No	48	Arthritis, Asthma, Cancer, Hashimoto’s Disease	Patient	W7
16	Male	African American	No	61	Diabetes, Arthritis, Hypertension, Chronic pain	Patient	W7
17	Female	White	No	38	Diabetes, Hyperlipidemia, Asthma, Autism Spectrum Disorder, ADHD	Patient	W7

Note: Abbreviations include irritable bowel syndrome (IBS) and attention deficit hyperactivity disorder (ADHD).

Table 2: Design recommendations for values elicitation TES for patients with MCCs and depression/ anxiety.

Design Recommendation	Challenge Addressed	Rationale
Service		
Incorporate clear, structured reflection prompts that elicit values actionable for health treatment planning.	Difficulty translating elicited values into actionable health treatment plans.	Structured prompts help patients articulate connect their values to their treatment planning, making their values actionable for providers.
Offer various services, including low-burden activities when mental health symptoms are high.	Mental health symptoms pose a barrier to engaging with values elicitation.	Providing a suite of tools can address patients' diverse needs and allow flexibility when patients have low capacity for engagement.
Incorporate self-guided skill-building features to handle difficult conversations.	Difficulties with communication and pre-appointment anxiety.	Supports self-reflection and skill-building to enhance patient communication and manage pre-appointment anxiety.
When relevant, involve facilitators experienced in physical and mental health.	Lack of understanding between mental and physical health care.	Facilitators with joint expertise can holistically offer values elicitation to support patients with MCCs.
Technology		
Create summaries of health priorities for patients to bring to appointments.	Patients experience anxiety and sometimes forget information during appointments.	Providing tangible outputs helps patients organize their priorities, reducing anxiety and helping avoid forgotten concerns.
Engage patients with intellectual disabilities in design work.	Intellectual disabilities can pose barriers to TES engagement.	Centering neurodiverse patients' perspectives will improve tool accessibility.
When used, explain the clinical intent of TES that use AI.	Some mistrust in the AI prototype.	Despite some mistrust, patients accepted the AI prototype due to its perceived utility for skill-building.
Implementation		
Establish concordance among providers about how to conceptualize values.	Discordance poses barriers, as providers must understand a TES to implement it.	Aligning providers' perceptions of the purpose and value of a TES will help facilitate TES implementation.
Design for real-world structural barriers (e.g., communication constraints).	Lack of interprofessional communication infrastructure.	Designing for present care coordination challenges helps TES add value for patients and providers.
Center implementation considerations (e.g., via the ACTS Model) throughout TES design processes.	Difficulty fitting new TES into existing healthcare systems and workflows.	Engaging with implementers (e.g., clinicians, staff) yields contextual considerations that could become implementation determinants.

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Appendix A

Workshop Prototypes

Appendix A1. Values bullseye worksheet (Workshops 1-3).[18] Established tool from Acceptance and Commitment Therapy to help patients reflect on their values via a mobile interface.

YOUR VALUES: *What really matters to you, deep in your heart? What do you want to do with your time on this planet? What sort of person do you want to be? What personal strengths or qualities do you want to develop?*

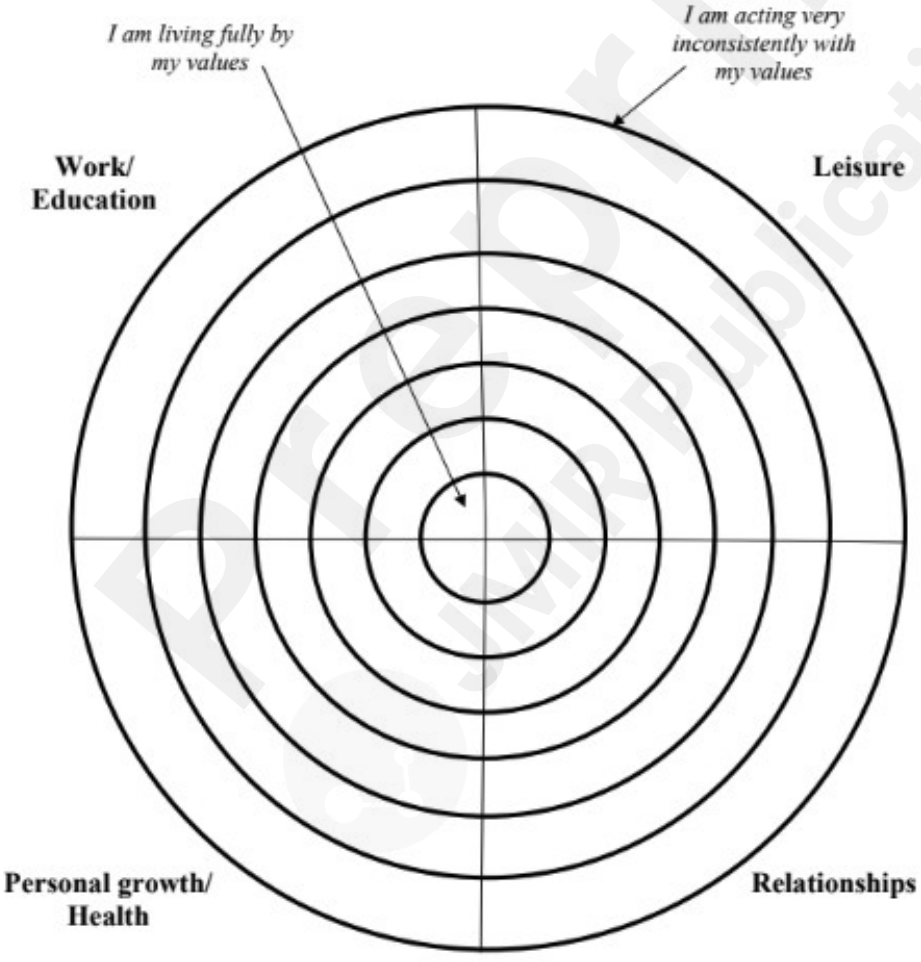
1. Work/Education: includes workplace, career, education, skills development, etc.

2. Relationships: includes your partner, children, parents, relatives, friends, co-workers, and other social contacts.

3. Personal Growth/Health: may include religion, spirituality, creativity, life skills, meditation, yoga, nature; exercise, nutrition, and/or addressing health risk factors like smoking, alcohol, drugs or overeating etc

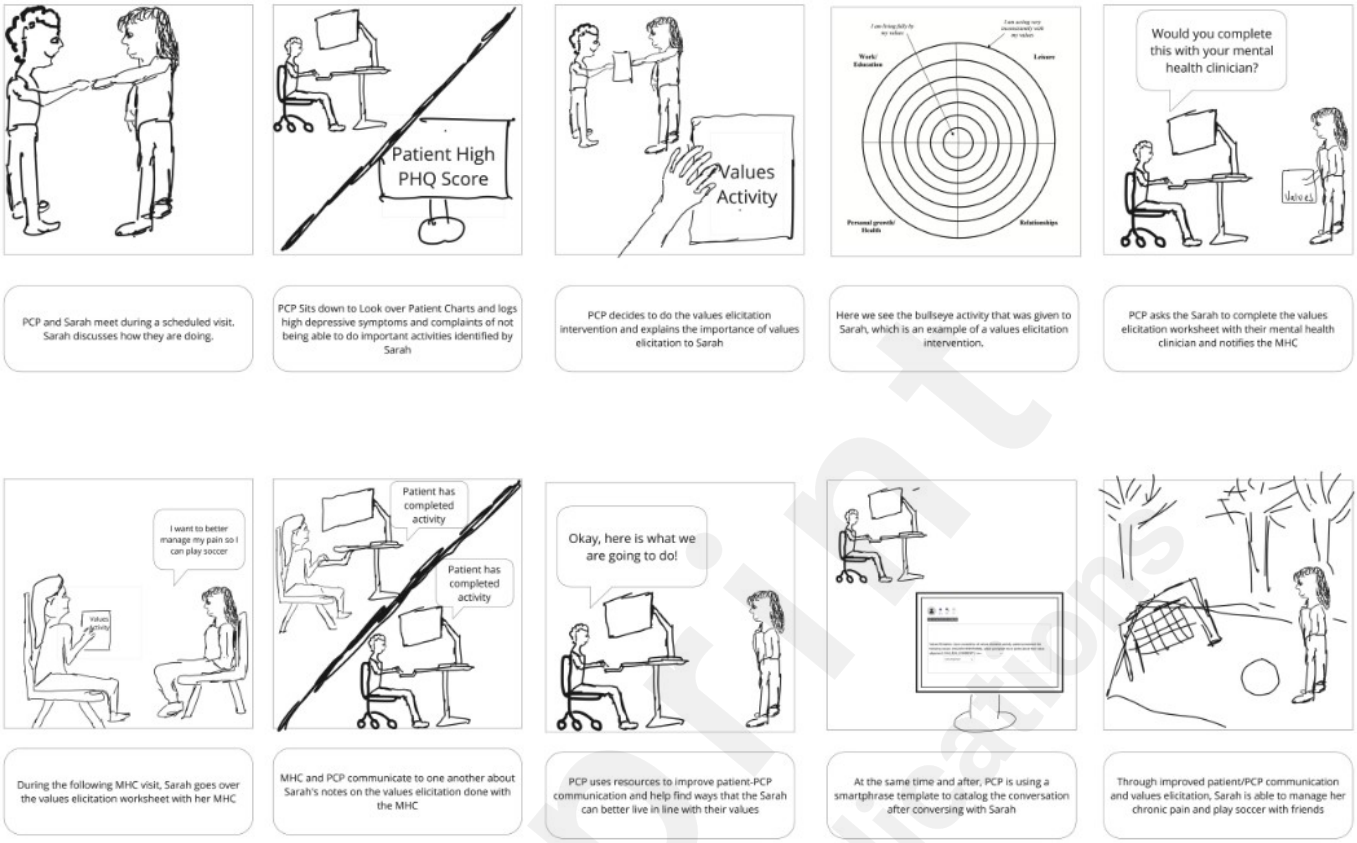
4. Leisure: how you play, relax, stimulate, or enjoy yourself; activities for rest, recreation, fun and creativity.

THE BULL'S EYE: make an X in each area of the dart board, to represent where you stand today.

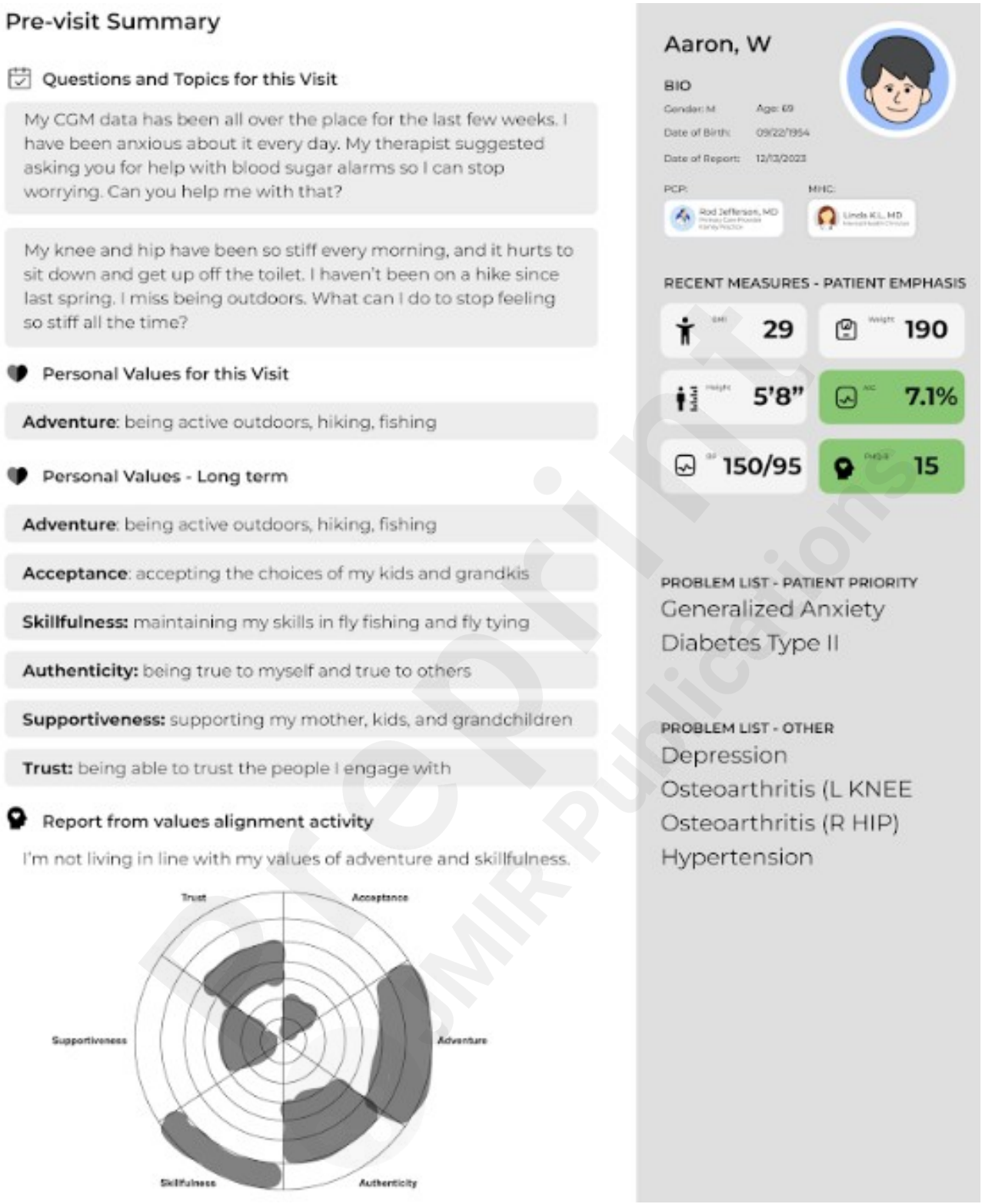


© Russ Harris, 2007 (adapted from Tobias Lundgren's "Bull's Eye" worksheet) www.thehappinesstrap.com

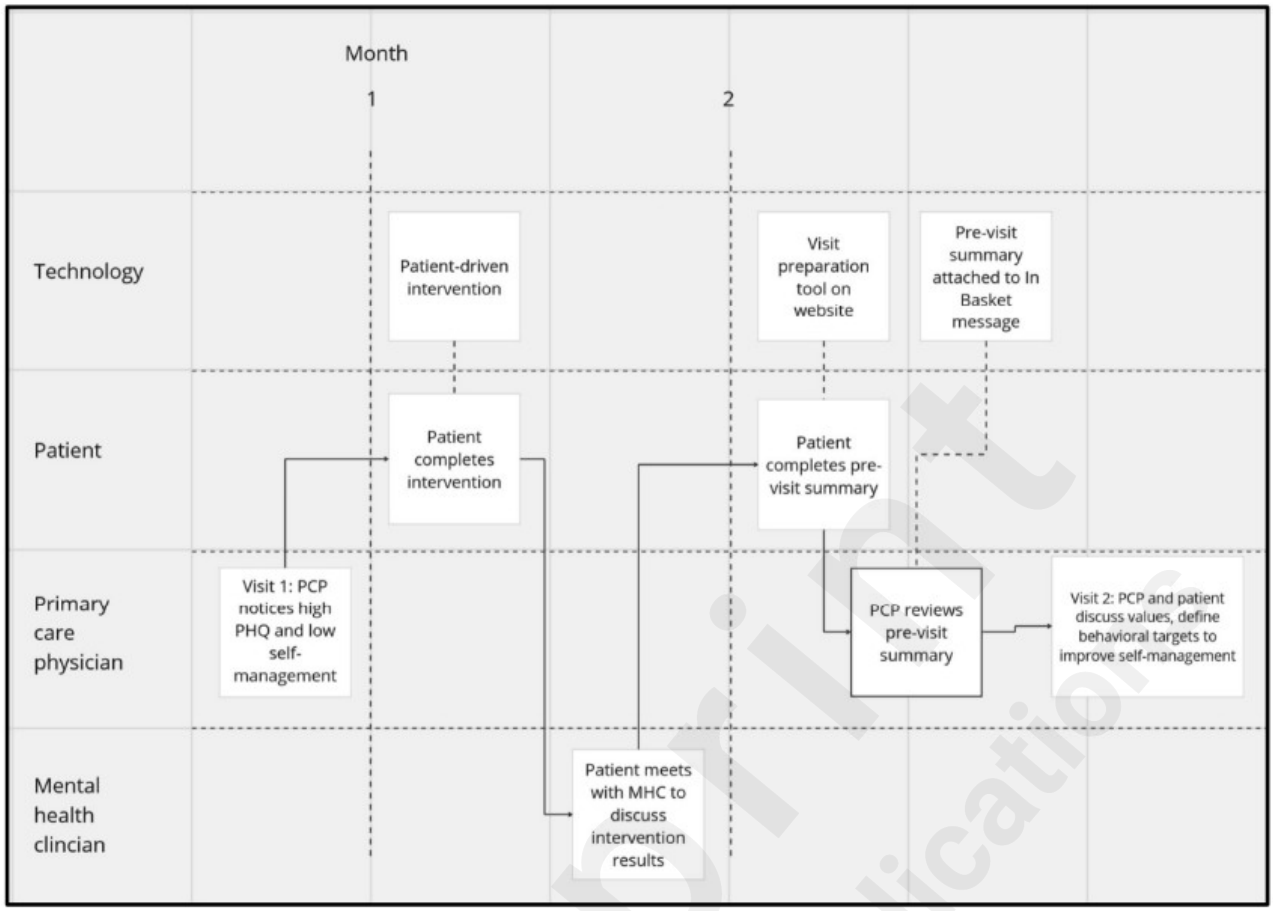
Appendix A2. Inbox storyboard (Workshop 2). Workflow prototype in which patients complete values elicitation pre-appointment and MHPs receive an inbox message displaying the results.



Appendix A3. Pre-visit summary (Workshop 4). Document available in patients' electronic health records listing patients' values and appointment-related questions.



Appendix A4. Workflow diagram (Workshop 4). Graphic displaying workflows to facilitate collaborative care management across mental and primary health care.



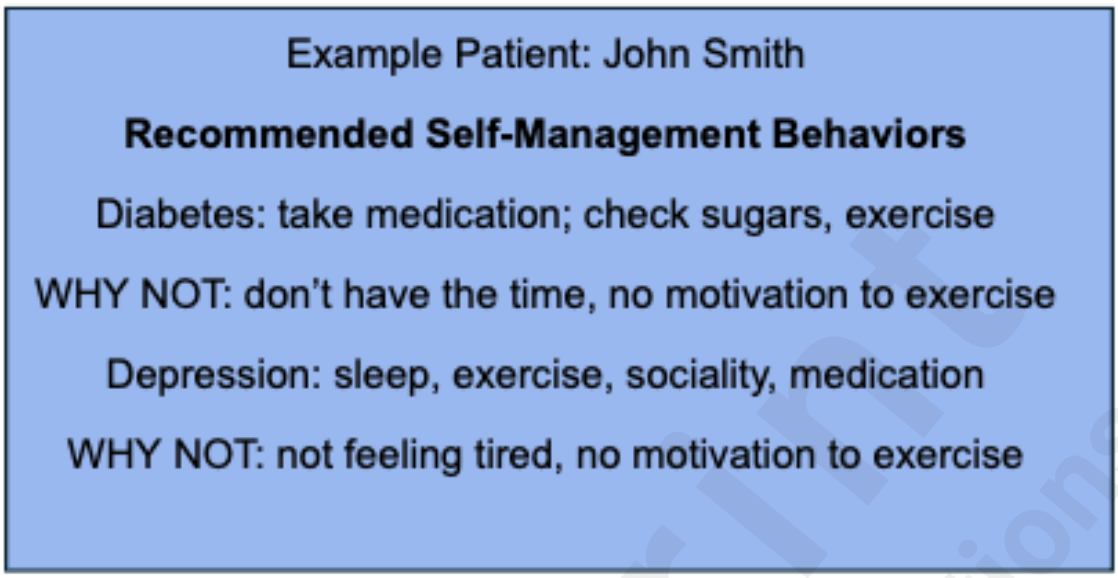
Appendix A5. Pre-meeting with an MHP (Workshop 5). Patients review self-care behaviors and assess their alignment with their values before meeting with an MHP; results are electronically transmitted to MHPs.

Patient sees a list of recommended self-managed health behaviors, based on the intersection of their specific chronic conditions.

For each health behavior recommendation, the patient will argue why it will not work.

Outcome: Patient will have reflected on how particular self-care behaviors align or misalign with

their skills and values.



Appendix A6. "Story-sharing" (Workshops 5-7). Patients are emailed a reflective exercise to complete pre-appointment, then meet with an MHP to reflect on their values and appointment priorities.

Alex has Type 1 Diabetes and manages her blood sugar levels with regular exercise and daily use of insulin.

Five years ago she discovered her love for dancing, which she found to be an excellent way to both exercise and do something she loves.

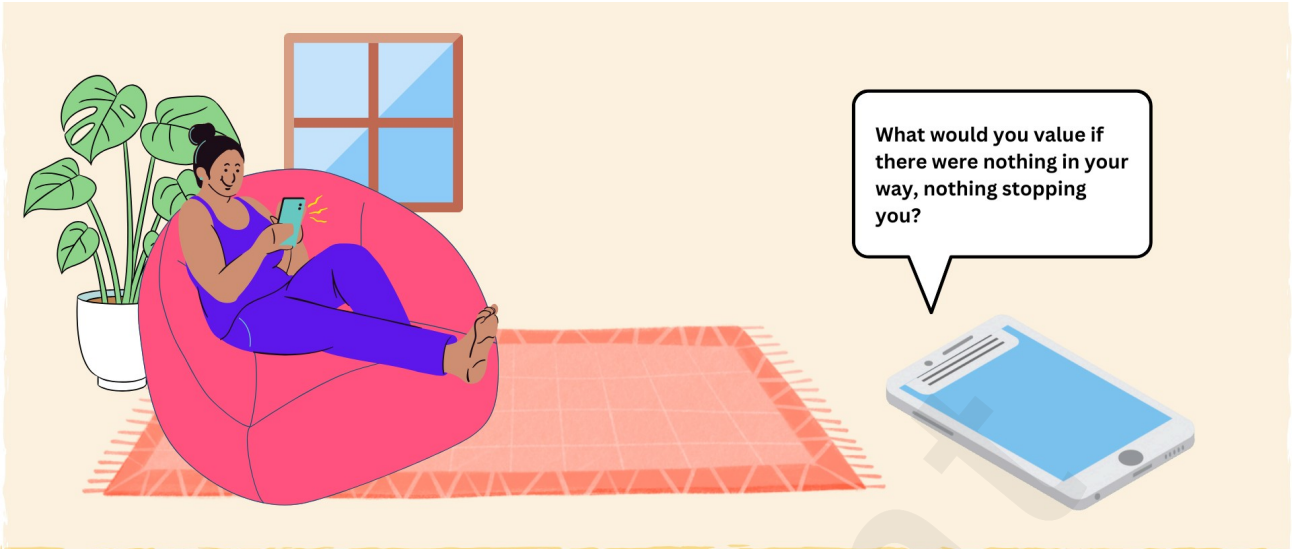
She loves it so much that she competes locally and joined a dance community.

In the last year, Alex was diagnosed with IBS, which impacted her ability to dance and manage her diabetes.

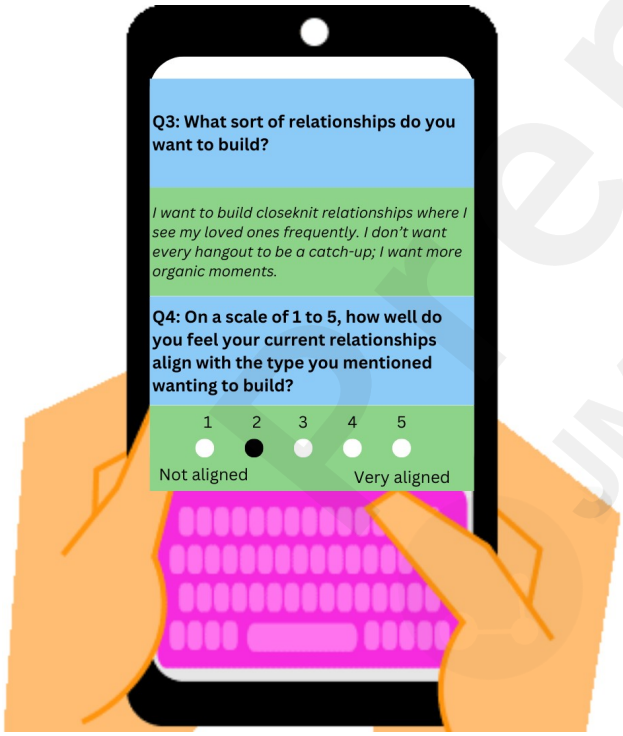
Because of her IBS symptoms, she’s had to turn down food outings with friends repeatedly.

Additionally, her symptoms have forced her to stop dancing, which makes it harder for her to manage her blood sugar levels.

After losing her favorite hobby and feeling isolated from her friends, Alex developed anxiety and depression.



To manage her depression and anxiety, Alex connected with a therapist. The day before an appointment, Alex receives a link from her therapist's office to complete a 10-minute values clarification exercise to bring to the appointment.

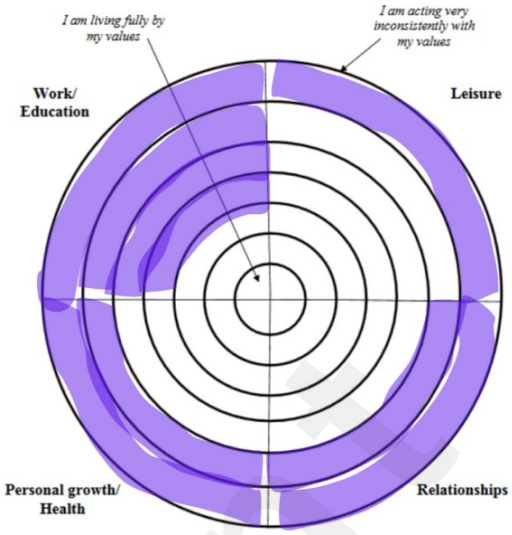


Alex takes 10 minutes to complete the questionnaire.

During this activity, Alex is asked to reflect on a variety of questions related to different aspects of her life, and is also asked to rank how well she feels she's doing in each of those areas.

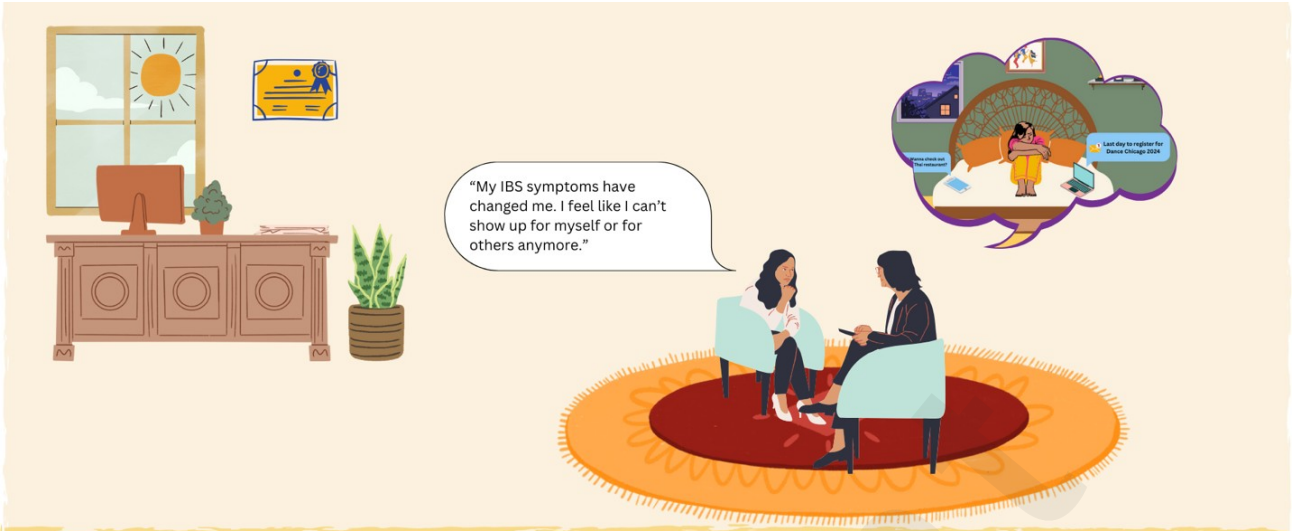
Summary

Based on your responses, it seems that you are living in line with your values in areas of **Work/Education**. If you are interested, your therapist can work with you to understand how you might prioritize **Leisure, Relationships,** and **Personal Growth/Health** during your visit tomorrow.



Alex's responses are turned into a graphic summary based on the Bull's Eye Values Clarification exercise. Alex will discuss these insights with their therapist.

The next day, Alex opens the link to the graphic and shares it with her therapist. The therapist goes over the Bull's Eye with Alex and wants to understand what has been contributing to the imbalance in her valued areas of living.



Alex tells the therapist her story. The therapist now has a better picture of how Alex's IBS symptoms have impacted her ability to dance and spend quality time with loved ones again. The therapist reflects back what she hears and is eager to hear Alex's thoughts.

Alex realizes that spending quality time with friends and exercising can better help manage her depression and anxiety. In order to accomplish that, the therapist supports Alex in developing questions to bring to her primary care provider in order to manage her IBS symptoms so she can engage in value-aligned behaviors again.

Appendix A7. "PCP Simulator" (Workshops 6-7). Pre-appointment, patients use a chatbot to practice communicating with their PCP and receive takeaways including communication tips and appointment priorities.

Alex has Type 1 Diabetes and manages her blood sugar levels with regular exercise and daily use of insulin.

Five years ago she discovered her love for dancing, which she found to be an excellent way to both exercise and do something she loves.

She loves it so much that she competes locally and joined a dance community.

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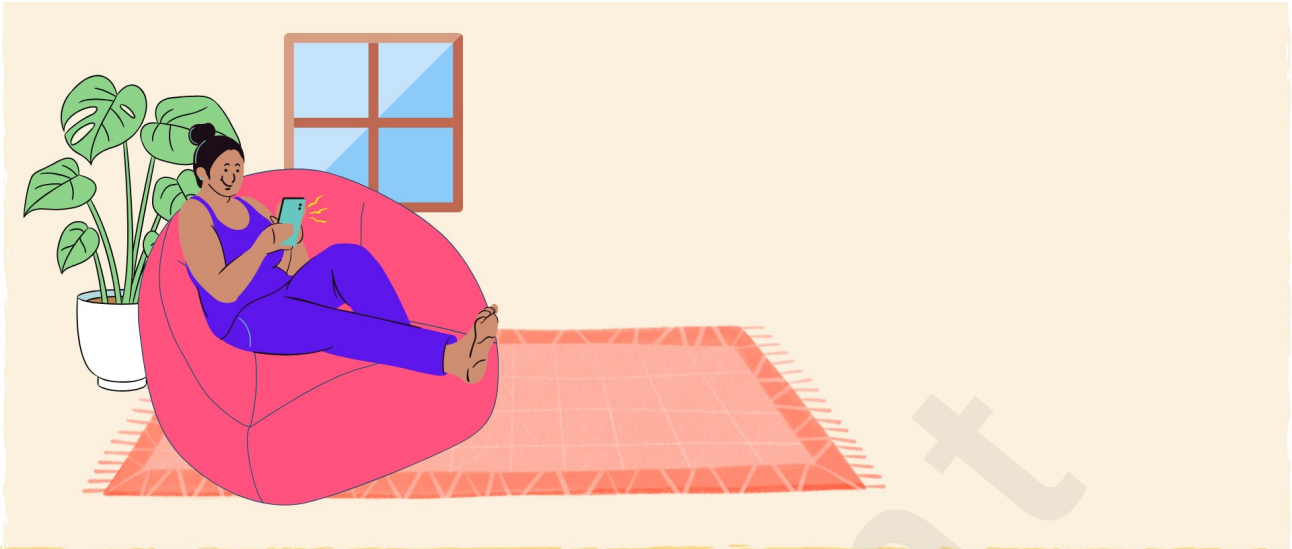
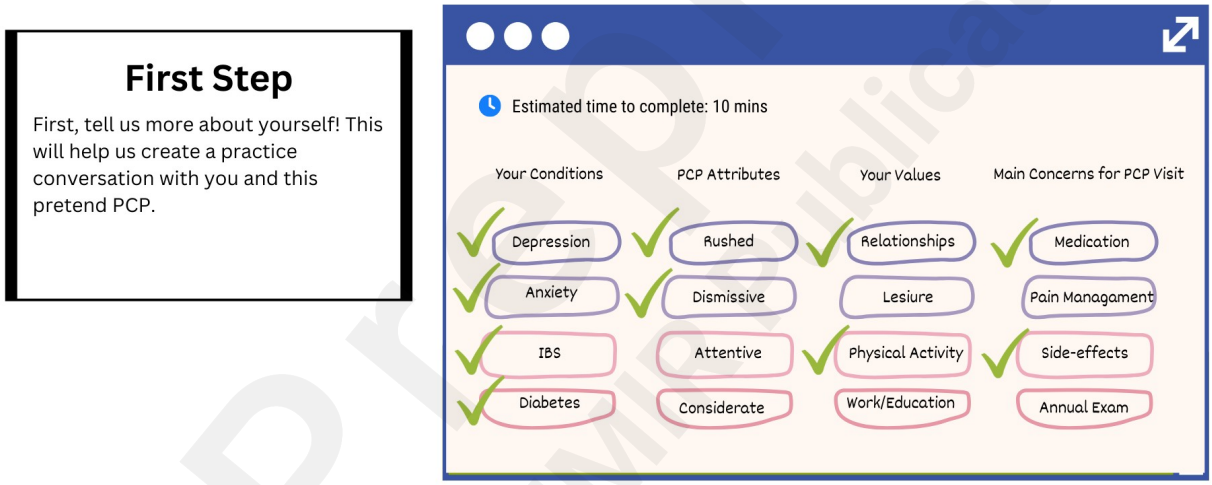
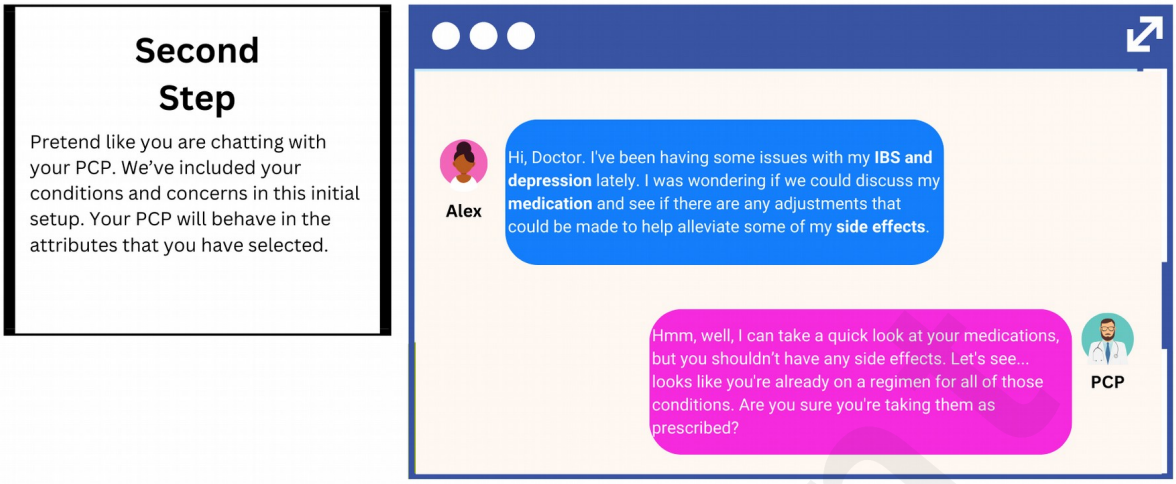


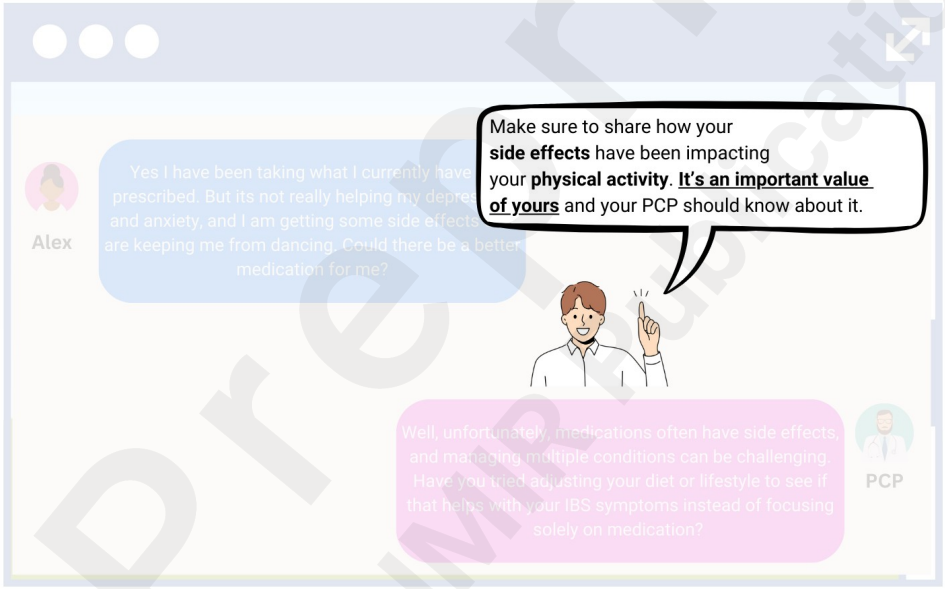
Alex has found it difficult to manage her IBS, mental health, and diabetes. In her experience, her PCP has been dismissive about her side effects and finding medications that work for Alex. The side effects have been getting in the way of her dancing.



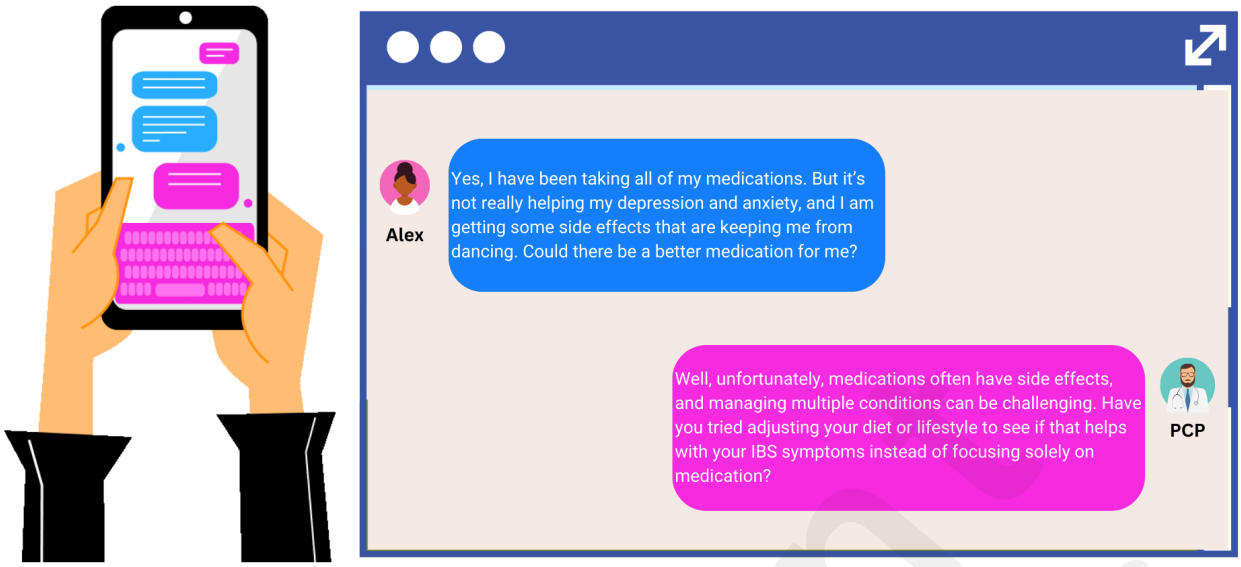
Alex is asked a variety of questions to set up the tool for a practice conversation. In the end, a summary and tips for communicating with her doctor will be provided for Alex's appointment.



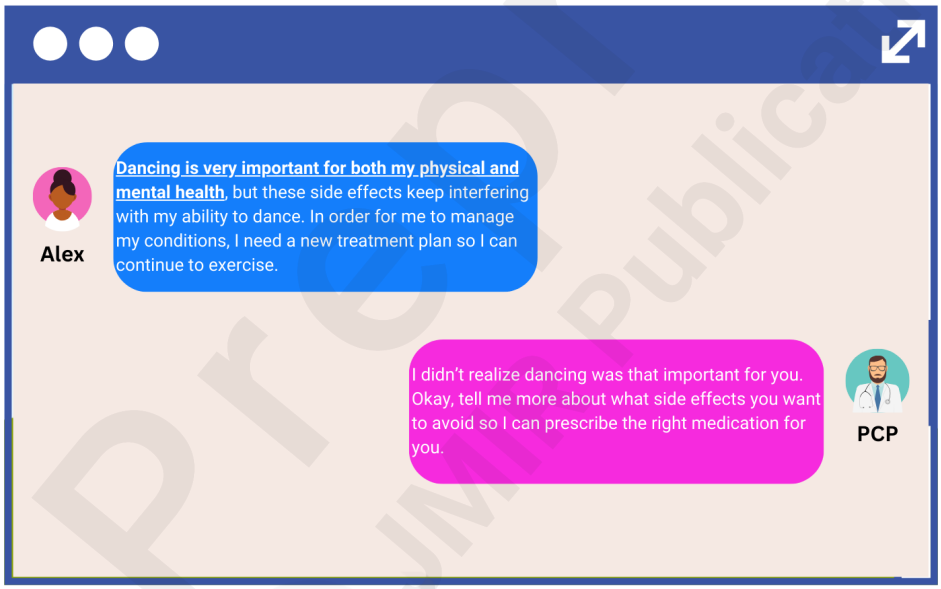
Alex starts the conversation by describing how her medications' side effects have impacted her wellbeing. The PCP is responding just as she described, dismissive and rushed.



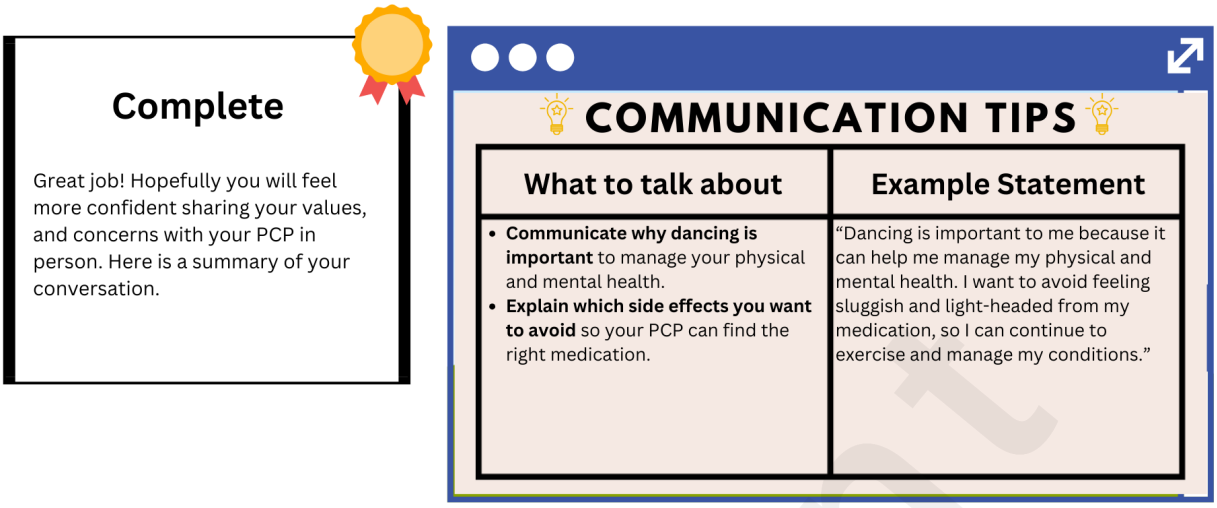
The tool reads the conversation and gives Alex a tip to better communicate her health priorities since her PCP was still being dismissive.



Alex continues to practice with the PCP, but it seems that the PCP is still not listening to her concerns.



Listening to the advice, Alex explains why she needs a new treatment plan so she can continue to dance to manage her physical and mental health.



Moments later, Alex finishes the conversation and gets presented with a summary page recapping her conversation and obtaining tips for her upcoming appointment.

Supplementary Files

Figures

Values elicitation technology-enabled service prototype summary.

Figure 1. Values elicitation technology-enabled service prototype summary.

Workshop displayed	Prototype name and summary
W1–W3	**Values bullseye worksheet.**[18] Established tool from Acceptance and Commitment Therapy to help patients reflect on their values via a mobile interface.
W2	**Inbox storyboard**. Workflow prototype in which patients complete values elicitation pre-appointment and mental health providers (MHP) receive an inbox message with the results.
W4	**Pre-visit summary**. Document available in patients' electronic health records listing patients' personal values and appointment-related questions.
W4	**Workflow diagram**. Graphic displaying workflows to facilitate collaborative care management across mental and primary health care.
W5	**Pre-meeting with an MHP.** Patients review self-care behaviors and assess their alignment with their values pre-meeting with an MHP; results electronically transmit to MHPs.
W5–W7	**Story-sharing.** Patients are emailed an exercise to complete pre-appointment, then meet with an MHP to reflect on their values and appointment priorities.
W6–W7	**PCP Simulator.** Patients use an artificial intelligence (AI) chatbot, playing the role of their PCP, to practice communicating with a dismissive PCP their values and to receive takeaways (e.g., communication tips, appointment priorities).

Multimedia Appendixes

Workshop prototypes.
URL: http://asset.jmir.pub/assets/09608e43fb53a7302995132c2bc711a1.docx