A rapid process for identifying and prioritizing technology-based tools for health-system implementation

Abstract
Background: Putting new technologies into clinical practice requires a rapid and trustworthy decision-making process, informed by best evidence.
Objective: We present a rapid evidence review process that can be used to inform health system leaders and clinicians seeking to implement new technology tools to improve patient-clinician decision-making and patient-oriented outcomes.
Methods: We conducted an environmental scan of health IT literature to identify relevant digital tools in oncology care. We synthesized the recent literature using current evidence review methods, creating visual summaries for use by a panel of national experts. Panelists were taken through a modified-Delphi process to prioritize tools for implementation. Findings from the rapid evidence review panel (RERP) were taken to a local validation panel for further review.
Results: Our rapid evidence review process shows promise for informing decision making by reducing the amount of time and resources needed to identify and prioritize a proliferating set of IT tools. Despite evidence for improved patient outcomes, panelists had substantial concerns about implementing patient reported outcome tracking tools, voicing concerns about liability, lack of familiarity with new technology, and additional time and workflow changes such tools would require. Instead, clinicians favored technologies that did not require clinician involvement.
Conclusions: Health system leaders can use the rapid evidence review process presented here to usefully inform local technology implementation and practice policy.

Keywords: Evidence review, expert panel, health information technology, Oncology Care Model, clinical decision support

Introduction
Computerized tools that aid patient-provider communication and share medical knowledge are proliferating. Many such tools have also been demonstrated in randomized trials to improve clinical care [1]. These include tools that can support patient self-management [2], patient decision aids [3], point-of-care clinical decision support [4,5], and web-tools that can connect health care teams and patients outside of traditional face-to-face clinic visits, such as tools that automate collection of important patient reported outcomes (PROs) and feed this information to the clinical care team [6]. These knowledge transfer and communication tools can be broadly categorized as “Patient And
Clinician Talk and Support” (PACTS) tools. There is high enthusiasm that such tools can help make clinical care more safe, effective, and patient-centered [7].

Despite increasing optimism about the potential for PACTS tools to improve clinical care, there are many barriers to their successful implementation [8,9]. These tools can be complex, with multiple components that engage not only patients but multiple members of the clinical care team [10]. Determining how they best fit into a local health system context is often unclear [11]. Further, the extent to which these tools have been tested is variable. Relatively few have been found effective in clinical practice outside of initial efficacy trials, whose purpose is to consider performance in ideal situations [8,12,13]. At the same time, it is not practical for hospitals and health systems to spend years evaluating and adapting these interventions for implementation.

Health systems and larger clinical communities interested in taking advantage of promising PACTS tools need a rapid, systematic, and trustworthy process for identifying, prioritizing, and adapting tools for local implementation [9,14]. Methods of rapid analysis have been developed to aid pragmatic application of research, such as ethnographic-style analysis [15,16] and assessment of health technology literature [17,18]. To our knowledge, however, no methods exist to address our question: “How can health systems rapidly identify and evaluate technology-based tools that claim to improve clinical care, in order to prioritize them for local use?”

One area where PACTS tools have growing policy support is oncology care. For example, the Oncology Care Model (OCM) is a pay-for-performance model that emphasizes patient-reported outcome measures and is being implemented by 192 practices and 14 payers nationwide, including our own academic cancer center [19]. So, OCM provided an ideal test case for developing and evaluating a rapid evidence review process to review PACTS tools, with a goal of enabling experts to 1) rapidly evaluate evidence for complex computerized tools and 2) prioritize which tools are put into practice. We called this novel process the Rapid Evidence Review for PACTS tools (RERP). This methodology paper describes our novel evidence review process and how it worked in the context of prioritizing, for local use, complex computerized tools to improve the patient experience of cancer care.

**Methods**

**Overview**

We developed our process to take advantage of existing measures, rapid evidence review methods, consensus-based decision making methods, and rapid qualitative analysis methods [17,18,20]. The process we developed attempts to streamline the information provided to an expert panel and enable the panel to meet just twice to evaluate and prioritize multiple interventions, once in a one-hour introductory teleconference, and again in a face-to-face five-hour meeting. This timeframe may be adjusted according to the quantity of manuscripts necessary for review.

It is not practical or efficient for panelists to review full manuscripts, fully review the literature, or individually evaluate evidence. Instead, the RERP makes use of established evidence review tools and frameworks to ensure a rapid process that is also
credible. By shifting the labor to a smaller, easily trained project team who can collect and synthesize relevant information before the expert panel review, the expert panel's evidence review is enhanced and accelerated. Our project team consisted of a content expert, an evidence-based medicine expert, a project manager, and a research specialist. Our team required approximately 3 months to assemble the evidence presented in the RERP.

We then used a rapid template-based coding method using the Tailored Implementation for Chronic Disease (TICD) framework and developed a categorization scheme for interventions, to rapidly interpret the expert evaluations from the RERP [21]. Our aim was to use these findings to inform local effectiveness, implementation, or hybrid studies [22]. We describe each step of the RERP process in detail below.

Figure 1.
1. Environmental Scan  
   *(see Figure 2)*

2. Expert Panel Recruitment
   a. Identify target population
   b. Recruitment
   c. Prepare participants

3. Conduct RERP
   a. Prepare materials
   b. Introduce goals and structure
   c. Evidence rating
   d. Re-rating
   e. Qualitative data collection

4. Analysis

5. Local Validation Panel
**STEP 1: Conduct a rapid environmental scan to identify promising tools.**

A number of procedures exist to conduct rapid reviews of literature [17,18,20]. We chose to conduct a thorough environmental scan [17]. We first sought to identify the relevant topic domains. In the context of OCM’s incentives to improve the patient experience of cancer care, we focused on PACTS tools related to improving cancer- and cancer-treatment related symptoms. We identified symptom domains by reviewing all published care guidelines from major professional organizations writing guidelines for any aspect of the cancer care continuum (prevention, screening, diagnosis, treatment, prognosis). Our review included the following organizations: American Society of Clinical Oncology; National Comprehensive Cancer Network; European Organisation for Research and Treatment of Cancer; National Cancer Institute; US Preventive Services Task Force; American Academy of Hospice and Palliative Medicine; American Cancer Society; and the Oncology Nursing Society. This review established the set of possible symptom domains for further study (see Supplement 2). From this larger set of symptoms, we prioritized those that applied to multiple different cancers treated within a cancer center (for example, we included chemotherapy induced nausea and vomiting but excluded highly disease-specific symptoms such as lymphedema in breast cancer patients).

An informationist then performed a systematic search for PACTS tools that targeted one or more of the selected symptom domains and were evaluated in randomized controlled trials (RCTs) (search strategy described in detail in Supplement 1). We chose to focus our search on randomized controlled efficacy trials (RCTs) because an initial search identified few to no implementation or effectiveness studies of PACTS tools in these domains. The search strategy we developed to identify PACTS tools will be of particular interest to those interested in implementing PACTS tools, and is described in detail in the supplement. Also, the standardization and internal validity of RCTs aids a rapid and rigorous expert panel evaluation. Still, we recognize the need to sometimes move beyond the randomized control trial, particularly in the context of complex interventions such as decision support, where local context and clinical workflows are likely to be key factors in determining the success of the intervention [23–25]. In the absence of large pragmatic trials and implementation studies, single-center and multi-center efficacy studies are likely the best starting point for identifying promising tools.

A content expert on the project team (DK) then reviewed the abstracts of all RCTs retrieved by the search strategy. He excluded interventions that were not technology- and knowledge-based -- or were not targeting one of the selected symptom domains. Next, he selected for further review those interventions reporting at least some evidence of efficacy in the abstract. Full manuscripts were retrieved for these trials and were read in full by the oncologist. Some manuscripts were excluded at this stage due to the limited clinical relevance of the findings. The oncologist then assigned “Effect Size” and “Reach” Scores to each RCT based on a process developed by the National Cancer Institute (i.e., using the Research-Tested Intervention Programs review process) [26]. Those RCTs with combined scores (Effect Size + Reach) of ≥4 were presented to the Rapid Evidence Review Panel (RERP) as the final product of this environmental scan. 14 RCTs in total fit the above criteria for presentation to the RERP. Finally, a member of the team
with experience in evidence-based evaluation (TJC) applied quality of evidence scoring to each RCT following the GRADE working group approach (Grading of Recommendations, Assessment, Development, and Evaluation) [27]. GRADE outcomes tables were created for the primary outcomes of each RCT (see tables in Supplement 3).

Figure 2.

**STEP 2: Expert Panel Recruitment**

**2a. Identify the target population to conduct the rapid expert review.**

The target population for the evidence review process can be local or national level, depending on goals for future implementation and effectiveness studies. Ideally, an initial national-level process to prioritize the most promising tools can be followed by local validation, which focuses much more on how high-priority tools need to be adapted to fit local clinical contexts and workflows. Targeting a national group of experts for initial prioritization has several advantages. First, a national panel lends itself to focusing on what might generally work to improve the patient experience, rather than
details of what might be practical in a particular context. Second, it allows the project team to obtain the perspective of clinical experts from multiple different geographic areas and a variety of clinical settings. Third, it allows health systems to incorporate expertise from beyond the boundaries of their own system, which enhances potential for solutions that can be used and evaluated at multiple institutions. Finally, a national panel allows health IT companies developing software for technological interventions to evaluate the types of software most likely to be accepted by their customers.

The panel meeting of national experts can be held, if resources allow, at a national society meeting for practitioners in the area of interest, to expand convenience for panelists and increase the number of experts willing and able to participate. The RERP, focusing on the patient experience of cancer care, was held at the 2017 Annual Meeting of the American Society for Clinical Oncology.

2b. Recruit the appropriate mix of participants.

To identify potential panel participants, we identified practitioners with expertise in the area of interest from across the nation. We sought to recruit panelists who practice in the field in which the intervention will be implemented and have first-hand knowledge of the topic and clinical workflows. We also considered whether to include patient representatives on the panel, to provide insight into patient needs, preferences, and knowledge that can further inform the impact and feasibility of the technologies being considered. However, given the goal of evidentiary review at this stage, we chose to focus on clinical experts for this initial evidence review and prioritization. We identified sixteen experts in medical oncology from across the US, including physicians in both community oncology practices and academic medical centers. Our final panel consisted of eight medical oncologists with a range of expertise relevant to the patient experience of cancer care and technology’s role in facilitating patient experience. Participants were recruited through direct contact by the principal investigator and co-investigators and subsequent snowball sampling. If resources allow, panelists can be compensated for their time.

2c. Introduce participants to the topic and prepare them for the work ahead.

A short introductory meeting is helpful to set the tone for the panel, present background information, and allow panelists to ask questions and learn what to expect. For the introductory meeting, we held an hour-long teleconference one week before the RERP in which we introduced ourselves and the panelists, gave the rationale for the project, and explained the panel members’ responsibility and what would take place during the RERP.

The purpose of the Rapid Evidence Review Panel is for expert practitioners to evaluate the potential feasibility and impact of putting complex technological interventions into clinical practice. We defined the goal of our panel as helping oncologists and health-systems nationwide evaluate the feasibility and impact of utilizing trial-tested PACTS tools to improve the patient experience of cancer care.
Because our intended audience was national in scope, we asked participants to consider feasibility and impact for the “average patient” in the “average care setting.”

**STEP 3: Conduct the rapid evidence review.**

We used a modified Delphi panel process. Modified Delphi panels are widely used in health research as a method to elicit group judgment that includes multiple rounds of rating, panelist discussion of judgment, and group facilitation to mitigate bias [28]. The modified Delphi was chosen as the best method of evaluation because it is seen as credible, widely used, and can quickly elicit expert consensus. Using the modified Delphi strategy, we conducted the RERP in three parts: an introduction, initial rating, and re-rating. We allowed time for discussion and questions in each part.

*3a. Creation of study summary diagrams.*

For technological interventions in clinical care, there will likely be a standard set of “actors,” while the clinical actions may vary by intervention. Actors may include the technology, the patient or caregiver, or the clinician. When visualizing a complex intervention, it is important to only include components that are part of the intervention and not solely part of research. Each actor will send, receive, and/or process information in some way. We presented the technology’s name and described its function in as much detail as possible. We described the frequency of patient contacts and detailed the information that patients provided to the technology or staff. Additionally, we specified the how the clinical team implemented the intervention. Symbols indicated where staff interacted with technology and whether a social media network or patient forum was present. See Figure 4 for an example diagram.

Figure 3.
Choice ITPA (Interactive Tailored Patient Assessment)

**Function**
- Administered via touchpad or tablet PC
- Web-based system to collect patient symptom data
- Tailors symptom questions to patient input
- Creates assessment summary

**Patient Self Report**
- Rate symptom:
  - 0 (not bothersome) to 4 (extremely bothersome)
- Prioritize need for symptom management:
  - 0 (not important to receive support) to 10 (extremely important)

**Frequency:**
- At inpatient visits
- At outpatient visits
- During treatment
- At follow-up visits

**Clinician Reads Assessment**
- Patient symptoms and problems in rank order of need for support
- No suggestions for action

1. Ruland, 2010
Choice ITPA, Depression & Anxiety
3b. **RERP Introduction.** The goal of the RERP introduction is to remind the participants of the goals of the session and key concepts and terms, and quickly set the stage for the focused discussion and rating that follows. Our project team led a brief introduction of the panel and its purpose. In addition, we defined feasibility and impact and how these concepts would be rated during the session (see Table 1).

Table 1. Impact and feasibility criteria.

<table>
<thead>
<tr>
<th><strong>Criteria 1: Impact</strong></th>
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<tbody>
<tr>
<td>• Evidence exists that using the intervention is likely to improve patient outcomes</td>
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<tr>
<td>• Actions are consistent with high-quality care</td>
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<tr>
<td>• Using the intervention is likely to affect many patients or have a significant impact on a smaller number of patients</td>
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<tr>
<td>• Intervention fills a gap: current rates of intervention’s actions are likely to be low</td>
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<table>
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<tr>
<th><strong>Criteria 2: Feasibility</strong></th>
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<tbody>
<tr>
<td>• Actions are likely to be accepted by providers:</td>
</tr>
<tr>
<td>• Actions fit with current workflows or workflows can be easily redesigned to fit</td>
</tr>
<tr>
<td>• Actions are consistent with current system incentives</td>
</tr>
<tr>
<td>• Actions will be accepted or welcomed by patients</td>
</tr>
</tbody>
</table>
3c. Rating.

Speed is crucial if to evaluate more than a handful of interventions. We allocated an average of ten minutes per intervention; this time was composed of four minutes for material presentation, four minutes for clarifying questions, and two minutes for private rating. It is reasonable to expect that the first few interventions will take longer as panelists adjust to the specifics of the topic area and the panel structure. With the highly-structured approach described below, our panel of medical oncologists was able to complete initial ratings of interventions from 14 RCTs in an average of ten minutes per intervention.

What information is necessary to evaluate an intervention? Rapid evidence review requires highly-structured information. For each intervention, the project team presented pre-prepared material, including a study synopsis, GRADE tables of evidence quality, and a visual description of the intervention. Examples of the structured materials are provided in the online supplementary materials. This structured information allows the panelists to quickly understand key aspects of the study and intervention, which they can then discuss while project staff take notes on their comments. Finally, the panelists rated the intervention's feasibility and its impact on a scale of 1-9, where 1-3 indicated low impact or feasibility, 4-6 indicated uncertain/equivocal impact or feasible, and 7-9 indicated highly feasible or high impact (Table 2) [27].

3d. Re-Rating.

The project team compiled the panelist’s ratings according to modified-Delphi panel methods [29]. For each intervention, the project team presented the median score and counts for both feasibility and impact, and indicated the level of panelist agreement (agree, disagree, or equivocal). After viewing their own and the group's overall ratings and level-of-agreement, the panelists re-discussed the interventions. We prompted them to explain the rationale behind their initial rating, especially if it was higher or lower than the median. Research staff took notes on the discussion. Finally, the panelists completed a final rating of each intervention.

We followed the criteria outlined by Fitch et al. to calculate agreement and disagreement [28]. For 8 panelists, counts indicated agreement when no more than 2 panelists rate the indication outside the 3-point region (1-3; 4-6; 7-9) containing the median. Counts indicated disagreement when at least 3 panelists rate the indication in the 1-3 region and at least 3 panelists rate it in the 7-9 region. Otherwise, agreement level was determined to be equivocal. To accelerate the processing of ratings and levels of agreement for real-time use during the session, we prepared an excel spreadsheet to automatically calculate and present median scores and counts to panelists.

3e. Qualitative supporting information.

Beyond prioritizing interventions quantitatively, understanding the rationale for panelists’ ratings can provide insights for local implementation. To collect this qualitative data, two members of the project team took notes during key points of the panelists’
discussion. Although recordings and transcripts are generally regarded as preferable for qualitative research [30], notes are preferable here because the time, effort, and resources required for transcription interfere with the goals of rapid analysis. Finally, we asked panelists for feedback on their participation in the RERP process using a short survey instrument which included space for free text comments.

Analysis: How are expert evaluations from the RERP interpreted?

There are three tasks for data analysis 1) Prioritize interventions for implementation; 2) Identify features of the interventions that contribute to positive or negative perceptions of feasibility/impact; and 3) Identify perceived barriers to and facilitators for putting the intervention into practice.

Task 1: Prioritize.

We ranked the interventions based on the panelists' ratings. We determined this ranking by ordering the interventions according to the panel's second (final) round of ratings, using median scores and level of agreement for impact and feasibility. In determining the ranking, we weighted impact and feasibility equally, and gave agreement second priority.

Depending on the project, stakeholders may consider the quantitative ranking described above as sufficient for determining which tools to prioritize for implementation. To decide whether this is sufficient, teams should consider the specificity required for meeting their aims. If simply recommending a type of system, then perhaps completing a prioritization is enough. However, if attempting to develop or implement a specific software and the team is interested in more specific details about why the rankings fall as they do, project teams should consider the benefits of additional analysis.

Task 2: Identify key intervention features.

We also wanted to identify features of the interventions that contributed to positive or negative perceptions of the intervention's feasibility and impact. This analysis allowed us to understand the types of tools and features that might be perceived as higher priority for implementation. We categorized each intervention as being primarily one of the three types: Self-Management Support, Patient Reported Outcomes (PROs), and Communication. Two interventions were classified with a secondary type. The project team generated a set of 17 codes to describe the features of the interventions; codes were generated from the original manuscript, the diagrams designed to explain each intervention to the panelists, and the panelists' discussion. We then coded the RCTs based on which of the 17 features they possessed. All features were coded based on the information provided in the original manuscripts. We understand that scientific manuscripts do not contain full details of the computerized tools they describe and acknowledge that certain features or details are omitted in the RERP process. We also calculated the number of features described for each intervention. In addition, the notes from the panelists' discussion were coded for presence of endorsement or
opposition to each of the identified features, and the number of features endorsed or opposed was recorded for each intervention.

**Task 3: Identify implementation barriers and facilitators.**

To identify perceived barriers to and facilitators for putting the interventions into practice, we conducted a content analysis of notes from the panel session using the Tailored Implementation for Chronic Disease (TICD) checklist [21]. The TICD checklist was developed from a systematic review of the literature in implementation science. It was designed to identify barriers and facilitators to implementation of health improvement interventions. Two members of the research staff read through discussion notes and coded per the TICD checklist. The raters then met and reconciled coding disagreements. From the final codes, themes were identified.

**Results**

We were able to rapidly review 14 manuscripts about computerized tools related to the OCM using our method. Panelist feedback indicated that participation was valuable and intuitive. What follows are the results we gained by doing so.

**Environmental scan and evaluation of evidence quality:**

Our environmental scan and evidence review process yielded 14 RCT-tested interventions associated with at least moderate impact and reach. Evidence quality was variable, with most trial outcomes graded as being based on low to moderate quality evidence. Supplement 3 provides the evidence review of the 14 RCTs from our environmental scan.

**RERP Task 1: Prioritize.**

Participants rated interventions on impact and feasibility (see Table 2). Agreement increased from the first to the second rating. Overall, most interventions were ranked more highly after discussion.

Table 2. Scoring schema for potential impact/feasibility and confidence in a given impact/feasibility rating.

<table>
<thead>
<tr>
<th>Scores</th>
<th>Potential Impact/Feasibility</th>
<th>Confidence</th>
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<tbody>
<tr>
<td>7-9 (High)</td>
<td>High Potential</td>
<td>Moderate to High (Minor concerns only)</td>
</tr>
<tr>
<td>4-6 (Equivocal)</td>
<td>Potential</td>
<td>Lower (Major concerns)</td>
</tr>
<tr>
<td>1-3 (Low)</td>
<td>No or Low Potential</td>
<td>-</td>
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</table>

Table 2. Scoring schema for potential impact/feasibility and confidence in a given impact/feasibility rating.
RERP Task 2: Identify key intervention features.

We found that these complex interventions contained multiple features, and that the panel had opinions about many of these features. We identified clear differences in how interventions were ranked based on the type of intervention being studied. We identified 3 main types of interventions among the 14 RCTs reviewed related to improving the patient experience of cancer care:

A) Self-Management Support:

Interventions with the primary function of providing resources and information to patients which involved no or limited clinician involvement. These interventions supported patient self-management and often provided patients with educational materials and were primarily patient facing.

B) Patient Reported Outcomes (PROs):

Interventions with the primary function of collecting patient-reported outcomes and transmitting that information to the clinician in some format to assist with treatment. Some of these interventions had additional components, such as decision support for patients and/or to help clinicians deal with the patient-reported information, or functions to trigger notifications to clinicians when certain thresholds had been reached. These interventions contained both patient- and clinician-facing components.

C) Communication:

Interventions with the primary function of facilitating patient-provider communication. These interventions were both clinician and patient facing.

Considering the ratings from Task 1 and the 3 main types of interventions identified in Task 2, self-management support interventions consistently received highest rankings (average rating for feasibility = 7.18, average rating for impact = 6.64; see Table 4).
Table 3. Outcomes of study ratings. PRO=Patient Reported Outcomes tools.

<table>
<thead>
<tr>
<th>Feasibility</th>
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<tr>
<td>Study Type</td>
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<td>Median</td>
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<td>Study Type</td>
<td>Rating 1</td>
<td>Rating 2</td>
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<tr>
<td>1 PRO</td>
<td>Equiv.</td>
<td>Equiv.</td>
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<tr>
<td>2 PRO</td>
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<td>Equiv.</td>
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<tr>
<td>3 SMS</td>
<td>Agree</td>
<td>Agree</td>
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<tr>
<td>4 SMS/Comm</td>
<td>Agree</td>
<td>Agree</td>
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<tr>
<td>5 PRO</td>
<td>Agree</td>
<td>Agree</td>
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<td>6 PRO</td>
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<tr>
<td>7 PRO</td>
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<td>Agree</td>
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<td>8 PRO</td>
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<tr>
<td>10 SMS</td>
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<tr>
<td>11 Comm/SMS</td>
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<td>Equiv.</td>
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<tr>
<td>12 PRO</td>
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<td>13 SMS</td>
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<td>14 SMS</td>
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<td>Study Type</td>
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<tr>
<td>3 SMS</td>
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<td>8</td>
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<tr>
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<td>5 PRO</td>
<td>Equiv.</td>
<td>Agree</td>
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<td>6 PRO</td>
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<td>7 PRO</td>
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<td>8 PRO</td>
<td>Equiv.</td>
<td>Agree</td>
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<td>9 PRO</td>
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<td>Equiv.</td>
<td>4</td>
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<td>10 SMS</td>
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<tr>
<td>14 SMS</td>
<td>Equiv.</td>
<td>Equiv.</td>
<td>7</td>
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SMS= Self-Management Support tools. Equiv.=Equivocal
Table 4. Average scores for feasibility and impact of different study designs based on second panelist ratings.

<table>
<thead>
<tr>
<th>Study Type</th>
<th>Feasibility</th>
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<tbody>
<tr>
<td>PRO</td>
<td>4.72</td>
<td>5.23</td>
</tr>
<tr>
<td>SMS</td>
<td>7.18</td>
<td>6.64</td>
</tr>
<tr>
<td>COMM</td>
<td>5.07</td>
<td>5.00</td>
</tr>
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**Task 3: Identify implementation barriers and facilitators.**

Using the TICD framework, six major constructs were identified as barriers to implementation: quality of evidence, cultural appropriateness, patient behavior, availability of necessary resources, information systems, and payer or funder policies. No themes were identified as major facilitators. Self-management support interventions were seen as having fewer barriers to implementation, including being more appropriate for the workflow, more in line with patient behavior, carrying less legal risk, and having better evidence for their success.

Taken together, the results of this mixed methods analysis allowed us to understand not only which specific interventions were considered most high-priority, but to also learn that self-management support interventions may be perceived as more impactful and feasible to implement.

**Discussion**

The slow progress from research to practice is well documented [31,32]. The approach we describe here, a Rapid Evidence Review for PACTS tools, is intended to balance the goals of rigor and efficiency for an evidence-based method to prioritize promising communication and decision support technologies. Clinical experts found the evidence review structure to be engaging and the content sufficient to make judgments; and they were able to quickly and effectively prioritize a heterogeneous set of PACTS tools.

Health systems cannot put all effective tools into practice, no matter how promising. This prioritization process can be used by health systems and practices seeking to employ PACTS tools as the basis for local implementation studies or larger pragmatic effectiveness studies. Further, the results of our evaluation highlight how our medical oncology experts favored self-management support tools over tools utilizing patient-reported outcomes. This is surprising given what seems to be growing evidence of the effectiveness of these interventions to improve quality of life [33] and perhaps even lifespan [34]. Technological, workflow, cultural, and legal barriers caused our panel to evaluate these technologies as less feasible and impactful. Further evaluation of PACTS tools will help elucidate the extent to which these views about the challenges of implementing patient-reported outcomes-based tools is shared across institutions. Local evaluation can help clarify expectations and planning for implementation at individual institutions. Finally, the use of a systematic evidence review method such as that
described here can help ensure that decision making for the implementation of new tools considers both the experience of relevant clinical experts and empirical findings from a diverse body of research literature.

Our rapid evaluation process has limitations. Although the RERP method was designed to limit the amount of time and resources it takes to complete the review and prioritization process, the time it takes to prepare the materials and synthesize evidence for the panelists is still non-trivial, creating a potential barrier if resources are limited. However, a relatively small project team could follow our process and accomplish the majority of the work prior to convening the rapid evidence review panel. As the amount of evidence to review increases, the amount of preparation time needed may increase.

While the RERP process provides a method to address the critical question, "Which PACTS tools should we prioritize for further study and implementation?," it does not solve all of the challenges health systems face when seeking to use these complex tools to improve clinical care. It is likely that implementation challenges, both resulting from infrastructure limitations and clinician concerns, has limited utilization of these tools. In order to scale up use of PACTS tools in different clinical contexts nationally, a computational infrastructure that can support interoperable applications is necessary to support data collection and curation. PACTS tools may be an excellent use case for machine-encoded, computable biomedical knowledge curation and execution platforms.

In the context of a relatively narrow and recent area of study, technology-based communication and support tools to improve the patient experience of cancer care, we identified numerous RCT-tested tools. To achieve the important task of improving the patient experience of cancer care, we needed a systematic and trust-worthy process for identifying and prioritizing the most promising tools for further study and implementation.

Even if health systems focused their efforts solely on tools with randomized trial evidence showing they can improve patient-important outcomes, the number of potential tools will likely exceed the system's capacity to put them into practice. Moreover, these technologies can be complex. Integrating novel tools into clinical workflows has proven challenging [35]. Thus, even more than with other types of interventions, randomized trial evidence of the tool's ability to improve outcomes may not translate into effectiveness in real-world settings. The RERP presents a method to streamline the process of guideline review and data collection while maintaining a rigorous evidence-based grounding. We took advantage of multiple existing frameworks to streamline our process while maintaining rigor: current evidence search and environmental scan procedures [17,36], the National Cancer Institute’s Research-Tested Intervention Program’s review process, the modified Delphi panel process, the GRADE ratings and summary of findings tables, and the TICD coding framework. Utilizing these existing frameworks for each part of the evidence search and review process allowed for a systematic process that was feasible to complete within approximately 4 months.

Additionally, the identification of potential useful features or perceived implementation barriers by experts (Task 2 and 3) may help health system leadership understand how the high-priority tools need to be adapted before implementation. The evaluation of the benefits and drawbacks of specific features of tools may inform the
design or configuration of new technologies prior to implementation. For example, a system architect may consider deleting or modifying some features seen as barriers and including other features viewed as helpful. Thus, important next steps include taking the findings of a RERP to a local group of decision-makers for validation and to determine how tools need to be adapted to fit a local context.

**Conclusion**

Before PACTS tools, or other digital tools, may be broadly used, proper assessment of their potential feasibility and impact using a RERP method may be beneficial. The RERP process presented here may enable healthcare administrators to make more efficient and effective decisions about the implementation of novel technologies in clinical practice.

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**Conflicts of Interest**

None Declared

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**Abbreviations**

GRADE: Grading of Recommendations, Assessment, Development, and Evaluation
JMIR: Journal of Medical Internet Research
OCM: Oncology Care Model
PACTS: Patient And Clinician Talk and Support
PRO: Patient-Reported Outcome
RCT: randomized controlled trial
RERP: Rapid Evidence Review Panel
SMS: Self-Management Support
TICD: Tailored Implementation for Chronic Disease
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