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# Continuing Medical Education as a Translational Science Opportunity for Health Communication Researchers: The BCERP Model

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## ABSTRACT

Health communication researchers often work across health issues to engage in research that bridges distance between bench scientists and practitioners. This translational activity is essential to increase the likelihood that emerging science from the laboratory makes it into the hands of health professionals who can integrate it into their everyday practice with patients. An underutilized translational approach by communication researchers is the development of continuing medical education (CME) opportunities that incorporate a communication science approach to the uptake of recommended practices based on emerging science. This manuscript explains the nature of translational science, highlights the role of CME as an integral strategy for engaging in it, and then provides the exemplar of a training and evaluation project funded by the National Institute for Environmental Health Sciences for the Breast Cancer and the Environment Research Program (BCERP). Lessons learned are discussed as they relate to developing a translational opportunity for the BCERP.

Research does not make it quickly into clinical practice nor into lay individuals' hands. Translational research efforts aim to bridge these gaps by attempting to move basic science to clinical applications and then into public health practice (Woolf, 2008). Communication researchers have a large role to play along the translational continuum given their expertise in developing and evaluating theoretically-informed, evidence-based persuasive messages; they possess knowledge and skills to help translate emerging science into practice. For example, health communication researchers have played this crucial role with the Breast Cancer and the Environment Research Program (BCERP), a National Institutes of Health-funded project investigating environmental exposures and their impact on lifetime breast cancer risk (see [bcerp.org](http://bcerp.org)). These communication scientists have worked on a transdisciplinary team to educate health professionals through a continuing medical education (CME) training, a strategy available for other health communication researchers' outreach and education efforts.

This paper explains the nature of translational science, highlights CME as an integral translational strategy, and then overviews a training and evaluation project funded by the National Institute of Environmental Health Sciences for the BCERP. A model for CME and lessons learned from the BCERP translational experience are discussed to facilitate the development and use of CME interventions in health communication researchers' translation work.

## Translational research efforts

Although moving research findings into practice is not a novel idea, efforts to do so are generally underfunded and not initiated consistently (Sung et al., 2003). *Translation* means different things depending on what stage of the process one is referencing; thus, across the translational continuum, three "blocks" have been defined. The bench-to-bedside stage of translational research, called the T1 translational block, refers to the "transfer of new understandings of disease mechanisms gained in the laboratory into the development of new methods for diagnosis, therapy, and prevention and their first testing in humans" (p.1279), while the T2 translational block refers to "the translation of results from clinical studies into everyday clinical practice and health decision making" (Sung et al., 2003, p. 1279). The T3 translational block promotes "interaction between laboratory-based research and population-based research to stimulate robust scientific understanding of human health" (Rubio et al., 2010). While there are opportunities for health communication researchers in T3 translation, particularly in comparative effectiveness research or implementation science, the focus here is on T2 translational efforts.

Health communication researchers are well-positioned to lead T2 translational efforts to encourage recommended behaviors and informed health decision-making. T2 translation requires research skills related to conceptualizing, implementing, and evaluating interventions as well as knowledge of related disciplines like behavioral science, organizational theory, public policy, and communication (Rubio et al., 2010;

Woolf, 2008). While often overshadowed by T1 (Kerner, 2006), T2 efforts may better “decrease morbidity and mortality than a new imaging device or class of drugs” as they can improve delivery of existing treatments and recommendations (Woolf, 2008, p. 212). Research on translating basic science into public health policy and recommendations has been underfunded, creating fewer opportunities for communication scientists to engage in translational research even though scientific findings that translate into precautionary practices are constantly emerging (Silk & Totzkay, 2018).

Broome (2013) asserts that “timely dissemination of early findings” can improve and change the lives of individuals (p.194). According to the precautionary principle, if a finding “raises threats of harm to human health or the environment,” precaution should be taken “even if some cause and effect relationships are not fully established” (Science & Environmental Health Network (SEHN), 1998, p. 1). This “better safe than sorry” approach to risk reduction recommendations from emerging scientific findings is invoked by health communication researchers to advance T2 goals with outreach, education, and research activities. For example, BCERP researchers developed and evaluated messages to encourage mothers to avoid exposure to the chemical perfluorooctanoic acid (PFOA), which is found in nonstick cookware and some fabrics (Silk et al., 2014). The connection between PFOA and human cancer risk is still not definitive, but these types of messages advocate avoiding cookware with nonstick coating and food packaging with PFOA whenever possible. The rationale behind this recommendation is that, regardless of the state of evidence directly linking these chemicals to cancer risk in humans, mothers can make changes to their routine or purchasing habits that do not incur any harm to their own or their daughters’ health and have the potential to reduce risk.

Research on translational activities directly related to health communication is observed through interventions that include printed educational materials and outreach activities, as well as via research examining opinion leaders, technology, and tailored interventions to communicate about health issues (Grimshaw, Eccles, Lavis, Hill, & Squires, 2012). Health communication researchers often already engage in these types of applied activities, making them natural partners for scientists interested in moving their work across the translational continuum. Additionally, communication scientists have expertise that can be used to influence priority audiences such as health care providers, though they may not have ready access to them. CME training provides an opportunity for engaging in translational research to bridge the gap between health science and practice. Although health communication researchers are likely familiar with the concept of CME, they might not have considered CME training an accessible strategy to reach health care providers who frequently meet and share health information with patients and their caregivers.

### Continuing medical education

Health care providers are busy professionals who have few opportunities to formally work on improving their skills outside of their practice. One method for providers to share and

gain current knowledge about advances in science, technology, or biological aspects of medical care is with CME (Levinson & Roter, 1993). CME opportunities allow participants to self-select into training with formats and content that best fit their perceived needs (Rotthoff et al., 2011). The most effective CME courses which change provider performance are interactive, prioritize topics based on needs assessments, and include multiple teaching and learning methods (Davis et al., 1999; Mansouri & Lockyer, 2007; Salinas, 2015; Towle, 1998; Zabar et al., 2010). Interactive courses may feature multiple learning methods such as workshops, small group discussion, individualized training sessions (Davis et al., 1999), or case study vignette demonstrations (Martel, Derenne, & Chan, 2015). Effective components of CME training include collaborating with relevant professional organizations (Davis et al., 1999), including patients as partners in the education process (Towle, 1998), and focusing on overcoming barriers in practice (Zabar et al., 2010). Organizations that offer CME credits must obtain certification from a chamber of physicians and must reflect changes in current health care landscapes (Towle, 1998).

### Online CME

As CME training is designed to reflect current advancements and trends (Levinson & Roter, 1993; Towle, 1998), online CME programs are now common (Salinas, 2015). Online CME trainings typically involve reading, listening to, or viewing online educational sessions. They are generally interactive and offer multimedia opportunities like case studies and exposure to authentic clinical settings, embedding of resources, and participation in social dialogue (Fordis et al., 2005), which result in similar or better knowledge gain compared to traditional, live courses (Salinas, 2015). Further, when selecting CME interventions, health care provider participants have indicated that the most important characteristics in choosing courses were content quality, ease of use, and ease of acquiring CME credit (Casebeer et al., 2004). CME should reflect these preferences and be interactive to best change behavior and knowledge.

### Communication and CME

CME programs with a specific focus on communication are rare, despite evidence of their effectiveness. For example, Levinson and Roter (1993) measured changes to objective and perceived provider and patient communication to evaluate CME training programs specifically designed to improve communication skills. They found that providers who attended longer interventions used more patient-centered skills, including open-ended questions and discussion about psychosocial issues with patients. Roter et al. (1998) also found providers who attended a CME program used more patient-centered skills. After the training, providers were less likely to verbally dominate the interview, listened more, talked less, and used more open-ended questions, facilitation, and emotional skills.

In sum, CME trainings offer a T2 translational opportunity to reach health care providers and influence their clinical

practice behaviors. CME interventions allow researchers to translate knowledge and get information to practitioners who can influence others to improve patient care and health outcomes. CME interventions are not often evaluated beyond an immediate post-test, providing an opportunity for better assessment. The BCERP provides an exemplar for how CME can impart emerging science and communication skills to PHCPs for clinical adoption.

### Breast cancer and the environment research program

The BCERP is a transdisciplinary research and outreach effort co-funded by the NIEHS and the National Cancer Institute since 2003. Breast cancer is too complex to be solved by one discipline and requires collaboration to address it. The BCERP brings together biologists, epidemiologists, breast cancer advocates, and communication scientists to research and translate findings regarding exposure to endocrine disrupting chemicals and lifestyle factors early in life, and the implications for breast cancer risk as women age (Atkin & Smith, 2010; Hiatt, Haslam, & Osuch, 2009). A BCERP priority is to understand the impact of exposures during times of increased vulnerability to environmental risks known as *windows of susceptibility* (WoS) (Biro & Deardorff, 2013). WoS are marked by rapid hormonal changes and cellular growth that leave breast cells vulnerable to damage or mutation when exposed to endocrine disrupting chemicals. Puberty is a critical window the BCERP focuses on that is especially opportune for communication about emerging science, given it is a developmentally vulnerable time and pediatric patients and their caregivers frequently engage with PHCPs during this time.

The BCERP is organized according to its disciplinary components and foci, consisting of the Biology, Epidemiology, and Community Outreach and Dissemination cores (see Silk & Smith, 2015). BCERP biologists study the effect of chemical exposures and diets on tumor development in animal models. This research has identified exposure to chemicals in common household items (e.g., PFOA, bisphenol-A [BPA]) and consuming diets high in animal fat as potential breast cancer risk factors. BCERP epidemiologists track the relative levels of identified chemicals in the population and test their relationship with cancer incidence. One such endeavor has followed a cohort of girls for over 13 years to track their exposures and pubertal development via regular blood draws, urine samples, diet recall, and other measures biannually (e.g., Wolf et al., 2010). Finally, the Community Outreach and Dissemination core consists of breast cancer advocates and communication scientists who translate findings into messages appropriate and accessible to lay audiences, while also coordinating and implementing educational and outreach activities to disseminate the BCERP's risk reduction recommendations.

### BCERP communication research

BCERP communication scientists have engaged in experimental message translation work (Perrault & Silk, 2014) as well as formative evaluation of relevant communities and audiences (Silk & Totzkay, 2018), particularly with caregivers. Caregivers

reported they are concerned about being able to implement BCERP recommendations (Neuberger, Silk, Yun, Bowman, & Anderson, 2011), and report confusion and uncertainty about the cancer-environment link (Silk et al., 2006; Volkman & Silk, 2008). They want reliable sources for breast cancer and environment information, desire personal agency in their decision-making, and need to be "sold" on the utility of risk reduction methods that are presented in concrete, actionable terms (Silk et al., 2006, 2014). Overall, caregivers intend to promote healthier lifestyles for their daughters and feel capable about doing so (Neuberger et al., 2011), but are conflicted about the role of chemical exposures. They report turning to PHCPs with questions (Silk et al., 2014), making them a useful information source for reaching caregivers. Thus, BCERP communication scientists wrote a CME-focused grant proposal to train and evaluate PHCPs on the role of endocrine disrupting chemicals and lifestyle during the pre-pubertal and pubertal WoS, along with communication strategies to integrate the information into discussions with pediatric patients and their caregivers.

### Development of a translational CME grant proposal

Although health care providers comprise a general audience for whom the BCERP has tailored information, BCERP communication efforts targeting them have been limited to website information (bcerp.org) and community-based efforts with advocate partnerships. This is not unique, as few purposeful efforts across health domains have attempted to get information to, and adopted by, providers (Dearing & Kreuter, 2010). To support the translation and dissemination of BCERP findings and conduct T2 translation research, BCERP communication researchers wrote a grant proposal to develop, deliver, and evaluate a CME training for PHCPs. A translational focus of the proposal was central to its funding as the BCERP had repeatedly discussed PHCPs, particularly by breast cancer advocates, as a primary audience who could serve as opinion leaders to influence change. The proposal adopted a rigorous communication science approach that included the diffusion of innovation (DoI) framework (Rogers, 2003), formative research, a scientific and community advisory board (SciCab), media production experts, and summative evaluation at two time points. These components synergized into a competitive proposal with communication researchers as principal investigators.

### Diffusion of innovations

The DoI framework acknowledges the dynamics of a social system to strategically leverage social network influence processes to facilitate adoption of an innovation (Rogers, 2003). In short, the DoI approach posits that an innovation spreads across an interconnected social system differentially based on personality characteristics of audience members and their appraisals of the innovation itself (Dearing, 2009). An innovation, such as a breast cancer risk reduction recommendation, is adopted early in the diffusion process by a small network segment known as *early adopters* who carefully appraise the

innovation and advocate for its use to other potential adopters in their network.

A specific type of early adopter is an *opinion leader*, who is a highly influential and well-connected early adopter looked to for innovation information and who can be used to sway other potential adopters' beliefs and behaviors (Boster, Kotowski, Andrews, & Serota, 2011). For this project, PHCPs were construed to be potential early adopters of risk reduction recommendations and natural opinion leaders for patients and caregivers. PHCPs are a logical intervention point to target behaviors and opinions of pediatric patients and caregivers as they are trusted sources of health information and memorable breast cancer messages (Ong, de Haes, Hoos, & Lammes, 1995; Smith et al., 2009). By conceptualizing PHCPs as influencers within a health information social system and treating their pediatric patients' caregivers as potential adopters of innovative breast cancer risk reduction recommendations, this translational research incorporated compatible theoretical approaches in one cohesive design to implement an evidence-based training.

### **Formative research**

In addition to applying an established theoretical framework, the success of this CME proposal was in its foundation in formative research, including focus groups and interviews, which was included as a first phase of research in the grant application. Despite the demonstrated utility of needs assessments in improving the effectiveness of CME trainings (Mansouri & Lockyer, 2007), formative research is often not included in CME development despite its utility. By identifying provider needs prior to the CME training's design and by incorporating perceptions and preferences of caregivers into the focus of the training, the potential for impact was increased. This added value component increased the rigor of the application and helped researchers address both caregiver and the PHCP needs in the CME content. Specific findings from this research are presented in Mulroy, M., Walling, B., Totzkay, D., Silk, K. J., & Smith, S. W (2018, November).

### **Caregivers**

To ascertain caregiver understanding and beliefs, two focus groups with female caregivers of young children ( $N = 23$ ) were recruited from a community research pool. These focus groups found that caregivers were only moderately concerned with their children's breast cancer risk, and did not show much understanding of specific breast cancer risk reduction strategies. After the topic of WoS was introduced, however, caregivers widely saw breast cancer risk reduction as an important topic of conversation with their PHCP and desired more information about the breast cancer and environment link.

A component of this formative research strengthening the proposal was a focus on caregivers' preferred communication strategies. For instance, caregivers expressed a desire for PHCPs to communicate directly with their child and felt strategies like the "teach-back method" seemed condescending and like a test, especially when it came to cancer and the environment. These results spoke directly to what strategies

the CME training needed to address and to how risk reduction recommendations could be spread. Given that communication skills training is often absent from CME courses, this gave the proposal additional strength.

### **Pediatric health care providers**

To study PHCP understanding of breast cancer and the environment and their current dissemination strategies, a focus group with a local pediatric office was conducted ( $n = 6$ ), as well as individual interviews with PHCPs ( $n = 6$ ) recruited from the American Academy of Pediatrics in numerous states. These included pediatricians, nurses, and nurse practitioners, and focused on what risk factors were routinely discussed with patients and how much appointment time was spent doing so. PHCPs discussed their knowledge of BCERP-studied environmental and lifestyle risks and their link to breast cancer, knowledge of the WoS concept, communication strategies and channels used to convey risk information to patients, and their understanding of caregiver-perceived barriers to enacting risk reduction activities.

Results of these discussions showed PHCPs do not currently discuss environmental and lifestyle risks in terms of breast cancer risk, though they do so more generally. This suggested risk reduction recommendations would indeed be innovative in this system. Discussions also outlined providers' preferred communication strategies for conveying risk information, such as handouts and the teach-back method, which did not align with caregiver preferences. Similar to caregivers, though, the perceived importance of addressing breast cancer rose after learning about WoS. In all, this formative research reinforced that a gap existed in provider knowledge of the breast cancer and environment link and that effective communication strategies for conveying this information should be addressed. These data directly informed the information to be highlighted when creating the CME training itself, and provided useful examples to connect with current PHCP practice and beliefs.

### **Scientific and community advisory board**

To ensure the scientific accuracy of training materials and to engage community partners, the SciCab was created to advise the translational project. Continuing in the spirit of the BCERP transdisciplinary model, community partners and BCERP scientists were invited to serve on the SciCab, which had the critical role of reviewing the accuracy of the training's information. This component further strengthened the project as the SciCab and researchers together drafted the formative evaluation protocol and the CME training itself. Over many iterations, the SciCab provided important direction and recommendations to ensure accuracy, while communication scientists worked to accessibly present the content. This is critical to T2 translation and in designing for diffusion by including stakeholders to ensure information and innovation fidelity while planning for successful implementation and adoption.

### **Evidence-based content**

The content of the CME training itself was drawn from BCERP research, reviewing studies and reports drafted by BCERP collaborators, in addition to results from formative research with caregivers and PHCPs. This information was used to outline a training aimed at filling the identified knowledge gap. By understanding what information caregivers wanted, the ways they desired to get that material, and the communication strategies they preferred, content about breast cancer prevention was developed to fit their needs. This was important to the success of this project because the design not only applied social scientific methodologies to understand current practice and preferences, but also purposefully translated basic science into practice, thereby implementing the spirit of T2 translational work.

The CME training was developed as three modules. Communication researchers first drafted learning objectives and learning outcome measures for each training module. Given these objectives, researchers then collected information and evidence from published BCERP materials and sought additional information necessary for comprehension. Communication researchers collaborated to develop scripts and presentation slides for each module. These materials were reviewed by the SciCab, who provided feedback and suggestions on claims made and additional resources that were needed over several iterations.

The first module focused on the breast cancer and environment link, establishing BCERP's credibility, and describing the importance of the WoS concept. The second module then provided an in-depth review of endocrine-disrupting chemicals, which most extensively reviewed and translated BCERP findings into to-be-acquired knowledge. The final module then used the results of the previously described formative research to teach communication strategies for PHCPs to use in patient interviews to best share the relevant information. This module rounded out the T2 translation process by supporting the actual implementation of the science emerging from the laboratory setting.

### **Media production expertise**

Once the module scripts were finalized, the communication scientists worked with a university-affiliated public media station that produces educational, research-oriented, and entertainment programs for public and private entities to produce a digital version of the CME training. This stage bolstered this project's proposal as it ensured the training would not be simple presentations or slideshows, but instead include interactive, multimedia, and engaging pieces with high production value. Each module was made into a one-hour, online training with animations, video demonstrations of communication strategies, videos of scientists sharing information, and summative quizzes. Upon completion, each digital module was reviewed by the SciCab and communication researchers for accuracy and appropriateness.

### **Rigorous research design**

After module production, the final steps were to implement and evaluate the training. As noted, CME courses are often not

purposefully evaluated for effectiveness or achievement of learning outcomes, especially past immediate post-test measures. The strength of this proposal was its use of a comprehensive pre-training knowledge and attitude evaluation regarding topics covered in the CME training, as well as post-test evaluations upon completion and one month after on knowledge indices and relevant, psychometrically valid outcome scales. Examples of outcome measures include knowledge of patient-centered communication skills and familiarity with terms like "window of susceptibility" and environmental exposures like oxybenzone, BPA, or phthalates.

To ensure this scientific rigor would lead to successful implementation, the grant application included a new partner from the Medical Society of the state in which most of this research occurred. The purpose of this partnership was to not only recruit health care provider participants and to ultimately host the online CME course itself, but also to conduct an in-person pilot test prior to launching the online training. For the pilot test, the researchers partnered with the state Medical Society, in a fashion familiar to most intervention-oriented health communication researchers who partner with community entities, to test the efficacy and viability of the training and evaluation mechanisms at a state-wide conference attended by diverse health care providers. In this pilot test, participants completed pre-test measures, attended in-person presentations of each of the three training modules, completed follow-up measures administered after each module, and were invited to complete follow-up measures one month after participation. This partnership also extended the reach of the T2 translational activity by ensuring the CME training would reach actual providers and be sustainably implemented. Overall, use of an evaluation with psychometrically-valid and expert-reviewed baseline and outcome measures, and having access to practicing PCHPs made the project suitable to complete the translation effort. The project is now in its final stages of evaluation and in the process of launching online for ongoing CME credit opportunities.

### **Discussion**

Health communication scientists are uniquely trained in communication theory, research methods, and behavioral sciences, which positions them to move emerging science across social systems. In the BCERP, a group of scientists generated knowledge that the sender (the communication scientists in translational research) translated to educate medical professionals (the opinion leaders) who will influence the ultimate receivers (their patients). This is similar to the "Two-Step Flow" model (Katz, 1957), in which media influence opinion leaders, who then influence the public. Translational efforts have potential for great impact as they help facilitate the transfer of knowledge into practice (Woolf, 2008). Communication scientists are poised to add their expertise to CME translational efforts as they can span disciplines to develop programs that lead to adoption of novel practices.

This paper argues for the field's greater engagement with translational research via CME courses, using the BCERP as an exemplar. While this project highlights how funding was

garnered for CME purposes, identifying external grant funding is not required to get involved with, or to offer CME training. Translational research and especially T2 translational activities will continue to grow as the need to facilitate knowledge dissemination and uptake of new health recommendations grows. Thus, health communication researchers may consider CME interventions as one effective route to reach opinion leaders with new practice recommendations based on emerging scientific evidence.

### **Lessons learned**

The primary lesson learned through the BCERP relates to the feasibility of using CME courses to share basic scientific findings, communication strategies, and new recommendations. By identifying health care providers as diffusers, a training program was designed using formative evaluation with providers and caregivers to fill a gap in knowledge. Interviews and focus groups identified that the concept of WoS increased both provider and caregiver concern for breast cancer risk and the connection to the environment. Preferences, perceived barriers, and identified caregiver needs are necessary to target communication behaviors that providers can improve. This process demonstrated that CME is an opportunity-laden route for communication intervention work that can be pursued by communication scientists, as they are uniquely prepared to address its challenges. The ability of health communication researchers to build and leverage partnerships, apply well-established theory to the design of CME training, rely on rigorous and carefully planned evaluation frameworks, and maintain an audience-focused approach to intervention design all facilitate successful translation work.

### **Partnerships are necessary**

To translate basic science to practice, relationships must be established with the scientists generating knowledge in the health domain of interest. Identifying scientists who are both active in their field and amenable to participate in knowledge transfer is especially useful. Without buy-in from scientists who understand the importance of moving their findings into the hands of medical professionals and patients who can act on their evidence, the translation process would be difficult. While having established relationships with diverse partners is ideal, new relationships driven by a grant application can also be helpful. For example, existing relationships with BCERP communication researchers, biological scientists, and community advocates aided in the development of the training outlined here. However, a new partnership with a media production group allowed for the design of an interactive, online, multimedia training; and a new partnership with a medical society facilitated access to health care providers.

Partnerships amass an impressive knowledge and skill set that supports transdisciplinary T2 translational research and ensure accurate, complete, and emerging science is included. This project's SciCab helped to refine the training content and added credibility to the grant proposal, as funders desire input from experts and community partners. Engaging in transdisciplinary research with stakeholders from diverse backgrounds

allows relevant parties to discuss the state of science and understand what implications the findings have for practice. This process adds finer detail to the translation process and brings about innovative activities for health communication scientists.

### **Theoretical frameworks guide content**

A strength of communication scientists is their knowledge of diverse social influence and message design theories that can be readily applied to translational work (Silk & Totzkay, 2018). Communication researchers are well attuned to put into practice theoretical frameworks of message design and effects around diverse health and risk issues, which adds strength beyond typical CME designs. Considering these frameworks when designing CME trainings ensures their viability and usefulness in successfully translating research into practice. Additionally, communication scientists can become thought leaders in the design of CME trainings and provide much needed theorizing in this context as they participate more in CME and T2 translational activities.

### **Use a rigorous research approach**

Health communication researchers are predisposed to know the value of a robust research design when planning an intervention. The planning of T2 translational work and CME trainings should be no exception. In this context, formative research with relevant parties to determine what they want to know and how they prefer to have it communicated is vital. In focus groups and interviews, the researchers leading this project identified that the WoS concept was a hook to pique interest and raise concern about breast cancer for both caregivers and providers. By implementing a rigorous mixed-methodological design, this nuance was identified and integrated into the design of the CME training to facilitate translation. This is now paired with summative evaluation comprised of baseline and follow-up measures that include knowledge indices and behavioral/attitudinal measures adapted from longstanding social influence frameworks. Evaluation data is forthcoming, but inclusion of strategies germane to health communication campaign activity adds strength to the CME endeavor by helping to assess whether and to what extent the translational activity is successful.

### **Consider delivery format with the audience in mind**

This project identified PHCPs as a logical intervention point for the communication phenomena of interest. PHCPs are likely a priority audience for a range of emerging science and health issues. Thus, it is important to identify the relevant medical professionals to educate via the CME process and to deliver content and communication strategies to their patients and communities. In this project, an interactive, in-person training was delivered at a state medical society conference and an online training was developed by partnering with a media broadcasting organization. Being able to deliver online modules that provide CME credit increases the reach of the training and may be preferred by participants. However, in-person training opportunities are also effective, and perhaps easier to develop and implement as they are unlikely to require the production expertise included in this project.

### Capitalize on early adopters and encourage early adoption

The translation project outlined here used the DoI paradigm, wherein early adopters and opinion leaders are identified within a social system (Dearing, 2009). This dynamic likely exists across health topics, so medical professionals can be encouraged to understand their status as opinion leaders and act as influential early adopters in the diffusion of emerging health recommendations. Not only can they act as opinion leaders and sources of innovation knowledge for their patients, but additionally so for their peers. Other interventions in this spirit can identify natural opinion leaders or train providers in communication skills that will facilitate their becoming opinion leaders in their medical community to spread health care and health communication innovations.

### Plan ahead about processes for awarding the CME credit

A challenge faced initially in this project was identifying a host to offer CME credit for providers. To implement and evaluate the training effectively, and to distribute information to change physician behavior, providers need to have access to the training. Due to accreditation expenses to offer CME credit, one route is to partner with organizations that are already accredited. This was the ultimate route taken for this project, as the state medical society became a partner who also was willing to host the training online in addition to assisting in pilot testing. Overall, partnerships need to be cultivated early as other medical societies and accredited institutions are likely amenable to partnerships with enthusiastic and active communication scientists.

## Conclusion

CME courses provide communication scientists with an opportunity to reach health care providers by translating results from scientific studies and sharing them in practical ways with providers who can influence health decision-making, which fits into the T2 block of the translational research continuum (Rubio et al., 2010; Sung et al., 2003). In this project, a CME training was designed by working with PHCPs, caregivers, and BCERP scientists to identify gaps in communication about breast cancer and the environment. Recently, BCERP communication researchers secured funding for a new grant application that aims to develop BCERP educational content for 5<sup>th</sup> and 6<sup>th</sup> grade health and science teachers. The grant application includes an advisory board, empirically tests DoI, proposes rigorous evaluation, and partners with old and new stakeholders. Though it is not CME-focused, the new grant project is testament to the approach advocated in this manuscript.

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