Value Sensitive Design of Technology Supporting Suicide Risk Assessment and Intervention: Perspectives of Healthcare Professionals

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Despite significant amounts of research on the widespread adoption of patient portals, research has been limited with respect to how healthcare professionals (HCPs) respond to portal messages communicating suicidality. This project interviews HCPs who respond to patient messages to learn current practice and concerns in handling suicide risk asynchronously. There are many values endorsed by HCPs in the assessment and intervention of suicidality in an asynchronous setting.

Keywords: Suicide; Patient Portals; Value Sensitive Design; Ethnography

1. Introduction

Suicide is one of the leading causes of death in the United States with rates increasing over time[1] and more than 720,000 people die worldwide from suicide[2]. Suicide is preventable[3], but prevention requires identification of risk in time to intervene.

Currently, identifying individuals at high risk for suicide has limitations with respect to individual self-reporting. Confidential resources, such as the 988 suicide and crisis line[4], can be helpful short-term, but it makes long-term monitoring of health outcomes and progress difficult. In contrast, individuals in clinical settings do not have the perceived anonymity afforded by resources like 988 and thus individuals may be more hesitant to self-report due to self-stigma[5–7] and/or fear of stigmatizing responses, unwanted treatment, and/or loss of privacy and autonomy[8,9]. Newer research shows that suicidal thoughts or behaviors (STB) are dynamic phenomenon and individuals who are not currently feeling suicidal might not disclose STB at a routine visit[8,10], suggesting that suicide interventions may benefit from "just-in-time adaptive interventions"[10].

We have reported that people who have experienced suicidal thoughts and behaviors (STB) send messages in the patient portal (PPM)[11], however research has been limited with respect to how people use PPMs to communicate STB[12]. Clinics have a duty to identify and intervene upon messages communicating STB. To our knowledge, there is no comprehensive system that is automatically tracking and intervening upon PPM messages communicating STB[13]. Without such a system, there are people who may be reaching out for help and not receiving it in a timely manner. Little work has been conducted to know how to identify STB in asynchronous formats such as portal messages[13]. An exception is a study that suggests those who have moderate to severe symptoms are more likely to respond asynchronously when given the option of responding synchronously vs asynchronously[14]. These results underscore that patients may be likely to self-report STB via PPM.

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The subsequent challenge to identifying these concerning messages is acting on them. Assuming correct identification, there must be a clear procedure for acting on the messages, both with the patient and within the healthcare team. Previous research has focused on alerting the provider, however outcomes were not reported[14]. We have only been able to identify one study reporting the perspectives of individuals who respond to messages related to suicidality. The study participants consisted of volunteer counselors in a large online support platform and found that many of them wanted more support and preparation for conversations with people experiencing STB[15]. It is unknown how healthcare professionals (HCPs) assess and intervene on messages communicating STB, how to best support HCPs in this assessment and intervention, and what values HCPs hold regarding the assessment and intervention of patients experiencing STB. This project reports the perspectives of HCPs who respond to patient messages. We sought to learn current practice and their concerns in handling suicide risk asynchronously. These HCPs are direct stakeholders[16] in the design of any technological solution. Our goal was to understand what HCPs find most useful in assessing and intervening in an asynchronous communication environment. Understanding HCP narrative accounts can help demonstrate patterns and values invisible to metrics alone[17].

2. Methods

2.1 *Sampling strategy and recruitment*

Interviews were conducted at an academic medical center in the mid-south of the United States. This study was approved by the Vanderbilt University Medical Center Institutional Review Board. Participants were recruited via purposive and snowball sampling to identify HCPs primarily from three outpatient clinics: primary care, neurology, and psychiatry. For recruitment we combined visiting the clinics in person and emailing flyers. The goal was to have approximately five interviews from each clinic conducted as saturation is not necessarily expected due to possible heterogeneity.

2.2 *Semi-structured Interviews*

The interview guide was developed through iterative process focused on what helps and hinders HCPs in responding to messages, and HCPs' desiderata for the design of a system to help with assessment and intervention. Embedded in these questions, we hoped to uncover themes and values to help us understand what is most important when HCPs are using the PPM for care related to suicidality using some known heuristics for interviewing stakeholders[18]. We also hope to identify the features of what might be considered a "message of concern". Two practice interviews were conducted prior to recruitment to refine questions and were not included in the analysis. Interviews were conducted virtually via Microsoft Teams[19] and in-person. Participants were not compensated.

2.3 *Analysis*

The participants were characterized using descriptive statistics on their roles, age, training backgrounds, and clinic they are representing. Interviews were transcribed using automated Microsoft Teams transcript[19] and Apple voice memo transcript[20] and manually validated.

We used Dedoose software[21] employing an open coding approach to help identify themes, including barriers and facilitators[22], using reflexive thematic analysis procedures[23]. Transcripts were also coded using the Systems Engineering Initiative for Patient Safety (SEIPS) 2.0[24] and value sensitive design (VSD) frameworks[18]. For SEIPS, focus was primarily focused on the work system, processes, and outcome codes. For VSD, a hybrid coding approach was adopted combining codes from previous VSD literature[18] and building upon their existing definitions of values and open coding for new values identified. Consensus through discussion was used for agreement on codes, but coding was primarily conducted by a single coder. After coding, analysis focused on describing the current system, facilitators and barriers in the current system, values highlighted by stakeholders, and identifying design features of tools and workflows that incorporate stakeholder values.

3. Findings

3.1 *Recruitment and participants*

Recruitment was November 2025-May 2026 with all interviews conducted January-May 2026. We interviewed 16 HCPs from five different clinics. We interviewed five HCPs from primary care, four from neurology, four from psychiatry, two from the discharge care center, and one from the trauma, burn, and surgical specialties. Most HCPs interviewed were nurses (7 RNs, 2 LPNs, 2 clinical nurse managers, 1 psychiatric-mental health nurse practitioner). There were two psychiatrists, one outpatient psychologist, and one medical social worker represented in the interviews. Median age was 36.5 years with 23-45 years old age range. Participants had been in their current roles for a median of 4 years with a 1–16-year range. Four HCPs had just an associate's degree, four had just a bachelor's degree, and eight with formal training beyond a bachelor's degree (ex. MD, PhD, MSN, MS, residency, fellowship, internship, postdoctoral training). Additionally, some of the participants had research expertise and some were co-authors of the organizational policy for response to STB.

3.2 *Current system*

3.2.1 *Actors and environment*

Participants described a complex sociotechnical system outlined in Figure 1. Patients are the primary actors in the system, initiating contact and communicating STB. Sometimes they initiate contact and then do not wish to share or answer questions. Patient avoidance of questions often elevates HCP's concern, resulting in increased intervention and sometimes diminished patient autonomy.

Nurses are the primary actors responding to the patient, via both telephone and PPM. Messages can be forwarded to the primary care physician (PCP) and/or psychiatrist for follow-up or referral.

When a patient calls the clinic via telephone, a centralized call center (access center) receives the call. The access center is primarily focused on scheduling tasks. Clinical concerns are assessed and triaged to nurses via the message basket, which can contain both access center-initiated call messages and direct PPM messages from patients. The access center marks calls involving STB or other distressing symptoms with a red exclamation mark in the message basket. Nurses reported prioritizing calls over messages. All patient-initiated messages are unmarked for acuity.

The discharge care center is a completely virtual clinic consisting of nurses, social workers, and other clinical staff. Their focus is to reduce hospital readmissions 30 days after hospital discharge. Due to rising calls related to STB since the COVID-19 pandemic, they have been tasked with responding to calls communicating STB outside of clinic hours.

Family and friends also play an important role in helping patients experiencing STB. Parents can help communicate concern for their child. Spouses can help communicate concern and remove lethal means (even if the patient does not directly communicate). If HCP reaches out and a patient does not respond, there is a potentially complex classification of family and friends to navigate including emergency contacts, people designated as "trusted adults", and a "communication for family and others" contact, depending on what kind of information release the patient has approved.

In calls with patients exhibiting STB, the presence of children can escalate the situation through limiting what the patient will discuss and introducing the risk of imminent danger to the children. When a language translator is needed, HCPs reported a preference for professional translators over family and friends to ensure the integrity of the translation.

Mobile crisis is a behavioral safety net throughout the state. Individuals can call or text and receive telephone services or an in-person or telehealth assessment. Their counselors can visit patients where they are, but the nurses lamented the delays in this service, resulting in a resource intensive experience for the nurse, who must stay on the line with the patient.

Police are also very important actors as they can detain and transport patients. They can transport for voluntary hospitalization if the patient has no other mode of transport but are often used for involuntary hospitalization under state law. All other options are usually exhausted before this.

3.2.2 *Assessment and triage*

Messages of concern take many forms. Explicit messages, suggesting self-awareness from the patient and a desire for help, are less common. For example, "*I want to kill myself*" (P4) or "*I'm on a medicine that makes me feel this way. This has happened before. I don't have a plan. I've got everything locked up.*" (P14). When people are no longer scared of the situation, it becomes particularly concerning to the HCPs. The most common type of concerning message is cryptic, conveying some sort of hopelessness, finality, or unsettling vagueness. Some examples of these are "*I'm feeling more sad than usual. I just feel like a failure*" (P4), "*I wish I could go to sleep and not wake up*" (P3), or "*I feel kind of blah. I feel unmotivated. I've been taking the same mood medicine for a long time. It used to seem like it worked better*" (P3). Participants reported that with cryptic messages, the HCP needs to get information from the patient to understand what is going on. The message might not even be something they say but actions they take, like hysterically crying on phone, cancelling appointments after positive biopsy results, calling HCPs with flat affect and then withholding information when HCP is inquiring (e.g., "*there's nothing else to talk about*"). Other concerning messages are multifactorial, such as sending "*goodbye and thank you*" (P1) to multiple HCPs, sending pictures of lethal means, or subtle shifts in tone from previous messages that are difficult to detect. Patients cannot flag messages as urgent but can use subjects such as "depression".

Somewhat related to messages of concern are threats. Sometimes they are for attention, and sometimes they are because a patient is frustrated or feels hopeless due to treatment-resistant chronic

illness. Some examples that might be threats for attention are "*if I don't get X, I'm going to hurt myself*" (P3) or "*if I don't get some relief soon, I'm going to have to do something*" (P7). To the HCPs, this is one of the reasons listening and validating the patient is so important.

Messages of concern warrant an immediate phone call from the HCP (multiple if unanswered). If the patient does not respond, the HCP must assess the risk and determine the next step. Depending on their estimation of the risk, they may message the patient back with resources, call the patient's family/friends, or call the police for a welfare check. If the patient responds, HCPs reported being more reluctant to call the police. They reported asking the patient's location and screening using the Columbia-suicide severity rating scale (C-SSRS[25]). Depending on the score, the patient will be assigned yellow (elevated risk), orange (moderate risk), or red (high risk) which will help determine next steps for intervention. HCPs noted that while the C-SSRS is a tool that can help, it does not replace their clinical judgement. Participants agreed that high and lower risk patients are easier to identify. Patients in the moderate category can sometimes be more difficult. Above all, the HCPs make sure to document everything. This protects both themselves and the organization. Figure 1 below outlines some of the workflow for assessment and intervention described thus far.

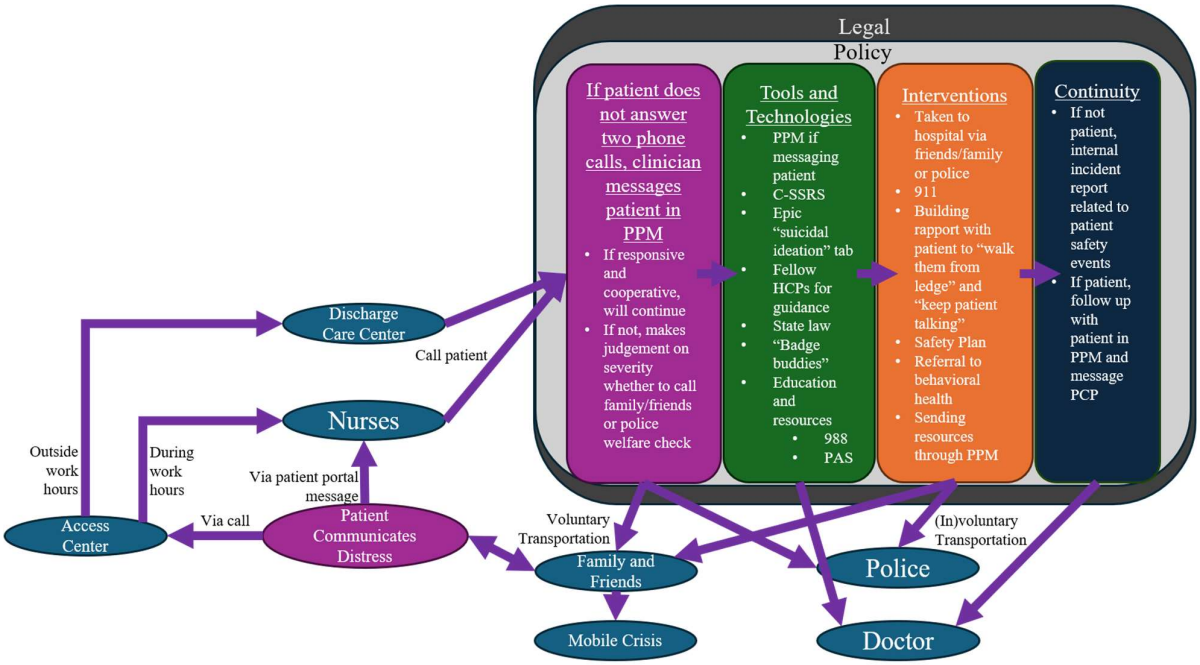


Figure 1. The actors, environment, tools, and interventions involved in management of a message or call from patient communicating distress compose a complex sociotechnical system

3.2.3 *Interventions*

The main purpose of interventions is patient safety. Can the patient safety plan and maintain safety if they encounter a suicidal crisis? Do they know what resources are available to them, how to access them, and feel comfortable accessing them? Figure 1 shows how interventions fit in with the system.

For yellow (elevated risk) patients, it seems the most common intervention is to let the patient know about the resources available to them such as local mental health resources, like the psychiatric

assessment service (PAS), and crisis lines (like 988). For specific issues such as postpartum depression or alcoholism, they can suggest specific resources for them such as rehabilitation programs. HCPs make a safety plan with the patient, with the most common usually being a Stanley-Brown Safety plan[26]. They can also connect the patient with clinic resources such as their PCP or psychiatrist or a referral to behavioral health. Primary care usually becomes the catch-all if they never go to behavioral health (which can sometimes be hard to get in). If patients are already on medication, they may need to change their dose and/or they can be recommended to seek psychotherapy, although this is sometimes difficult due to availability.

For orange (moderate risk), HCPs are advised to stay with the patient. They should request help from their fellow HCPs to connect the patient to an immediate assessment by an HCP (preferably specializing in mental health). For example, they may write on a note "call 911" so they can stay on the phone with the patient. They stay on the phone with the patient until mobile crisis arrives.

For red (high risk) patients, it is a similar process, except it is recommended the patient go to the emergency room. If there is concern of imminent danger, another HCP should call local law enforcement to the patient's physical location for an urgent welfare check and communicate that the patient may be an imminent danger to themselves. HCPs can notify their emergency contacts, and this is often when state law is utilized to detain the patient.

Another theme highlighted with each of the interventions is that of continuity and timeliness/urgency. The orange and red workflows attempted to avoid patients being left alone to figure out what to do next and with limited people knowing what was going on.

The workflows above represented clinics outside of psychiatry. For those in psychiatry, there was a very strong sense of **therapeutic alliance**[27], trust and rapport building, honesty, and avoiding stigma that must happen for patients to be willing to disclose STB. Making sure the patient feels heard and understood is paramount. Participants described it variously as, *"Just being near and sitting with a patient and acknowledging like that you're on the same team and that you want to continue to help them and work with them,"* (P11) and "*Sitting with them in the fear and in their sadness"* (P8). One participant stated, *"Effectiveness means maintaining safety. I mean, that's the most effective thing. The second most effective thing I think is candor. It's just trust, like therapeutic alliance."* (P1) They use the Stanley-Brown[26] to "*game plan suicidal crises*" (P8). Participants also focus on removing lethal means because as one stated, *"people have a preferred method of attempting suicide and if you can help them avoid that, they're not going to be a sort of readily accessing another method"* (P8). Overall, the participants from psychiatry backgrounds communicated more comfort with uncertainty and patient autonomy than the other clinics. They recognized the limitations of their role, with one participant summarizing it this way: *"Even the best, the best clinicians have lost patients to suicide, and I think it's prideful to think that anything I could do as a clinician would prevent all my patients from ever attempting suicide. So, I think there's a real humility about this."* (P8).

3.2.4 *Facilitators*

A frequently cited facilitator was the recently implemented organizational policy for suicidal ideation (SI) response and accompanying annual online training. For many of the HCPs (particularly

those outside of psychiatry), this policy helped them feel more comfortable helping patients who endorse STB because it gave them a clear workflow and script that they can read word for word. Some wished that the associated training was more in depth and/or hands-on, but overall, there was positive reception. Additionally, this policy appears to have been a resource for standardization, as the assessment and interventions across all the clinics were very similar. However, the policy was not mentioned by any of the participants from the psychiatry department, suggesting it might be less relevant to them because they rely more heavily on their clinical expertise and training. Overall, the workflows described by the participants were closely aligned with the published policy.

In addition to the policy, there were many tools and technologies that participants found helpful for assessment and intervention, including the C-SSRS[25] for assessment and the Stanley-Brown safety plan[26] for intervention. Both are available in the electronic health record (EHR), although many of the HCPs reported that they like to keep physical copies in a folder for ready access. Many participants used smart phrases to document SI in the note, with some customized for specific locations. During a nurse's call with a patient, a nurse triage function is available that produces the C-SSRS and other educational resources to help assist the patient. Participants described the need for a smart phrase to send patient educational resources through the PPM, and some HCPs maintain their own list of resources. Another physical resource available to the HCPs are "badge buddies," or cards that are attached to their ID badges that have the assessment and intervention workflows outlined. In the discharge care center, they have physical SI crisis packets with hard copies of educational tools and C-SSRS. Additionally, there is an intranet website that has "tip sheets" with quick and easy explanations of the policy (and other resources) as some of the HCPs complained that the policy can sometimes be too bulky and complicated to make sense of in real time. Another less mentioned tool is the ability to send the patient an automated message to check on them to see how they are doing. Nurses cannot send these, but the physicians can. Many of the HCPs highlighted how tools are helpful, but they do not replace their clinical judgement. They still need to pay attention to clues beyond what the patient is saying like their tone or withholding of information.

In addition to organizational resources, participants described facilitators for assessment learned through their experience and training. Most commonly cited was the idea of personalizing the assessment of risk by really knowing and understanding the patient. Examples included knowing what is going on in the patient's life, e.g. a recent death of family member or pet. Knowing the patient's usual disposition helped them identify changes. HCPs in psychiatry were often concerned with comorbid psychiatric diagnoses and understanding how they may interplay with patients' disclosure of STB, and if it is expected symptom of another diagnosis. If someone has chronic suicidality, and/or this is a marked change from their baseline, understanding what or why that has happened and personalizing the assessment to the patient is very important. The psychiatric HCPs highlighted the distinctions between passive vs active, chronic vs acute, and static vs variable risk factors, all of which rely heavily on personalizing the assessment of risk and understanding the nuance based on their previous training. To them, this assessment is not black and white; there are many shades of gray. Their extensive previous training and experience also seems to make them more comfortable with helping patients endorsing STB. Additionally, because the patient is not physically present, non-verbal clues such as background noise were highlighted. One HCP described how "*one of [the patient's] plans was to jump in front of a bus. Well, then I hear that he is, there's*

a car is behind him and he tells me that he's, you know, somewhere on the street and I'm like, okay, well now that's elevated the situation" (P15). For most of the participants, the goal was to focus on building rapport and trust with the patient to strengthen the therapeutic relationship. They desired to remain calm (and keep the patient calm) through deep breaths, and they sought to keep the patient talking. The HCPs also worked hard to avoid stigma by normalizing and validating the patient for being vulnerable with them and making sure the patient felt understood. For those who help train other HCPs in this, they found it is helpful for HCPs less experienced with this to think of this as any other medical diagnosis. *"It's treating it like you would any other medical condition that you're making it to where they can speak up and share and feel like they're going to be treated just the same way they would if they were experiencing heart attack or stroke symptoms because there's always been this stigma with depression and suicidality… I think it helps us provide more compassionate care when we put it in a lens of I'm asking you these questions because this is how we treat this condition."* (P14). Another HCP mentioned that some patients prefer messaging over calling due to the perceived anonymity of it. They felt like they received more open and honest answers when messaging with patients.

There were fewer facilitators mentioned for intervention than assessment, but a lot of this seems to be due to the strong focus on establishing the therapeutic alliance as the primary focus in the initial assessment. The HCPs described how they work together with the patient to figure out what they are going to do next, *"not being paternalistic"* (P12) and gaining agreement of the patient. This largely helps with patient buy-in and follow-through. For example, one of the other facilitators is helping the patient know the resources available to them, especially local resources. It is important to make sure that the patient feels comfortable accessing those resources and if not, helping them access them. For example, one patient's suicidal ideation involved using her car, so they made sure she had transportation to the next steps of her treatment plan.

3.2.5 *Barriers*

There are many barriers to responding to PPM messages that are not specific to suicidality. For example, there is nothing for a patient to do to establish the acuity of a message. The patient decides the subject line, but many of the HCPs go through the messages in chronological order. Another HCP or calls from the access center can mark messages as "urgent" but the patient cannot. This is one of the biggest concerns expressed by the HCPs, made worse by the fact that patients can send messages outside of work hours and concerning messages may be missed.

Overall, the non-psychiatry HCPs desired more training and/or knowledge of response to STB and the tools and technologies available to them. They also expressed a need for access to more mental health professionals to refer patients to, particularly outside the emergency room or the psychiatric hospital, as these settings carry stigma or can be far away for some patients.

There were many barriers to assessment addressed through the interviews. One of the most commonly expressed barriers is the discomfort of the subject due to the gravity of the topic. They want to respond appropriately and in a personalized way. HCPs highlighted how frameworks and tools can be helpful, but they are never going to be appliable to every situation, and one must still use their clinical judgment. Another commonly expressed barrier was the idea that the "onus is on

the patient" for disclosure. The patient takes the lead on how much they wish to disclose/not disclose. One participant put it this way: *"that person is help seeking because if they weren't help seeking, they probably could attempt at home and never tell anyone, right?"* (P1). For most clinics, many of the standardized assessments are only conducted at patient intake so if the patient does not bring it up on their own or it is a known ongoing issue, it may not be a topic of discussion. Because of this, it is important to make patients feel safe enough to disclose, further highlighting the importance of the therapeutic alliance, building rapport and trust, and avoiding stigma with the patient. Several HCPs mentioned how often a patient will reach out and express distress, but when directly asked what is going on, they may withhold information or stop responding/hang up which raises concern by the HCPs and they feel they must "drag it out of the patient". One participant described how all she knew about a patient was his occupation and the city he worked in. The patient got disconnected and they were able to call the police with the little information she had, and the police found the patient. The HCPs care deeply about their patients, and it is frustrating to them when they do not want to communicate what is going on so they can receive help. To this end, it is also frustrating to many of the HCPs that they do not have a lot of the usual non-verbal communication that they have in person, so there is a lot of uncertainty about the patient's situation and they have to ask more basic questions like where the patient is and who they are with.

Stigma remains a major challenge to assessment. Overall, the HCPs expressed this seems to be getting better and they are actively working to help avoid stigma by normalizing and validating the patient, but this stigma still exists. Along with this stigma, both patients and HCPs worry about the laws related to their external environment. Some patients seem worried about disclosure due to fear of losing autonomy due to laws that allow people to be detained for involuntarily hospitalization. Additionally, HCPs are very concerned about not doing enough for a patient for fear something bad will happen to the patient and they will be held liable, so they focus a lot on "covering themselves" by documenting everything thoroughly, including when the patient refuses to answer or denies help.

In addition to barriers to assessment, there are many barriers to intervention. First and foremost, HCPs are nervous and unclear on what the risk level is of a message that has been sitting for a long time. For this reason, they call the patient as soon as possible. If the patient does not respond, it is also difficult to know how to respond. This is coupled with the fact that most HCPs outside of psychiatry do not know what the outcome was of their previous interventions, as most of the interventions are very immediate as opposed to longer-term, making it more difficult to learn.

3.3 *Value sensitive design*

3.3.1 *Values highlighted*

Value Sensitive Design (VSD)-based interviews are useful for eliciting HCP values that would be difficult to ascertain by using EHR data, video, or observations. Many of the values were elicited through dialogue. Table 1 below outlines some of the values expressed in the interviews with definition and examples. Overall, the most endorsed values were safety, collaboration (both with the patient and other parties such as HCPs, police, and family), therapeutic alliance, personalized assessment of risk, timeliness/urgency, human welfare, calmness, trust, and the desire to do better.

Table 1. Values and definition with examples of value

Value	Definition with examples
Therapeutic alliance	Building rapport and trust with the patient so they feel heard and understood; this relationship helps the patient desire to be more honest and forthcoming; establishing that the patient and the HCP be on the "same team" and will attack this together; sitting with the hurt with the patient and not being scared
Clinician care	HCPs care deeply about their patients; they wonder if they did the best they could do even once they leave work or if they followed all the company protocols
Personalized assessment of risk	Understanding how circumstances past and present affect patient's current state; understanding the patient on an individual level
Safety	Concern for the patient's immediate safety and ability to keep themselves safe
Human welfare	"Refers to people's physical, material, and psychological wellbeing"[18]; this is more specifically related to their current physical well-being than safety
Timeliness/ urgency	Doing something while it is still relevant or useful; oftentimes there is need for quick action by HCPs
Avoiding stigma	Normalizing and validating the patient; thanking them for sharing and being vulnerable
Collaboration	Not being paternalistic with the patient and working together; working together with nurses, family/friends, police, and doctors to help the patient
Trust	"Refers to expectations that exist between people who can experience good will, extend good will toward others, feel vulnerable, and experience betrayal "[18]; this is related to establishing therapeutic alliance, but focuses more on the initial process of building rapport and maintaining relationship with genuine candor and honesty so the patient is willing to disclose STB
Informed consent	"Refers to garnering people's agreement, encompassing criteria of disclosure and comprehension (for "informed") and voluntariness, competence, and agreement (for "consent")"[18]; HCPs will often outline explicitly what they expect the patient to do next (sometimes with a timeline) and confirm with the patient if that is acceptable to them
Accountability	"Refers to the properties that ensures that the actions of a person, people, or institution may be traced uniquely to the person, people, or institution"[18]; each role has their own responsibilities and outcomes they are responsible for; patients are held accountable even if they stop responding or hang up
Privacy	"Refers to a claim, an entitlement, or a right of an individual to determine what information about himself or herself can be communicated to others"[18]; patients do not have to disclose STB; limited information can be shared with family/friends
Autonomy	"Refers to people's ability to decide, plan, and act in ways that they believe will help them to achieve their goals"[18]; patients have the right to decide how to disclose STB and if cooperative, they can collaborate to design their treatment plan
Necessary loss of autonomy	If patient is a true danger to themselves or others, they lose the agency to deny help and can be legally detained for involuntary hospitalization
Continuity	Making sure the patient has clear next steps and is not forgotten
Calmness	"Refers to a peaceful and composed psychological state"[18]; oftentimes HCPs focus on maintaining calm both for themselves and the patient
Identity	"Refers to people's understanding of who they are over time, embracing both continuity and discontinuity over time"[18]; HCPs often have strong identity as someone who helps people
Freedom from bias	"Refers to systematic unfairness perpetrated on individuals or groups, including pre-existing social bias, technical bias, and emergent social bias"[18]; regardless of any other factors, all patients will be assessed and treated as needed
Universal usability	"Refers to making all people successful users of information technology"[18]; making sure the assessment and intervention fits the particular patient
Legal protection	Making sure to document everything to protect yourself and the institution
Desire to do better	Recognizing the current system is not perfect; desiring to do best with what resources are available

3.3.2 *Toward a value sensitive design technical framework*

Based on the values endorsed by the HCPs, Table 2 outlines some of the design features of a system that helps with assessment and intervention of STB in PPM. Participants were skeptical that the personalized nature of risk assessment would make the identification of messages of concern difficult for an automated system. What is considered risky for one individual might not be risky for another. Additionally, there was some concern that patients might react negatively to automated responses, but overall, HCPs were more concerned about safety than the patient's immediate feelings. They recognize the patient is likely in a heightened state so treating this delicately is important. Because of this heightened state, it is also interesting to note that none of the HCPs were comfortable with a large language model (LLM) automated response. Automation was discussed in terms of a pre-scripted response, not a chatbot. Usually, these pre-scripted responses began with

establishing the therapeutic relationship by thanking them for sharing and trying to connect them to a human as soon as possible.

Table 2. Design features, their practical advantages, and the values they support

Design feature	Practical advantage(s)	Value(s) endorsed
Automated message response based on automated identification	Responded to right away	Timeliness/urgency; continuity
Automated message that must be "humanized" right away	Can receive needed care immediately by human. Allows patient to be heard and understood	Therapeutic alliance; timeliness/urgency; collaboration; continuity; personalized assessment of risk; accountability; legal protection
Having dedicated team to respond to patient messages outside of normal clinic hours	Patient can immediately connect with a person to feel cared for	Therapeutic alliance; clinician care; timeliness/urgency; collaboration; accountability; continuity; universal usability
Having automated feature that allows concerning messages to be marked as urgent for HCPs	Reduces cognitive burden on HCPs and improves timeliness	Timeliness
Content of message not saying outright that it is a message related to STB. Calling it a "concerning" message	Does not scare the patient if they were just saying it as a threat but also doesn't further escalate or heighten situation if being serious	Human welfare; calmness; avoiding stigma
Not immediately calling police or mobile crisis if STB message is received. Gives patient option if they would like to themselves	Does not scare the patient if they were just saying it as a threat but also does not diminish patient's autonomy	Personalized assessment of risk; avoiding stigma; autonomy; calmness; privacy
Content of message explicitly stating that it is an automated message, and someone might not respond to their message right now	Informs patient of situation so they can decide how to proceed	Informed consent; trust; legal protection
Content of message thanking patient for their message and being vulnerable with them. We are not scared by the content shared	Acknowledges the patient for being vulnerable with them	Therapeutic alliance; trust; avoiding stigma; calmness
Content of message giving patient easy to access resources they can access right now	Patient may be in heightened state with limited capacity to think rationally or complete complicated tasks	Personalized assessment of risk; human welfare; timeliness/urgency; collaboration; informed consent; autonomy; safety
Content of message explicitly asking patient if they are suicidal and making response simple "yes"/"no"	Sometimes messages communicating STB are threats for attention. This will distinguish if serious and the simple usability will help with likely heightened state if being serious	Freedom from bias; universal usability
Content of message making options for them to contact their PCP later that day	Makes patient feel heard and understood and that they will be taken care of	Therapeutic alliance; clinician care; timeliness/urgency; continuity; autonomy
Making it clear that response is mandatory, but giving them multiple easy options to select from	Help HCPs know what is going on and what steps the patent chose to take while still acknowledging the likely heightened state of the patient	Clinician care; autonomy; universal usability
Urgent care psychiatric evaluations	Can receive needed care immediately	Therapeutic alliance; timeliness/urgency; continuity
Information-gathering tool to help HCPs better understand the patient	Reduce cognitive burden and improve response time	Timeliness/urgency; personalized assessment of risk

4 Discussion

This study explored assessment and intervention of STB in patients over the phone and through PPM by examining perspectives on this work of HCPs at a large academic medical center. We found that there are multiple types of “messages of concern”, but most common was a vague or cryptic message that demands a personalized and nuanced assessment of the patient to clarify the risk. This corroborates other studies finding that effective natural language processing tools will require more nuanced and context-specific approaches to ascertain suicide risk[28]. HCPs often must engage the

patient, asking difficult questions, to understand the situation. This is a similar finding to another study looking at primary care experiences with PPM messages[29]. Based on the patient's responses, there are actors in a variety of roles facilitating assistance for a patient communicating distress. Through interviews, we elicited the values held by HCPs carrying out assessment and intervention. Using these values, we developed design features of a possible framework to help HCPs in the future. Many of the values and design features described in our study are similar to those recommended by the Coalition for Health AI for crisis and severe distress handling[30]. Another study of informatics solutions in suicide prevention, specifically a postvention tool facilitating follow-up on patients at risk for suicide, found similar design solutions[31].

Some limitations of this work include this was a single-center study with a limited number of participants. Participants represented only a few clinics with various prevalences of STB at each clinic. Patient and caregiver's perspectives were not explored. Future studies could explore if these results validate in another external clinic system or different setting (such as volunteer crisis counselors) and explore patient and caregiver perspectives.

Future research should also explore building a value conscious model[32], or specifying an ethical theory to be deliberately designed with, for assessing suicide risk from portal messages. Using classifications prior work on values in technology design, specifically in healthcare[33], we primarily identified values relevant to "professional or individual practice" (trust, autonomy, privacy) and "societal values that span many sociotechnical systems" (safety and well-being). There was minimal focus on "organizational values" (stewardship, employee well-being, fair competition). This echoes what has been reported in the scant value sensitive design literature in healthcare informatics[33]. We acknowledge that values can inherently conflict with one another. For example, many of the interviewees noted how they limit their work in the messages to clinic hours for their own mental health/wellbeing, and this can conflict with their desire for the well-being and safety of a patient. Another analysis of mental health across the care continuum found that safety, privacy, and equity were important, but in cases of suicide "the clinician retains diagnostic and treatment authority at all times"[34]. Another analysis of values important in mental health focused on safety, equity, evidence, and clinical accountability[35]. Another analysis focused on "equity, replicability, privacy, efficacy, and engagement" and highlights these have remained relatively unchanged over the years, but with the advent of LLMs, the sense of urgency has become heightened[36]. A study focused on youth mental health and digital technology using VSD found that "personalization, empowerment, and autonomy" to be most important[37]. Currently, there does not seem to be clear consensus on what values should be consciously included in a mental health model based on literature, so further exploring ethical frameworks for this conscious design is necessary, especially as found through our study, there are many values endorsed by HCPs in this assessment and intervention of patients in crisis, and sometimes these can be dynamic, conflicting, and emergent. It is doubtful that current technologies can, without human oversight and involvement, participate effectively in this very human task of responding to patients in crisis while supporting the values endorsed by HCPs.

5 Funding and Acknowledgements

Funded by the National Library of Medicine 5T15LM007450. Special thank you to my family.

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