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Dissemination Using Infographic Reports Depicting Program Impact of a Community-Based Research Program: eB4CAST in *iCook 4-H*

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ABSTRACT

Objective: To evaluate barriers to dissemination and implementation and perceptions of the Evidence-Based Forecast Capture, Assemble, Sustain, Timelessness (eB4CAST) dissemination infographic tool as part of *iCook 4-H* dissemination.

Design: Online surveys and phone interviews.

Participants: Experts (n = 35) in community research completed the survey; 13 completed the interview.

Main Outcomes Measure: Experts' perceptions of eB4CAST reports used for *iCook 4-H* dissemination.

Analysis: Frequency and thematic analysis.

Results: Survey respondents agreed (85%) that the eB4CAST infographic provided a clear understanding of *iCook 4-H* and relevant information (83%). Statistics included in the infographic were reported as easily understood (66%). Respondents (83%) stated that the infographic would be helpful to share outcomes with stakeholders. Thematic analysis showed that the majority of interviewees agreed that eB4CAST infographics might aid in overcoming barriers to dissemination and implementation including communication and community ownership.

Conclusions and Implications: This study provides perceptions from experts regarding the value of using eB4CAST infographics as a tool to disseminate the impact of a community nutrition program.

Key Words: community, dissemination, infographics (*J Nutr Educ Behav.* 2019; 51:S52–S59.)

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INTRODUCTION

Although significant effort has been devoted to developing evidence-based

community health programs, such programs are not widely used to advantage in many communities. To overcome this, dissemination and

implementation (D&I) research seeks to understand reasons underlying the lack of program support and to develop methods for promoting the adoption of evidence-based programs and practices in communities.^{1,2} However, there is still an estimated 10- to 25-year gap between research discoveries and community impact;³ thus, there is a need to overcome the barriers identified through D&I research.

According to the National Institutes of Health,⁴ dissemination addresses the

targeted distribution of information and intervention materials to a specific public health to understand how best to spread and sustain knowledge and the associated evidence-based interventions

and implementation is the

use of strategies to adopt and integrate evidence-based health interventions within community settings in order to improve outcomes and benefit population health.

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Although these 2 are complementary, they stand alone within D&I research. Past years of D&I research illuminated several prerequisites to successful research dissemination, including effective communication, community engagement, and adequate resources.^{2,5–8} The implications and impacts of research should be effectively communicated to community stakeholders, including policy makers, organizational directors, health care providers, and other community leaders, if research is to be translated into practice.⁹ Furthermore, implemented community programs should be adopted with community engagement and promote research–community partnerships for program success.⁶

Traditional methods of research communication often are ineffective for community dissemination.¹⁰ However, few evidence-based tools exist to help researchers communicate their work effectively to community partners.¹⁰ As a result, many researchers may struggle to make their research accessible and easily understood by stakeholders and community members. Passive dissemination strategies are generally ineffective, but intervention strategies using interactive educational meetings and educational outreach are the most effective strategies for behavior change and potentially a means for successful dissemination.¹¹ A potential example of this is through the use of infographics. Infographics are a quick way to create communication channels through visual engagement.^{12,13} Moreover, infographics provide a way to take complex data and share them with communities in an easily understood way, which overcomes a challenge of dissemination.^{13–15}

To facilitate the effective dissemination of community-based programs to stakeholders and community members, the Evidence-Based Forecast Capture, Assemble, Sustain, Timelessness (eB4CAST) framework was developed,¹⁶ which incorporates direct (research results, participant and program leader feedback, and other program-collected process and program outcome data) and indirect (publicly available community-level statistics) data to produce electronically generated, community-specific

infographics illustrating program need and community impact. Four constructs form the eB4CAST framework: capture, assemble, sustainability, and timelessness. Capture involves collecting program-specific indirect and direct data to justify need and report impact. Assemble is the collation of complex data into a visual format that can be understood by diverse populations. Sustainability supports the use of visual media in communicating with community participants, program leaders, and key stakeholders to endorse program sustainability. Timelessness embodies the cyclic movement through these constructs to continue program monitoring and data sharing to ensure timeless program evaluation and community impact. The eB4CAST framework provides a systematic process to capture, synthesize, and share program need followed by program impact that can be modified to fit the goals of community-based programs and provide a tool to aid in dissemination and implementation.

This study acquired expert perceptions of the barriers to D&I and assessed their perception of eB4CAST as a dissemination tool for community health researchers and professionals to overcome dissemination barriers. Although eB4CAST was developed and described elsewhere for use in community and public health research,¹⁶ this study specifically sought community stakeholder opinion on the eB4CAST infographics from the *iCook 4-H* study¹⁷ by evaluating favorability regarding the design, content, and perceived usefulness in dissemination through surveys and interviews. The overall objective was a formative evaluation of the *iCook 4-H* eB4CAST infographic dissemination reports to gather perceptions about the eB4CAST format.

METHODS

Study Design

The study design included an online survey for community researchers to provide perceptions about the *iCook 4-H* eB4CAST infographic content and format as well as an interview about the barriers to dissemination and the usability of eB4CAST to aid in

dissemination. The researchers conducted the online survey using Qualtrics (Provo, UT) from the beginning of March, 2017 to the end of April, 2017. Those who completed the survey were given the option to provide their contact information and complete a follow-up interview with an incentive. Follow-up interviews were conducted by phone over a 2-week time span in May, 2017. Interview participants were offered a \$25 incentive for their time. This study was approved by the institutional review board at West Virginia University No. 1611355404; electronic consent was obtained from all participants before beginning the study.

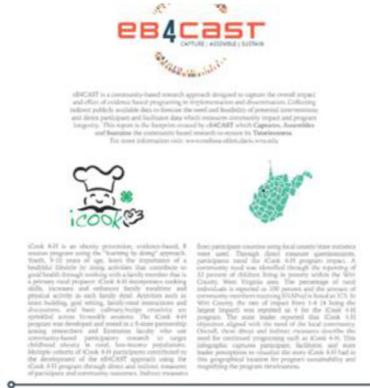
Participants

Experts in D&I, community nutrition, public health, and other health-related fields from all 50 American states were identified through an online search of relevant organizational Web pages and invited through e-mail to participate in an online survey. Of the 137 individuals who were identified and contacted, 38 responded to the survey. Those who completed the full survey ($n = 35$) were given the option to participate in the interview; of the 19 who indicated that they were interested and scheduled for interviews, 13 completed the interview process.

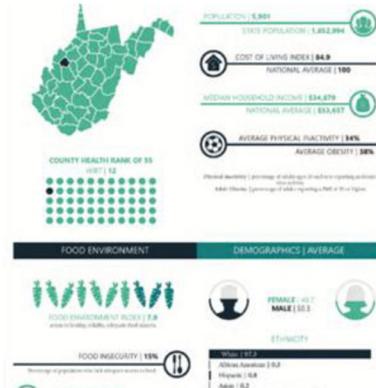
Surveys

The survey included 16 items, as a 3-point Likert scale (disagree, neither agree nor disagree, or agree), designed by researchers to assess experts' perceptions of the content and visual elements specific to the eB4CAST infographic report and its usefulness in disseminating research findings. An open-ended question was provided for participants to provide additional feedback about the eB4CAST infographic. Survey questions were developed to evaluate each page of the *iCook 4-H* eB4CAST infographic specifically. A copy of the sample infographic report was e-mailed along with the survey (Figure) so that experts could reference the report while completing the survey. The researchers also collected information about respondents'

Page 1: Program Overview



Page 2: Community Profile



Page 3: Program Impact



Page 4: Ripple Effect Mapping

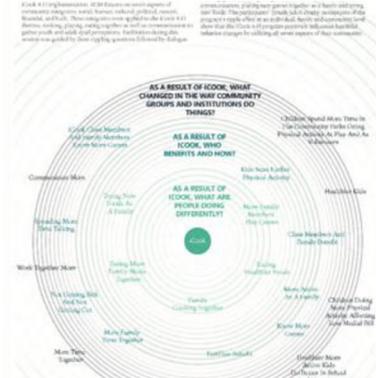


Figure. Sample Evidence-Based Forecast Capture, Assemble, Sustain, Timelessness infographic from *iCook 4-H* program.

professional backgrounds and familiarity with the *iCook 4-H* study.

The 45-minute interview consisted of 7 questions designed to ask about 4 main topics within D&I. Interviews were conducted via phone, with 1 interviewer and 1 interviewee, on speaker so that notes could be taken by a trained note taker. All interviews occurred in a private location to ensure participant confidentiality and privacy. Participants were asked to discuss their experiences with dissemination and the research–practice gap in personal careers, their perception of the adequacy of tools for evaluation and dissemination, and their struggles sharing effective programing outcomes with community leaders. In addition, participants discussed whether they believed infographics were an effective way to disseminate programs into the community and

whether they thought the eB4CAST infographic would help disseminate community programming. Finally, participants were asked about their interest in an eB4CAST-style report to demonstrate organizational or program impact.

Analysis

The researchers analyzed descriptive statistics and frequency calculations based on Likert scale values using JMP (version Pro 12.2, SAS Institute, Inc, Cary, NC, 2015). Interview data were analyzed using thematic analysis. A 6-phase checklist for thematic analysis was used as a reference.^{18,19} Data from interviews were transcribed; 2 independent reviewers studied the transcriptions. Both reviewers were trained in qualitative data analysis strategies.²⁰ Each reviewer generated initial codes and

then developed overarching themes and subthemes. Reviewers' independent analyses were then compared, merged, and refined to produce the final thematic analysis. If discrepancies emerged, independent reviewers discussed themes to agree collectively on 100% of the themes.

RESULTS

Survey participants predominately had backgrounds as extension faculty (55%) with 15 median years' experience (range, 1.5–50 years). Other experts included non-extension faculty (21%), deans (5%), community program coordinators (18%), and health professionals (1%). The disciplines of participants included nutrition and dietetics, family and consumer sciences, public health, and policy. Nineteen of 50 states were represented in the sample. The majority of participants (71%) were familiar with the *iCook 4-H* program. Of the survey sample, 37% completed the interview. Interviewees included extension faculty (62%), deans (15%), and non-extension faculty (15%).

Table 1 reports survey responses. Most respondents agreed that the sample infographic was visually appealing (95%), they had a clear understanding of *iCook 4-H* after reading the infographic (85%), and information presented in the infographic was relevant to the *iCook* program (83%). Whereas a majority of respondents also agreed that the statistics in the infographic (66%) and ripple effect mapping (REM)²¹ section (69%) were easy to understand, 22% disagreed with each of these statements. The majority also stated that the statistics in the infographic showed the importance of *iCook* (77%) and that the REM section added important content to the infographic (69%). Most respondents agreed (83%) that the infographic would be helpful for sharing information about the *iCook* program with community members. Some respondents provided additional written feedback about the sample infographics. Examples of feedback included requests for clarification regarding statistics and figures presented in the infographic and for the inclusion of additional data to illustrate the

Table 1. Expert Feedback Response (%)

Survey Item	Agree	Neither Agree Nor Disagree	Disagree
The <i>iCook</i> infographic is visually appealing.	95	5	0
After reading the <i>iCook</i> infographic, I have a clear understanding of the <i>iCook</i> program	85	6	9
The community information presented in the infographic was relevant to the <i>iCook</i> program.	83	14	3
The statistics in the infographic are easy to understand	66	11	23
The Ripple Effect Mapping section was easy to understand	69	9	23
The statistics in the infographic showed the impact of <i>iCook</i>	77	14	9
The Ripple Effect Mapping section added important content to the infographic.	69	17	14
The infographic would be helpful to share with community members to spread the word about the <i>iCook</i> program.	83	9	9

impact of *iCook* further, particularly data related to children's dietary habits and prior dietary knowledge.

Based on thematic analysis of the interviews, 5 core themes (lack of resources, lack of awareness, adequate tools were limited and unavailable, difficulty in sharing programming, and audience impact) were developed with 22 subthemes, as shown in Table 2. The first 2 themes, with 8 subthemes, regarded a gap in dissemination research: lack of resources to disseminate outcomes and lack of awareness regarding outcomes. With respect to the lack of resources theme, lack of time, rural feasibility, and lack of funds were noted as concerns. For lack of awareness, difficulties were noted in reaching and communicating effectively with target audiences. One participant stated, "... It's really difficult to convey the context, methodology, and finding implications in a way people will pay attention to."

The next theme (adequate tools are limited or do not exist) concerned the adequacy of tools available to evaluate community nutrition interventions. This theme was developed from participant responses, with 5

supporting subthemes. Among the responses, 2 participants commented on the Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM) framework,²² generally endorsing its utility, but they acknowledged limitations to community research, such as that it does not account for variations between communities and at the individual level. Others mentioned that although adequate evaluation tools exist, they might be difficult to use or might not be general enough to make comparisons between programs or program sites. With regard to the REM tool,²¹ which was used to construct a section of the eB4CAST report, 1 participant stated, "Just used REM for another project and I think it's a great tool; we just need to make this not confusing for others to use," whereas another mentioned, "I think REM has a lot of promise." Among participants who felt that adequate tools did not exist, the lack of validated tools and lack of tools for specific topics or areas of research, and difficulty using existing tools to estimate community impact were mentioned as areas of concern.

One theme, difficulty sharing programming, and 5 subthemes developed when discussing how to disseminate and share programs with others including stakeholders and community members. Participants noted several internal and external barriers to sharing their programming, including difficulty getting information to the public; a lack of understanding between agencies and community leaders; lack of time, staff, and/or venue; overlap between agencies' work; and different goals for program outcomes. One respondent stated,

I don't have the manpower to turn around and drive reports [to the community]. I don't have a project coordinator and my students leave every 2 years. I don't have enough time.

Another stated,

I think it's hard and challenging to communicate [with] people who have no knowledge or background of effective community-based programming and why they could benefit from different programs [and] to explain that in an elevator, speech is impossible.

Most participants who expressed no struggle with sharing programming cited strong relationships with community leaders and members. One of those participants showed the need for successful research–community collaborations, stating,

I go to my county commissioners quarterly and work closely with our board and economic development. They always know what's going and I have a 4-H promotion extension committee to go over what is taking place. You have to foster those relationships to make it work.

The last theme, audience impact, was generated based on the aspects of infographics in dissemination. Six subthemes supported the main theme. With regard to audience impact, participants noted that infographics were simple and easily understood, could show an impact more clearly for audiences, and were better for diverse communities. Respondents stated that infographics were easy to distribute and provided

Table 2. Thematic Analysis of Cognitive Interview Data

Topic	Themes	Subthemes	Related Quotations
Gap in Dissemination Research	1.1 Lack of resources	1.1a. Lack of time 1.1b. Funding shortages	<p>... Research is published, but a notification of what's published to a really specific audience would be beneficial and I don't see that happening currently.</p> <p>... It's really difficult to convey the context, methodology, and finding implications in a way people will pay attention to.</p> <p>The participants are [giving] you their time; the least you could do would be to go back and disseminate your research.</p> <p>I've been in extension for 30 years and I only have a loose impression on the impact of my work. You think that I would know better by now but I think it is extremely difficult to evaluate the impact of what occurs in the community.</p> <p>... We haven't seen the take hold of evaluations like we see others do in other regions.</p> <p>I think it's hard and challenging to communicate to people who have no knowledge or background with effective community-based programming how and why they could benefit from different programs. And to do that in an elevator speech is impossible.</p> <p>I do struggle because I think a lot of community leaders and extension administration want the economic impact vs the short-term impact. So, it is hard for me to convey long-term outcomes and I can't always put a dollar figure on that, so that's why I struggle.</p> <p>[The] the traditional academic report isn't relevant for everyone, so we are moving in this direction. [These] are easily digestible and pleasant.</p> <p>... I think [it's] one of the new tools that has the ability to connect quickly and broadly across different populations and sectors.</p>
	1.2 Lack of awareness	1.1c. Rural feasibility 1.2a. Lack of dissemination 1.2b. Difficulty conveying content 1.2c. Difficulty reaching audience 1.2d. Difficulty capturing audience attention	
Tools to Evaluate Community Nutrition Interventions	1.3 Adequate tools are limited and unavailable	1.3a. Tools not translatable between programs 1.3b. Difficulty choosing the best framework 1.3c. Low interest in tools 1.3d. Tools unavailable for some topics 1.3e Lack of validated programs	
Discussing Programming With Others	1.4 Difficulty sharing programming	1.4a. Difficulty getting information to public 1.4b. Lack of understanding between agencies and community leaders 1.4c. Lack of time, staff, and/or venue 1.4d. Overlap between agencies' work 1.4e. Different goals for program outcomes	
Infographics in Dissemination	1.5 Audience impact	1.5a. Easily understood 1.5b. Visually appealing	
	1.6 Benefits to users	1.5c. Better for diverse communities 1.6a. Connect across different populations 1.6b. Easy to distribute	

the ability to connect quickly and broadly across different populations, which made them beneficial to users. One participant stated,

We have been trying to move to a visual graphic; [they] are easier to digest and the traditional academic report isn't relevant for everyone. These [eB4CAST infographics] are easily digestible and pleasant.

All participants endorsed the statement *I would like to have an electronically generated report documenting my program's impact*. Participants noted that the infographics were user-friendly and less time-consuming compared with other means of dissemination, summarized the work effectively, and were a good conversation starter, among other benefits. Suggested improvements included clarification of some data points and phrases and inclusion of photos in addition to graphics.

DISCUSSION

This study highlights experts' perceptions regarding barriers to dissemination and the perceived usefulness of eB4CAST infographic reports to aid in disseminating community-based childhood obesity prevention programming. This study used eB4CAST infographics, specifically from the *iCook 4-H* program, as a first evaluation of the perceptions regarding eB4CAST. This sample population, which consisted mostly of extension services personnel, appeared to have generally favorable views of the eB4CAST infographic report, especially regarding its aesthetic appeal and effectiveness in conveying information about the *iCook* program and communities. The majority of participants indicated it would be helpful to share the infographic with community members to spread information about the *iCook* program. Interviewees acknowledged common barriers to disseminating programs as being a lack of resources and awareness, which made it difficult to share programming. Interviewees endorsed eB4CAST as a potential method to improve communication with target audiences and show program impact for further dissemination and

implementation. Overall, eB4CAST was perceived as a useful method of research dissemination by professionals in this qualitative evaluation.

The eB4CAST framework provides a systematic process to capture, synthesize, and share program need followed by program impact that can be modified to fit the goals of community-based programs and provide a tool to aid in dissemination and implementation.

Although many community-based researchers reported disseminating scientific results into the community, many challenges remain in the efficiency and success of translating research into community practice.²³ The most prevalent challenges in disseminating research into the community include communication, community ownership and program awareness, and a lack of resources, all of which can affect the success of dissemination and implementation. It is important to alleviate as many of the dissemination barriers as possible so that findings and further programming can be translated effectively into community-based practice. The eB4CAST tool aims to overcome these barriers through personalized program infographics that capture community-level data and program impact and assemble it into a visually appealing and easily understood format that can be used for dissemination for program sustainability and timelessness.

There is a divide between academic discourse and the community, which makes it difficult to share programming;²⁴ this was acknowledged by participants in this qualitative study. Therefore, dissemination tools need to be understood easily by individuals of diverse backgrounds. The use of infographics was praised as a way to convey key messages and promote community behavior change.²⁵

Experts in the current study noted the promotion of infographics a way to disseminate a community program easily in an understandable manner. This may allow communication barriers to be overcome through easily understood program infographics and may make it easier for personnel to share programming. Specifically, the *iCook 4-H* eB4CAST infographic was promoted as an efficient way to promote the *iCook 4-H* program within the community and share program outcomes. eB4CAST could be modified for future programs as a way to increase program awareness by sharing current and projected programming among community stakeholders to aid in program dissemination.

The eB4CAST tool could be modified for future programs as a way to increase program awareness by sharing current and projected programming among community stakeholders to aid in program dissemination.

Consistent with previous findings, this study also highlighted that the researchers reported struggling with a lack of resources or personnel to complete dissemination effectively.²³ The eB4CAST infographic is 1 potential way to overcome this barrier, because the infographic, which was made by the researchers in this study, was designed to be replicated with minimal time and resource requirements in the future. Therefore, researchers and community program leaders do not have to create new versions of dissemination materials, which saves time and personnel costs. This approach was successful in previous disseminations, in which researchers were able to use infographics to share research findings at minor monetary costs.²⁶

Finally, community ownership is important when trying to disseminate and implement programming into a community, and in turn to

increase the likelihood that programming will be sustained.^{5,6} Therefore, in community-based research, it is essential for researchers to develop collaborations with community members. Experts in this qualitative study found the eB4CAST infographic to be beneficial to community members and 1 expert stated that they “provide the ability to connect quickly with different population.” The eB4CAST might be used as a tool to aid in developing community partnerships and provide community ownership of their own outcome data in infographic format.

The eB4CAST tool could potentially be a tool to aid in developing community partnerships and providing community ownership of their own outcome data in infographic format.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Although expert feedback was mostly positive, this study was had limitations. First, the eB4CAST infographic tool in this evaluation was used specifically within the *iCook 4-H* study, so the perceptions from this study may not be translatable to other community-based programs. However, eB4CAST infographics are modifiable for different programs, which makes it possible and flexible for communities to control what data they want to highlight from their program with graphics that align with program goals. Therefore, future research programs are encouraged to test the eB4CAST tool in other community-based programs to ensure its acceptability in diverse community programs. Second, the majority of survey respondents were already familiar with the *iCook 4-H* program, which might have made it easier to understand the information on the infographics and limited the representativeness of experts in the sample. Additional testing is needed of the eB4CAST infographic clarity in

other populations. Furthermore, the population surveyed were experts in the field, and so they were more adept at understanding the importance of the eB4CAST infographic report. More testing is needed to see whether these reports are well-received and understood by members of the community and participants in the community-based programs. In addition, some experts pointed out areas of weakness in clarity in the eB4CAST data and had suggestions for improvement; revisions are needed to ensure that eB4CAST is comprehensive before it is used in other programs. These suggestions were used to revise the eB4CAST infographic for *iCook 4-H* dissemination and other community programming moving forward. Finally, long-term outcomes of D&I after use of the eB4CAST have not been tested and should be addressed in future research.

The eB4CAST infographic report was well-received by professionals in a variety of community health fields including public health, policy development, and community nutrition. The eB4CAST infographic report was acknowledged by the expert’s perceptions as a potential way to overcome certain barriers within the dissemination of community-based research; with more testing with diverse community programs and community members, it could be used in other community-based programs as an effective dissemination tool.

The eB4CAST infographic reports might be used by researchers to overcome barriers to disseminating research programs into community settings, and may potentially close the research–practice gap with future testing. Researchers might look to use tools such as eB4CAST to support long-term program goals for dissemination and implementation. Use of an infographic format translates research into visual, easily understood information for all audiences that could be beneficial to aid researchers in establishing relationships with community partners and stakeholders. It is hoped that with eB4CAST for future community-based programs, barriers to disseminating program outcomes and

supporting program longevity will be diminished.

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SUPPLEMENTARY DATA

Supplementary data related to this article can be found at <https://dx.doi.org/10.1016/j.jneb.2018.10.013>.

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