Supplementary Material

Appendix A. Sample Semistructured Interview Prompts

1. What do you think about using this tool, embedded in the EHR, in your practice?
   (a) Comfort
   (b) Stability
   (c) Readability
   (d) Operation

2. What do you think about the interface of the tool as it is displayed in the EHR?
   (a) Font size
   (b) Color
   (c) Readability
   (d) Appealing

3. What do you like the most about the tool?
4. What do you like the least about the tool?
5. Any suggestions for improvement?

Appendix B

Code Book

Introduction

A directed content analysis of data from video interviews was conducted to understand oncology providers’ attitudes toward an application, designed to work with the electronic health record (EHR) for use in the promotion of cardiovascular (CV) health of cancer survivors. Study aims included (1) assessment of the usability of the cardiovascular health (CVH) tool as part of the cancer survivorship care plan and (2) identification of enablers and barriers to tool use in the oncology setting. Directed content analysis uses an existing construct or theory as a starting point, and then builds on that research to describe a phenomenon more completely. The goal of a directed approach is to validate or extend conceptually a theoretical framework, theory, or research. Deductive category application is another term used to describe this process.2

The code book was organized by color for ease of reference. Major themes were identified in red text and subthemes were identified in blue text. Descriptive examples (bulleted) and quotes (in green) were included under their respective theme or subtheme. Items excluded from the theme were listed after the quote section.

Themes and Subthemes

System Functionality

Architecture Functionality

Definition: the application interaction with the health information technology environment, specifically technical interaction of software and hardware.

Inclusion Criteria

• How and from where information populates the application.
• Speed of returning data to populate the application -real time, versus delayed.
• Accuracy of information.
• Trust.
• Type of hardware: i-pad, i-phone, computer screen, interaction with the medical record.
• Operating systems.
• Security of the system and data.

Exclusion Criteria

• Comments concerning button, slider, or any other interface functionality

Positive Architecture Functionality

"I like that it fits on one screen on an i-pad.”

Negative Architecture Functionality

"A printout would have been nice.”

Interface Functionality

Definition: users’ perception of the functions of the interface. User–system interface including all aspects of the system seen, touched, or heard.3

Inclusion Criteria

• Ease of use.
• Sensitivity of the buttons/sliders.
• Display mechanics.

Exclusion Criteria

• Does not include comments about content or lack of content for any specific slider/button or content algorithms behind the system.
• Does not include comments about hardware.

Positive Interface Functionality

"It’s quick and easy to use … “
Negative Interface Functionality

“... but I don’t like sliders.”

Content

Physical Activity
Definition: physical activity for ideal cardiovascular health is defined as ≥150 minutes/week of moderate intensity activity or ≥75 minutes/week of vigorous activity or combination, for adults >20 years of age. For children, 2 to 19 years of age, and +60 minutes of moderate or vigorous activity every day.4

Inclusions Criteria
- Comments about the definition and how it is measures.
- Comments about the subjective nature of patient reported outcomes.
- Comments about the importance of capturing physical activity (PA) data.

Positive Physical Activity Comments

“[The application] is an additional tool to talk to patients about physical activity which is something that I always bring up to all patients in remission. The more we study the role of exercise in cancer, the more it seems to be protective; independent of it effect on cardiovascular health which of course is quite beneficial.”

Negative Physical Activity Comments

“Physical activity is so subjective. I’m not sure that it is a meaningful thing ... from my standpoint it’s actually pretty much a waste of time.”

Diet
Definition: food and nutrition as well as supplements consumed by an individual.

Positive Diet Comments

“Wow, just diet alone can make a huge difference in [cardiovascular health].”

Negative Diet Comments

“Diet is so subjective and most people don’t really have any idea of how much sodium they’re taking in ... most people off the top of their head wouldn’t know that.”

Objective Data
Definition: body mass index (BMI), blood pressure (BP), smoking, medication, A1c, and cholesterol.4

Positive Objective Data Comments

“Smoking, BMI, diabetic control, blood pressure control, and cholesterol control are the biggies.”

Negative Objective Data Comments

“Cholesterol, we [oncologists] almost never look at that; blood pressure we look at but consider that a primary care function and we never look at hemoglobin A1C.”

1.3.4. Other Content
Definition: Statements about content not currently included in the application but which users might expect to see

Inclusion Criteria
- Race.
- Age.
- Risk scores.

Exclusion Criteria
- Diet.
- Exercise.
- Objective data.

Positive Other Content

“...I would think race and age would be important factors to consider when evaluating CV health ... they are not included in the application.”

Cardiovascular Health Score
Definition: a score based on a continuum of cardiovascular health from poor to ideal, with the goal of achieving and maintaining ideal CVH. Seven attributes (factors and behaviors) affect the CVH score and include smoking, BMI, physical activity, diet, total cholesterol, BP, and fasting blood glucose.4,5 The concept of CVH encompasses more than the absence of CVD.4

Inclusion Criteria
- Comments concerning factors and behaviors.
- Comments about CV risk scores.
- Comments about meaning of CV health score.
- Comments about the development of the metric.
- Comments about validity and reliability testing.

Exclusion Criteria
- Specific information about individual factors or behaviors (e.g., cholesterol content and diet content)—see theme 7.

Positive CVH Score Comments

“...the CV health score) is really sort of nice ... wow, if I’m a diabetic and I let my hemoglobin A1c go to 8.2, wow, that really drops my overall CV health.”

“...you can see that losing 30 pounds improves your BMI and also improves your cardiovascular health. I like that functionality—you can show patients what happens.”
Negative CVH Score Comments

“a patient would kind of look at this and go, “what’s this 57% mean?” (Points to score displayed in cardiovascular health score box). Is that likelihood of being dead of or likelihood of being alive? Is that the probability for cardiovascular event? At 10 years down the road? At 20 years down the road? Does that just tell me that I’m at 57% median relative to the rest of the country? That number doesn’t mean very much to a patient, or me the way it is!”

Appropriate End-Users

Users
Definition: individuals using and involved in all aspects of the design, redesign, development, implementation, security, and use of the health information technology (HIT). Also includes the way HIT makes users think and act.5

Inclusion Criteria

• Providers—nurses, physicians, any clinicians.
• Patients, caregivers, and family members.7
• Health IT professionals.
• Informatics professionals (Chief Nursing Informatics Officer [CNIO], Chief Information Officer [CIO], and informatics nurse specialist)—user training, safety and reporting.

Positive—Oncologists as Users

“Endometrial cancer [patients] tend to be a very high survival population, ... and are less likely to die of their cancer, than obesity related issues and cardiovascular disease....That would be a very good population to use this in. Even up front because they are often very morbidly obese with medical comorbidities that play into our decisions for surgery and their cardiovascular risks surrounding that. That would be a good population to use this upfront.”

“I think I would use it in different patients at different times.”

Negative—Non-oncologist Users

“I don’t think patients would have any problems using this.”

“The patient would come to the clinic and the nurse ... or they (the patient) would do this before they came to the clinic?”

“You go to a primary care doctor because you are worried about your heart....when you come to an oncologist, you’re not worried about (CV Health—points to the application).”

“In survivorship training we’re supposed to be doing that and I’m meeting with the primary care people ... they are asking who is supposed to be in charge of survivorship care and CV Health. Is it us? Is it You? Is it a mixture? To be quite frank we are too busy with treating people—I think survivorship probably should be somewhere else and maybe not in our domain.”

“We certainly are not going to prescribe or change or adjust medications regarding cholesterol, blood pressure or blood sugar. We’ve never done that; we won’t be doing that.”

“The nurse could have done this before you come in (to see me for the visit).”

“This would be a really good tool for a primary care doctor.”

Facilitators and Barriers to Integration

Use
Definition: an attribute of usability concerning the ability of the user to complete the desired task in the desired context/environment. For our study we focused on how the tool might be used, and in what types of patient populations.

Inclusion Criteria

• How the tool is used—use scenarios.
• With what types of populations of patients might the tool be useful.

Positive Use Scenarios in Oncology

“Endometrial cancer for instance they tend to be a very high survival population, where honestly it’s been shown that they are very much less likely of their cancer, more likely to die of obesity related issues and cardiovascular disease and things like that. That would be a very good population to use this in. Even up front because they are often very morbidly obese with medical comorbidities that play into our decisions for surgery and their cardiovascular risks surrounding that. That would be a good population to use this upfront.”

“I think I would use it in different patients at different times.”

Negative Use Scenarios in Oncology

“I’m more worried about different types of things than cardiovascular health....I (see) 20 to 30 year olds and they aren’t worried about myocardial infarctions (MIs) because they are impervious to about anything.”

“To be quite frank we are so busy with treating people that I think survivorship probably should be somewhere else and maybe not in our domain.”

“I’m more worried about different types of things than cardiovascular health....I (see) 20 to 30 year olds and they aren’t worried about MIs because they are impervious to about anything.”

Workflow
Definition: collaborations and processes, sometimes requiring two-way communication to ensure patients receive the care they need at the time they need it.3

A modular sequence of tasks, with a distinct beginning and end, performed for the specific purpose of delivering clinical care.8
Inclusion Criteria

- Clinical workflow and clinical information system mismatches.
- HIT systems “workarounds.”
- Where in the course of the oncology interaction would this type of preventative health application can be most effective (between visits, before or after chemotherapy, at the office visit, once a year, etc.)

Positive Workflow Comments

“In patients treated with an intent to cure, you could use (this application) right away—encourage them to start living a healthy lifestyle and change their focus from being a cancer patient to surviving – probably use it right away, I would say.”

“I would think that the appropriate time (to use the application) would be after treatment has completed. ... during treatment, there’s a lot of focus on the treatment, side effects and where we go next. To add this would just seem to be overwhelming ... .”

Negative Workflow Comments

“If going through this generates a lot of non-oncological time then I wouldn’t like using it...if I’m finding out that we are spending even 5 minutes talking about what they ate or their activity. I have higher priorities in terms of their survivorship types of things I have to get in within that time.”

External or Internal Contextual Influences

Definition: federal, state, and organizational rules and regulations including quality reporting measures, organizational governance issues, and organizational culture that influence HIT implementation and use.

Inclusion Criteria

- Health Insurance Portability and Accountability Act (HIPAA)—restrictions on secondary use of data.
- American Recovery and Reinvestment Act (ARRA—2009), including the Health Information Technology for Economic and Clinical Health (HITECH) act.
- Agile, flexible workforce able to embrace change.
- Organizational mission, vision, and values aligning with HIT implementation and use.
- Social, environment, and management influences.
- Human (e.g., nursing shortage) and fiscal resources to support HIT.

External or Internal Contextual Influences

“The CoC (Commission on Cancer) is demanding that we give survivorship things to people, we’re doing that as part of our CoC requirement.”

References