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From plan to action: Adapting evaluation to serve the developmental needs of a newly-funded multidisciplinary research center

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ABSTRACT

The Southeastern Coastal Center for Agricultural Health and Safety (SCCAHS) is one of many newly-funded federal research centers, housing five multidisciplinary research projects and seven pilot projects, and serving a multi-state region. In the early stages of such a complex project, with multiple teams separated by geography and disciplines, the evaluation program has been integral in connecting internal and external stakeholders at the center and project levels. We used a developmental evaluation (DE) framework to respond to the complex political environment surrounding agricultural health and safety in the southeast; to engage external stakeholders in guiding the center's research and outreach trajectories; to support center research teams in a co-creation process to develop logic models and tailored indicators; and to provide timely and feedback within the center to address communications gaps identified by the evaluation program. By using DE principles to shape monitoring and evaluation approaches, our evaluation program has adapted to the dynamic circumstances presented as our center's progress has been translated from a plan in a grant proposal to implementation.

1. Introduction

1.1. Purpose

Federal agencies fund research centers on a variety of topics, and an evaluation component is normally required. The purpose of this article is to describe the role played by the evaluation program component of the Southeastern Coastal Center for Agricultural Health and Safety (SCCAHS) in the beginning stages of a new research center. SCCAHS is one of many federal research centers newly-funded each year, and houses multiple research and pilot projects from various institutions. Typically, the role of an evaluation program is to emphasize accountability, especially in the case of federal agencies that need to demonstrate that the activities facilitated by their programs are meeting stakeholder interests, and that their programs are achieving desired impacts (American Evaluation Association, 2016). However, at the outset of this project, we found that the purpose of evaluation on this project would be more multi-faceted. We began our evaluation process by examining how we would bring this project to life, from the grant proposal to practice. Out of this process, we discovered gaps that needed to be addressed in order for our Center to thrive. Because we used a developmental evaluation (DE) framework, our evaluation team had the flexibility to engage with these gaps, and the evaluation program adapted as we built it. This article outlines our approach to synthesizing the disparate projects within the Center by defining and connecting center goals, facilitating connections and encouraging communication with internal and external stakeholders, and incorporating stakeholder needs and insights into Center projects.

1.2. Importance of academic research centers

In recent years, federal scientific funding has shifted away from funding individual scientists working on a single research project and toward "Big Science" projects – large, collaborative projects of $5 million or more involving multi-disciplinary networks of scientists (Kagan, Kane, Quinlan, Rosas, & Trochim, 2009). These projects vary in range and scope, and include "cooperative centers, public private collaborations, research coalitions, transdisciplinary centers, clinical research networks, multisite projects, science and technology centers" (Trochim, Marcus, Mâsse, Moser, & Weld, 2008 pg. 9). Extramural research centers are also included in the category of "Big Science", and since their beginnings in the 1960s, they have become increasingly

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interdisciplinary in both the number and types of departments included in the centers, and the level and nature of interaction between scientists (Mâsse, Marcus, Morgan, Croyle, & Trochim, 2008). The basic goal of research centers is straightforward—to produce innovative, relevant, and impactful research. However, due to the broad scope of these projects, centers are also expected to work across disciplines, mentor and develop new investigators, disseminate research findings to stakeholders, increase recognition of the center's home institution, and foster scientific infrastructure in the program field. As pressure increases for fiscal accountability of federally-funded projects, evaluators must consider the scientific goals of the project, as well as the programmatic goals related to project functioning, outreach, and collaboration when developing an evaluation plan (Kagan et al., 2009).

1.3. Evaluating research centers

The size, complexity, and transdisciplinary nature of research centers pose many challenges for evaluators, including navigating different epistemological fields, institutions, and standards for assessment and gathering high-quality data without overburdening scientists with reporting requirements (Kagan et al., 2009; Klein, 2008). Despite the challenges, evaluation is vital to ensure accountability to other funders and stakeholders, and to assess whether outputs, outcomes and impacts are on track for achieving a center's goals (Tash, 2006). A variety of indicators have been recommended for the evaluation of a research center, including the number of studies in the center's program area, the quality of collaborations, the number of translational research projects, the quality of institutional support, and the development and application of successful interventions (Runyan, Garrettson, & Yee, 2014). While several studies have explored DE principles in the context of project evaluation, using DE to evaluate complex research centers is less common, and certain DE principles, like complexity perspective, systems thinking, and co-creation, are especially pertinent in evaluating multifaceted research centers.

1.4. Stakeholder involvement in evaluation

Research centers face challenges identifying goals that cross disciplines and affect a wide array of stakeholders with different, and sometimes contradictory, needs (Kagan et al., 2009; Trochim et al., 2008). Researchers, administrators, policy-makers, and community stakeholders may view the center's success through different lenses, and evaluation must take these multiple perspectives into account (Trochim et al., 2008). Involving stakeholders in the evaluation process—from formulating evaluation questions to designing reporting methods, to scheduling submission of reporting data—enhances the evaluation's credibility and utility (Chen, 2001; Kagan et al., 2009; Patton, 2011). Maintaining open lines of communication with center stakeholders about evaluation findings is a critical strategy in ensuring that stakeholders use evaluation information to improve outcomes and processes (Trochim et al., 2008).

1.5. Southeastern coastal center for agricultural health and safety (SCCAHS)

SCCAHS was established in 2016 as part of a Centers for Disease Control and Prevention (CDC) / National Institute for Occupational Safety and Health (NIOSH) Agricultural Health and Safety Initiative. SCCAHS explores and addresses the occupational safety and health needs of people working in agriculture, fishing, and forestry in Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Puerto Rico, and the U.S. Virgin Islands. SCCAHS is a multidisciplinary partnership of academic institutions, community organizations, and industry representatives that brings together individuals and organizations that are already pursuing basic and applied research, as well as intervention, translational, and outreach solutions for occupational illness and injuries. SCCAHS provides a centralized regional infrastructure where these individuals, organizations and companies can engage in mutual learning, leverage resources, build on previous efforts of colleagues, and promote new research.

SCCAHS consists of (1) the Research Core, made up of five funded research projects; (2) the Outreach Core, which focuses on dissemination and the translation of research to practice; and (3) the Planning and Evaluation Core, consisting of the administrative program, the emerging issues program, and the evaluation program. Over 45 faculty and staff from six universities work on SCCAHS.

SCCAHS is the newest of 11 Agricultural Safety Centers across the United States. Active collaboration between the NIOSH Centers' evaluation programs is an expectation of NIOSH. This collaboration occurs primarily through the bi-monthly conference calls involving evaluation, communication, and outreach (ECO) teams from each Center, as well as through a yearly in-person meeting at a national conference. Up until the 2016–2021 grant cycle, NIOSH Centers worked in collaboration on a cross-center initiative called the Agriculture Center Evaluation (ACE) working group. ACE was a response to the Kennedy Report, which was an evaluation of NIOSH completed in 1995 by external reviewers (HICAHS, 2009, 2011). ACE was established as a team of representatives from each Center who worked together to create evaluation research questions and define evaluation indicators to measure the overall accomplishments of NIOSH Centers. Each Center collected its own program data, which was then deposited in a standardized national database. The lead Center collected and managed the data aggregated in the centralized database. Evaluation reports summarizing the data were first released in 1999, and continued each year that funding was available, including 1999–2001, 2004–2007, and 2006–2010. This collaborative evaluation effort systematized reporting, which facilitated internal and multi-site evaluation, and less burdensome annual reporting requirements and periodic external reviews of the NIOSH Agriculture, Fisheries and Forestry (AgFF) Initiative.

In the 2016–2021 grant cycle, NIOSH-funded centers were required for the first time to add their own evaluation programs to function as a part of the Planning and Evaluation Core, creating new challenges and opportunities for evaluation. Because SCCAHS is a newly funded Center, the evaluation program was part of the Center from its inception, and as a result, evaluation has been well-integrated into the research and outreach activities of the center.

2. Evaluation approach

2.1. Using the transparent box paradigm and DE activities to identify Center processes and activities

The evaluation tasks described in the SCCAHS grant proposal were traditional, and fell under five essential tasks, which are consistent with the guidelines included in the publication on Evaluating Occupational Health and Safety Research Programs: Framework and Next Steps (Institute of Medicine (IOM) and National Research Council (NRC) (2009)), as well as the CDC's framework for program evaluation (Koplan et al., 1999).

1 Engaging stakeholders to maintain a responsive and focused evaluation program;
2 Collecting relevant M&E data from the Center as a whole, its cores, and individual research projects;
3 Analyzing and interpreting data to establish the quality, effectiveness, and impact of the Center as a whole, its cores, and the individual research projects;
4 Reporting and sharing evaluation findings and recommendations with key stakeholders; and
5 Maintaining an open line of communication and engagement with the evaluation programs of other agricultural health and safety centers across the country.

As work with the other Center teams progressed, the evaluation team found the need to become more involved in Center processes, facilitating communication and collaboration among the Research, Outreach and Administration Cores. In a classical evaluation paradigm, an evaluation program might evaluate a research center only based on whether initial outputs and outcomes were accomplished on a given timeline. This "black box" approach ignores the process in which these outputs and outcomes occurred, and does little to illuminate how the Center's theory of change, activities, and larger context are related to outputs and outcomes (Wholey, Hatry, & Newcomer, 2004). Instead, we utilized the "transparent box" paradigm of evaluation to help us better understand our Center the outset. While we still worked with the Center Research Core and Outreach Core to identify their projects' activities, outputs and outcomes, we wanted to understand how factors affected these core elements. Political environment, stakeholder needs, management and leadership, and communication and coordination inside and outside the Center all affected outcomes. Using the transparent box paradigm as well as employing DE activities, we paid attention to Center processes to further develop emergent evaluation questions and, subsequently, adapt our evaluation activities. These questions included:

1 How do we define our Center's programs?
2 What lessons can we learn from other AgFF Centers?
3 How can we improve communication and collaboration among Center projects?
4 What are stakeholder needs in the AgFF sectors?
5 How can we incorporate stakeholder insights?

2.2. Using DE principles to evaluate a new, complex project

Although a logic model and a theory of change for the center as a whole were submitted in the SCCAHS grant proposal, the process of actualizing program work required coordination with internal stakeholders to reexamine what was outlined in the grant proposal and turn these aspirations into a plan of work (Lawrence, Rallis, Davis, & Harrington, 2018). Because SCCAHS is a new center, monitoring and evaluation activities were structured to evolve in response to the changing needs of the research, outreach, and administrative components. At the beginning stages of the project, the evaluation team worked to connect the elements described in the grant proposal to actual programmatic work. This stage of the project was especially fertile ground for innovation as the program developed from a plan outlined in the grant proposal to a more fully-specified action plan. Our Center is funded on a five-year cycle, and initial efforts were used to lay the groundwork to develop multiple center activities, from research activities on the research project level to processes engaging diverse Center teams. The integral involvement of the evaluation team and evaluation processes in these developmental stages ensures that Center projects will be more adaptable and flexible to challenges and changing dynamics down the road (Lam & Shulha, 2015). This developmental process was helpful in this first cycle of grant funding, but will be repeated in future grant cycles as new research projects are awarded funding (Lawrence et al., 2018).

Our approach infused Patton (2016) eight essential principles for guiding the DE process. These principles include: (1) *Developmental purpose:* the evaluation program is designed to be dynamic in consideration of "systems change, innovation and adaptation" (Lawrence et al., 2018 pg. 72); (2) *Evaluation rigor:* data collection methods, analysis and reporting are rigorous enough in answering evaluation questions to provide constructive criticism to the program; (3) *Utilization focus:* the goal of the evaluation is that it is used by those who developed the program; (4) *Innovation niche:* allowances and adaptations for program innovations are encouraged; (5) *Complexity perspective:* recognition of the complexity of program components are taken into account in evaluation process; (6) *Systems thinking:* evaluators plan and execute their work in the context of interlocking systems; (7) *Co-creation:* evaluators use a collaborative approach working with program staff and leadership to define the evaluation process; (8) *Timely feedback:* evaluation results and recommendations are presented to stakeholders in a timely fashion to foster innovation.

As work began across the center, timelines, leadership expectations, and work plans evolved in the Research, Planning and Evaluation, and Outreach Cores. The evaluation program was able to adhere to the more traditional evaluation tasks as described in the proposal, and we also adapted to needs that were identified as work progressed. We co-created logic models for each research project and core to describe the dynamic, interrelated, complex functions of the Center. Thus, the SCCAHS evaluation plan used elements of developmental evaluation by applying an evaluation perspective in all stages of the project, from discussions to decision making, allowing the evaluation process to adapt despite non-linear processes and continuing innovations within the project (Patton, 2011).

2.3. Connecting DE activities with developmental evaluation principles, processes and products

Our involvement in Center processes was consistent with not only DE principles, but also DE activities described in evaluation literature: orientation, observation, sensemaking, and development of the program (Baldwin & Lander, 2019; Rey, Tremblay, & Brousselle, 2014).

Orientation. We met with each research project within the Research Core to create logic models for their projects, clarifying goals and defining external factors within and outside our Center that could affect their progress.

Observation. The evaluation team attended Outreach and Internal Operating Committee meetings, and considered internal dynamics between Center teams in developing strategies for evaluation of progress and strategies for internal collaboration.

Sensemaking. Because the evaluation team was the only team that had met with every single project within the Center, we became the nexus of information sharing between teams. Our knowledge of the complex research science and internal relationships between teams was helpful in creating reporting products to be shared with internal Center team members and external stakeholders.

Development of the project. Typically, DE is used to evaluate a single program or intervention. However, we applied DE principles and activities to evaluate an entire research center, comprised of multiple projects. In this way we were integral in the development of the project as a whole, offering insights to increase communication, collaboration, and efficiency.

In addition to these activities, we used DE principles to guide our key processes and products. These connections between DE principles, processes and products are presented in Table 1.

2.4. SCCAHS evaluation questions and related activities

Outside of typical monitoring and evaluation work, our role as evaluators came to include communicating to bridge gaps between Center projects, between our Center and other AgFF centers across the country, and between Center projects and external stakeholders. Our evaluation questions clarified project timelines, goals, and processes, so our internal stakeholders could better understand their own work and the work of their Center colleagues. Our questions also incorporated the successes and pitfalls that other AgFF Center had experienced over their decades of existence. Finally, our evaluation questions considered how to connect our research goals with the needs and feedback of our community stakeholders, who are the ultimate users of our research findings.

2.4.1. How do we define our Center's programs?

The SCCAHS evaluation team began our evaluation process by bridging gaps between SCCAHS projects, by engaging internal

Table 1
Developmental Evaluation Principles, Process, and Products.

Developmental Evaluation Principle	Developmental Process	Products
Developmental purpose	Evaluation team was critically involved in the translation of an aspirational grant proposal into a real-world work plan that allows for evolving leadership and flexibility of products created.	Project-level planning meetings leading to individualized logic models Data collection and reporting system tailored to each project
Evaluation rigor	Evaluation team worked with project leaders to co-develop a framework for measurement and accountability. Progress is reported to entire team to address gaps in progress and facilitate communication between projects.	Quarterly indicator forms and calendar Quarterly reports Data collection and reporting system
Utilization focus	Evaluation team identified key intended users at the outset, and ensured that all evaluation activities focused on the collection of actionable data. Needs assessment and process evaluation were specifically designed for utilization by project leaders.	Needs assessment study and Community Stakeholder Advisory Board meeting Process evaluation report (assessment of center functions, collaboration, and effectiveness)
Innovation niche	Outreach Core and the evaluation team explicitly focused on innovation through fostering stronger project communication and providing leadership on project strategy and accountability. Knowledge was also built on data gathered from all other NIOSH Ag Centers.	NIOSH Evaluation team interviews and summary report Needs assessment study and Community Stakeholder Advisory Board meeting Evaluation team facilitating communication role for the Center
Complexity perspective	In a complex and dynamic environment involving numerous stakeholders with diverse perspectives, including vulnerable populations that are at-risk of adverse health consequences and lack power and voice, the evaluation team and the project leadership must maintain a firm focus on the well-being of farm workers while avoiding the alienation of industry stakeholders who are also critical to the success of the Center.	Needs assessment study and Community Stakeholder Advisory Board meeting Pilot projects and research projects focused on worker well-being as well as worker productivity Culturally-relevant messaging, training, and outreach materials
Systems thinking	Evaluation team used knowledge gathered in NIOSH Ag Center interviews to form the basis of our program. Connected SCCAHS research and outreach strategies to NORA goals. Evaluation team facilitated communication and integration within SCCAHS team and between SCCAHS and other centers.	NIOSH Evaluation team interviews and summary report Logic model outcomes connected to NORA outcomes Comprehensive data collection and reporting system Center-level and project-level logic models
Co-creation	Interviewed other NIOSH Ag Centers to gain insights, avoid pitfalls and foster collaboration in the creation of SCCAHS evaluation program. Met with SCCAHS research and outreach project leaders to develop logic models and reporting systems tailored to each project. Worked with SCCAHS stakeholders to prioritize issues and create best strategies for communication in needs assessment.	Needs assessment study and Community Stakeholder Advisory Board meeting Process evaluation report (assessment of center functions, collaboration, and effectiveness) NIOSH Evaluation team interviews and summary report Project-level planning meetings Center-level and project-level logic models
Timely feedback	Evaluation team addressed a communications gap identified in SCCAHS process evaluation by creating and sharing quarterly reports updating project progress. Actively participate in SCCAHS' Internal Operations Committee by infusing evaluative queries and thinking.	Bi-weekly meetings with Outreach Core to provide ongoing guidance Quarterly reports shared with internal and external stakeholders Review evaluation reports to assess overall center functions and effectiveness

stakeholders and describing their respective projects (Koplan et al., 1999; Patton, 2011). Evaluation teams from other NIOSH Center evaluation teams recommended that we meet face-to-face with other teams within the center in a strategy to build relationships within SCCAHS. Following this suggestion, the evaluation team met one-on-one with each research project PI and program leader to develop and revise logic models depicting their projects' inputs, activities, outputs and outcomes. Consistent with the principle of the complexity perspective (Patton, 2016), the groups also identified key logical assumptions and external factors that are likely to influence project progress. The participatory process used for logic model development aligned with Patton's (2016) developmental evaluation principle of co-creation, and enhanced the relevancy of evaluation activities and products by working with key program stakeholders to reach a common understanding and provide input regarding the goals of the project and of the project evaluation.

Once final revisions were made to the logic models, the evaluation team then connected activities, outputs and outcomes to the National Occupational Research Agenda (NORA) goals for the AgFF sectors, which is consistent with developmental evaluation principles of complexity perspective and systems thinking. NORA is the framework for research for NIOSH Centers, and is meant to foster creative research to improve workplace health and safety (NORA Agriculture, Forestry, & Fishing Sector Council, 2018). NORA prioritizes research goals by determining how many workers are potentially affected by a certain injury or illness, how severe the injury or illness is, and how probable it is that research-based interventions will mitigate the injury or illness. NORA describes nine research areas for the AgFF sector, which include: surveillance; vulnerable workers; outreach, communications, and partnerships; agriculture safety; agriculture health; forestry; and fishing.

In addition to outcome logic models, we also produced a process model demonstrating the SCCAHS organizational plan on a Center level, as well as a Center service utilization plan (Rossi, Lipsey, & Feeman, 2004). The organizational plan built upon the plan submitted in the grant proposal, but was expanded to clarify roles and responsibilities outlined in the proposal's specific aims (Fig. 1). It also outlined how Center Cores interact with each other, as well as with external advisory boards.

In addition to this explanation, we created a service utilization plan (Fig. 2) that outlines how Center teams are expected to interact with each other and outside stakeholders, and also includes contingencies to plan for unanticipated results. The development of an initial process model was a part of our efforts to employ the transparent paradigm, and to inform researchers within the Center to better understand the structures in place to better connect them with each other and with outside stakeholders.

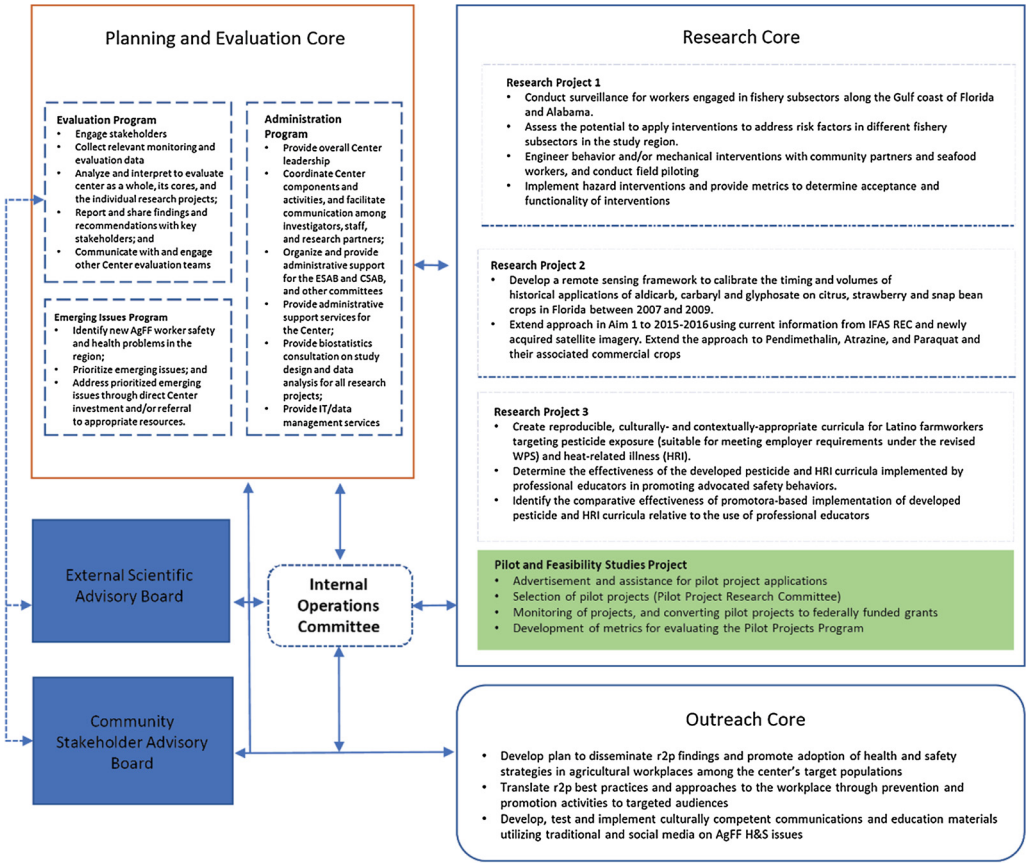

Fig. 1. Organizational Plan.

2.4.2. What lessons can we learn from other AgFF Centers?

Wanting to learn from the decades of evaluation experience accumulated by other NIOSH centers, the SCCAHS evaluation team reached out by engaging with other NIOSH centers to ascertain the purpose of their evaluation teams, how these teams function within their Centers, and to seek guidance about pitfalls to avoid and strategies to pursue. The insights garnered from this engagement guided the SCCAHS evaluation team in developing evaluation activities on both a project level and whole-center level. We used a participatory process with internal stakeholders, which was aligned with the developmental evaluation principles of co-creation and systems thinking, and also contributed to finding "innovation niches" when the information was shared across the center (Patton, 2016).

The first task that the SCCAHS Evaluation Coordinator completed was to read and summarize the most recent annual reports submitted to the CDC from the other NIOSH Centers. The annual reports contained information about research and pilot project updates and findings, outreach initiatives, and evaluation accomplishments. The Evaluation Coordinator summarized each Center's report in presentations that included information about related research projects, including surveillance projects, pesticide research, and heat-related illness research, as well as outreach and administrative activities. The Evaluation Program shared the presentations with SCCAHS teams, and they were also shared during the national NIOSH Evaluation, Communication and Outreach conference calls, in which representatives from all 11 Centers participate.

The next task for the SCCAHS Evaluation Program was to collect information about specific evaluation approaches through a review of the evaluation portions of annual reports and websites. There were several common themes among the evaluation program activities. These themes included: creating and reviewing logic models with internal stakeholders; collecting and storing monitoring and evaluation data; and sharing evaluation reports with internal and external stakeholders. The evaluation program was already addressing those themes, however, this process allowed us to fine-tune some of our activities and generate ideas, such as specific strategies for efficient data collection and strategies for engaging stakeholders through a needs assessment survey.

The other ten NIOSH Centers reported using different strategies in completing evaluation activities, and based on these diverse activities, the Evaluation Program created semi-structured interviews to conduct with evaluation staff across Centers. The phone interviews took place from January through March, 2017, and were completed with nine of the NIOSH Centers. The interviews contained some common items, including questions about collecting data from research PIs and other Center staff; strategies for Center-level evaluation; information about conducting needs assessments among external stakeholders; and pitfalls to avoid as an evaluation program. Interviews also included items tailored to specific Centers to obtain more details about activities outlined in Centers' annual reports. Some of these items pertained to social network analysis, pilot project monitoring, strategic planning, development of advisory boards, and using a risk/cost/impact rubric.

2.4.3. How can we improve the communication and collaboration among Center projects?

NIOSH centers use different methods to evaluate the center as a whole. One center's evaluation facilitated strategic planning to develop the center's mission and vision, discussing center priorities by involving the entire center in the process. Several centers conducted leadership evaluations, which gathered information about how team members interact with the center director, their superiors and project team members. Furthermore, two centers conducted social network analysis to document which individuals and organizations were collaborating on research and outreach projects. These centers reported that these

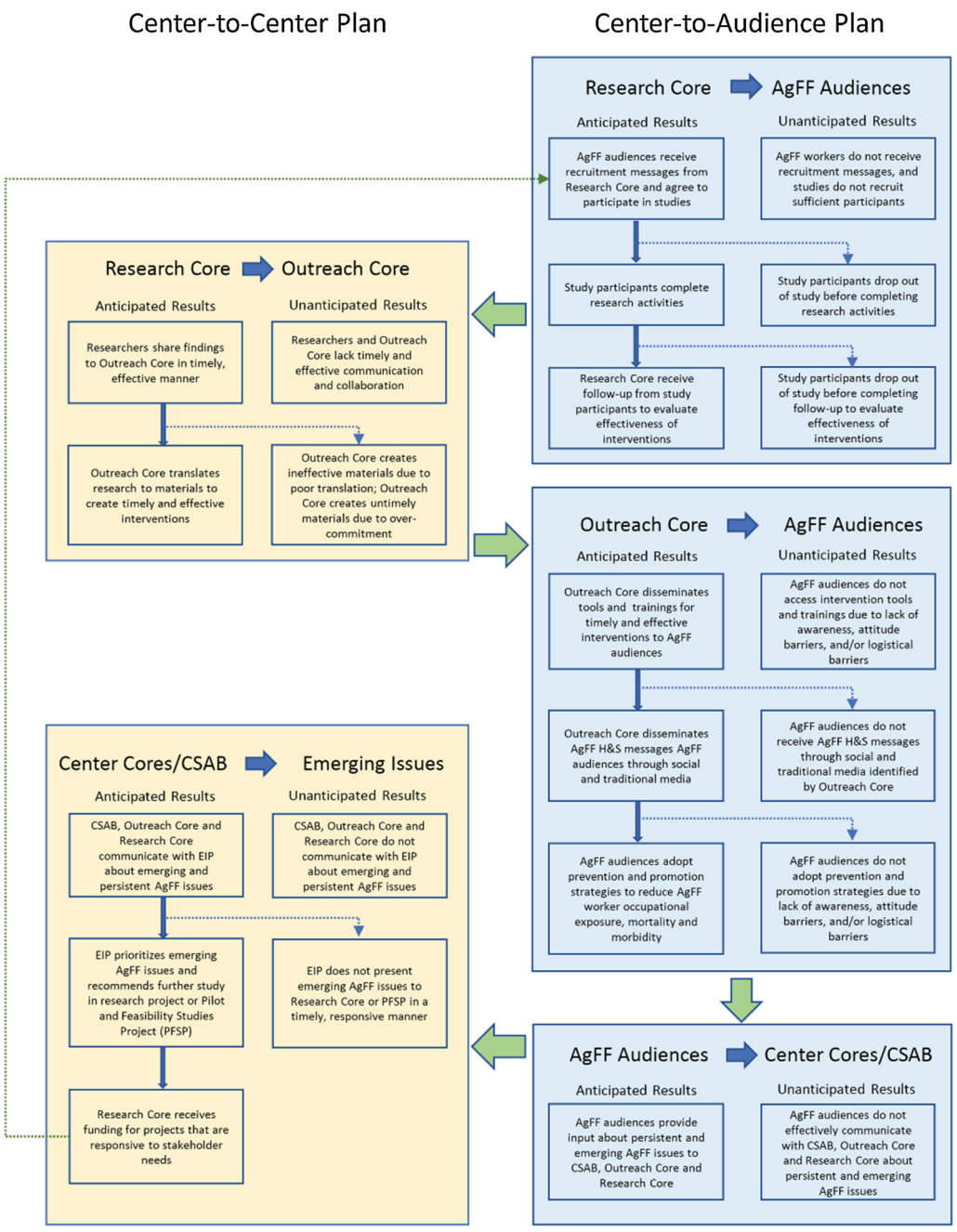

Fig. 2. Service Utilization Plan.

relationships used to be centrally-focused at the beginning, but communication and collaboration increased with time among center partners as recommendations from evaluation findings were implemented.

Early in the SCCAHS' second year, the Evaluation Program team developed a process evaluation instrument to gauge levels of communication and collaboration among primary workgroups and within the Center as a whole. SCCAHS members provided suggestions on improving work processes within their primary teams and within the Center. They identified the teams they currently collaborate with, and which teams they are currently not collaborating with and need to collaborate with in the future. Participants were also asked whether the project management software, Basecamp, has been effective in facilitating communication and collaboration within the Center. Finally, participants were asked to describe barriers and challenges for communication and collaboration among SCCAHS teams, as well as recommendations for improving communication and collaboration. A third-party evaluator collected the data and screened it to protect respondents' anonymity. Forty-five team members were contacted and 21 responded. Data collection began December 2017 and continued through January 2018. Respondents reported positive experiences working in their primary teams, indicating high levels of communication and collaboration. Working with SCCAHS teams as a whole was more challenging for many respondents, who reported lower levels of communication and collaboration. Respondents suggested that more opportunities for collaboration were needed and suggested more updates from other teams and more opportunities to meet outside of the Internal Operations Committee (IOC) meetings. The Process Evaluation Report was shared at a subsequent IOC meeting and distributed to SCCAHS teams for their review and action.

Following up with process evaluation conclusions, the evaluation team sought to improve transparency between teams by creating a reporting system for SCCAHS personnel to track their projects' progress.

Monitoring is also an integral part of developmental evaluation, in which the evaluation team and research projects communicate about evolving strategies and progress being made, allowing for adaptation in evaluation strategies as indicated by Patton's (2016) developmental evaluation principle of providing an innovation niche in the evaluation process.

Developing a reporting system was a major topic of conversation during interviews with other NIOSH centers, yet all personnel interviewed agreed that data collection was a crucial activity in not only monitoring complex research centers, but in communicating the activities, products, progress and impacts across research teams. Most center evaluation teams collect similar data. Reported activities included research activities pertaining to a project's progress, and outreach activities including the type of stakeholder engagement, the audience and the contact count. Outputs include curricula, publications, book chapters, and papers and posters presented at conferences. Outcomes were described as knowledge about the hazards affecting workers in agriculture, fisheries and forestry; research translation; dissemination of behavioral and mechanical interventions to mitigate the hazards facing these workers; and adoption of these innovations by employers and workers to reduce the incidence of injuries and disease among workers.

Evaluators reported facing basic challenges working with PIs and project leaders when attempting to collect data for reporting purposes. The takeaways from these conversations were that data collection needed to be simple, not redundant, tailored to individual research projects, and persistent. Based on the description of these reporting challenges and successes, the evaluation team was intentional in developing a reporting system that would collect information relevant to all SCCAHS team members that would not be overly burdensome. Using the logic models and the grant proposal as guidelines, a form was created for each indicator, which consisted of several short-answer questions to encourage detailed reporting. Each indicator was organized in a Gantt chart that displayed which indicators are due in which quarter throughout the year, and identified a point person to complete the indicator form. This calendar of indicators was reviewed by project leaders at the beginning of the fiscal year to verify the timing and point person.

The credibility of the reporting indicators was improved due to the collaborative process engaging both the evaluation team and researchers in creating the indicators and reporting schedule (Trochim et al., 2008). By working with project PIs to collect relevant data, we were better able to communicate accomplishments and outcomes with our internal Center team members, as well as external stakeholders, as the reports were published online for the public to read.

2.4.4. What are stakeholder needs in the AgFF sectors?

Three of the NIOSH centers we interviewed reported that they had conducted needs assessments. The SCCAHS evaluation team collaborated with the Outreach Core to develop a needs assessment survey to guide the activities of the Outreach Core. Using a participatory approach, the evaluation team solicited key questions and key target audiences from different projects within SCCAHS, and created the needs assessment survey based on team member feedback. Topics in the needs assessment included: stakeholder information; industry/employer training preferences; emerging health and safety issues in AFF sectors; AFF health and safety issues; strategies for self-employed workers; professional information sources; sources for news in general; social media use, and communication preferences.

The SCCAHS evaluation team acted as the first point of contact with external stakeholders identified by research teams and the Outreach Core. In this way, SCCAHS demonstrated to stakeholders that the center engages relevant parties in identifying issues, challenges, and strategies affecting agricultural, fisheries and forestry workers. The needs assessment process identified stakeholders to add to the SCCAHS newsletter list, and the contact database has been referenced in subsequent outreach initiatives. The evaluation team shared needs assessment results and key findings with these stakeholders in a synthesis report, which offered insights into issues, interventions, obstacles and potential benefits to stakeholders in AFF sectors (Authors, 2017).

2.4.5. How can we incorporate stakeholder insights?

Highlights from the Needs Assessment Report were presented at the first SCCAHS Community Stakeholder Advisory Board (CSAB) meeting, and it provided a springboard for stakeholders to understand and prioritize the breadth of issues outlined by needs assessment participants and discuss current and future SCCAHS projects. The SCCAHS Outreach Core led the CSAB meeting and gathered external stakeholders from academia, industry, worker advocacy groups, public agencies, regulatory agencies, and Cooperative Extension. The purpose of the meeting was to inform stakeholders about the progress made by Center research projects, and solicit feedback about the projects, as well as issues, gaps, and existing resources relevant to the Center. The CSAB Meeting Report was shared with internal and external stakeholders. SCCAHS hosts annual CSAB meetings, and input from these meetings will inform the future direction of Center outreach and research initiatives.

Farmworker, seafood, and forestry worker health is a politically sensitive issue involving stakeholders with different and sometimes competing interests. In contrast to many of the other NIOSH Ag Centers whose audiences include family farms and ranches, much of the agricultural and fisheries production in the SCCAHS region relies on vulnerable workers, including Latino guest workers and undocumented workers employed by large agribusiness operations. Fisheries operators are typically self-employed and uninsured. Because our center operates in this delicate context, balanced stakeholder input from the outset has been crucial in clarifying research and outreach priorities on a center level.

3. Discussion

3.1. Lessons learned: Benefits and challenges of using DE to evaluate research centers

3.1.1. DE takes complex systems into account

Research centers are complex by nature, involving multiple research projects, administrative tasks, and outreach components. Staff in these regional institutions are separated by disciplinary and geographical distances. In our center, the evaluation program set out to infuse developmental evaluation principles in the normal evaluation tasks of collecting monitoring and evaluation data from teams within our center and providing critical feedback to help projects maintain focus and efficiency. As work progressed in the first two years of our center, the value of this approach for our evaluation program became evident. Using these principles, we were better equipped to incorporate multiple and sometimes conflicting stakeholder perspectives, adapt to changing leadership roles, and fill identified communications gaps.

3.1.2. DE can enhance evaluator responsibilities to include bridging gaps

Unlike other AgFF Centers based around the country who employ full time directors and faculty, SCCAHS only funded two full time support staff. Center administration, research project PIs, and outreach specialists focused a percentage of their time on SCCAHS projects. Our experience showed us that strong leadership is crucial for the cohesiveness for such a large project, especially when team members wear many other hats. Center leadership also has to contend with diverse research subjects, research goals, and project staff personalities. Because leadership responsibilities were not clearly outlined in the grant proposal, as the plan was implemented the evaluation team adapted our activities and roles to bridge gaps to address accountability and internal communication issues (Lawrence et al., 2018).

Based on the information collected in our process evaluation, the

evaluation team expanded our role as networkers between SCCAHS research teams, Outreach Core and administration teams. Several SCCAHS team members reported that they were unaware of what other teams in the center were working on, so connecting team members within a center became a higher priority. In the second year of the 2016 grant cycle, the evaluation team created quarterly reports that highlighted the activities and outputs described in each team's portion of the grant proposal, and provided updates on that quarter's progress to achieve those activities and outputs. The report also described gaps in the proposed research and what had been accomplished that quarter. These gaps were discussed in SCCAHS leadership meetings, and in one-on-one meetings with team directors. Quarterly reports were helpful in facilitating plans of work to ensure that center teams were on track to accomplish what they proposed. Quarterly reports also became another way to communicate with external stakeholders. Reports are published on the SCCAHS website for the public to read and were also sent to community stakeholder advisory board members in advance of the SCCAHS annual stakeholder meeting. Sharing reports with both internal and external stakeholders created a feedback system that enhanced the quality of the data reported and conveyed to project members that the data they provided would be more closely reviewed (Trochim et al., 2008). Sharing quarterly reports is also a strategy for providing timely feedback to support innovation, in accordance with Patton (2016) principles of developmental evaluation.

Stakeholders played an integral role every step of the way in the formation of the SCCAHS evaluation program. Through phone interviews, we learned from the experiences of other NISOH evaluators who had been working in this field for up to 20 years. We also took care to include our internal stakeholders when describing SCCAHS research, outreach and administrative projects, and based our logic models on our conversations with these internal teams. Finally, we engaged external stakeholders through our needs assessment study and our CSAB meeting, in which stakeholder feedback was synthesized and distributed to research, outreach and academic project directors.

Seeking input from stakeholders on multiple levels has helped the SCCAHS evaluation program to better understand the contexts we with work within: from internal systems across center cores, to regional systems drawing feedback from audiences served by the center, to multi-center networks involving other NIOSH agricultural health and safety centers addressing farm safety and health in different regions across the country. By seeking input from stakeholders from each level, we were able to bring a systems-thinking perspective (Patton, 2016) to SCCAHS team members working in research, administration, and outreach to better situate the center's work in complex environments.

3.2. Future directions for SCCAHS evaluation

The majority of this article was written in the first two years of SCCAHS' timeline. True to form, our evaluation roles and responsibilities have adapted to changing needs. Our role at the beginning of the project was most useful on the project level and center level, and as time has progressed, activities, monitoring and feedback on those levels have settled. Our focus has turned to bridging gaps on a systems level by taking into account evaluation across AgFF Centers around the country, the effect of our center within a greater economic context, and how our Center's future research agenda fits within the wider research environment surrounding agricultural health and safety.

3.2.1. Common metrics

During interviews, one NIOSH center evaluation team suggested that the future could bring changes to the framework of NIOSH evaluation. Though the most recent funding cycle requires reporting on a center by center basis, there is a possibility that reporting could evolve to a collaborative format using common metrics across centers. This appears to be a trend with other federally-funded centers in an effort to make the evaluation process more efficient, decrease the spending, and create systems to compare multiple centers based on relevant outcomes (Trochim et al., 2008).

Taking these trends into consideration, we connected our project-level and center-level logic model activities, outputs and outcomes to the NORA goals in order to be more prepared for the possibility that our center might be evaluated in comparison with other centers working towards the same outcomes in Agricultural, Fisheries and Forestry sectors. Metrics common across other centers also can inform our decisions in which evaluation data to track and report on for current center reports and future impact evaluation assessment.

These preparations, however, are only the beginning. Those tasked with establishing common metrics across NIOSH centers would be presented with unique challenges. NIOSH centers address distinct issues that vary by region, and research topics differ between institutions. Some NIOSH centers have been in existence since the 1990s, while others were first funded in the past few years. Furthermore, centers' organizations structures are not uniform. Possible pitfalls of instituting common metrics could include the alienation of researchers who view data collection as burdensome or immaterial, resulting in poor data quality (Runyan et al., 2014; Trochim et al., 2008). Additional questions include deciding which programs should be evaluated; who will oversee the evaluation and when will it take place; how will it be funded; and how will results be reported to internal and external stakeholders (Trochim et al., 2008).

We think the development of common metrics cannot use a one size fits all approach—rather, centers will need to work together to engage in the co-creation of metrics, albeit with some leadership to guide the process. The ultimate goal would be to create a common evaluation system with enough structure to provide the basis of comparison between centers, while also allowing for flexibility in recognizing the individual achievements of each center (see Rubio et al., 2015).

3.2.2. Economic evaluation

Initially evaluation focused at the project level as SCCAHS researchers studies biological and behavior interventions to address AgFF health and safety issues, which subsequently were evaluated using outcome evaluations. However, Center leadership expressed the need for the evaluation of Center impacts as a whole, especially in terms of economic impact. In response, the evaluation team began to plan an economic evaluation. Because many of our research projects focus on heat-related illness, we decided that the evaluation would assess the Center's economic impact on this issue only. The first step was to determine the perspective from which we would base our evaluation: the worker, the employer, or society at large. Taking these perspectives into account, we assessed which data we would need to describe economic impacts. While other AgFF Centers in other states collected economic data from farm operators or workers and employers, we determined that the nature of agricultural work in Florida made it too difficult to collect primary data. Most farmworkers are Spanish-speaking, have no permanent address in the U.S., and are hard to access. Similarly, employers are typically not small owner operations—rather they are large companies employing hundreds of workers, are quite diverse in their operations due to the variety of commodity crops grown in our region, and are similarly hard to access. Finally, we decided on an economic evaluation focusing on society at large because it would require secondary data analysis only, and would have the greatest variety of end users. We have recently partnered with a health economist to perform a macro-economic analysis focusing on our seven-state Southeast region. Work on this project will begin mid-2019.

3.2.3. Planning for the future

As SCCAHS further develops, attention will be focused on the renewal application for the next five-year funding period. Leading up to the renewal, Center leadership will need to determine the focus of future research. The evaluation team will play an important role in this process by providing the documentation of progress and impacts of

current research projects, as well as the Center as a whole. The evaluation team is also spearheading the development of a strategic plan to guide SCCAHS in fulfilling a leadership role nationally and accelerating SCCAHS' involvement and impact throughout its catchment area on occupational health and safety issues. By engaging our Center's internal faculty and staff and external stakeholders, a participatory and collaborative process will be utilized to gather input and feedback in designing our Center's growth strategy. It is anticipated that the products from this activity will be invaluable for focusing our involvement and impact over the coming years.

4. Conclusions

In this article we described our attempt to put developmental evaluation principles into practice in the context of a federally-funded regional research center. We have succeeded on a number of fronts, while other aspects of the developmental evaluation framework have proved challenging. The former includes the co-creation of evaluation tools and processes (which also enhanced understanding of research projects and connections with the larger center) while the latter includes challenges with timely reporting by researchers and conflicting opinions about center purpose and direction among both internal and external stakeholders. As a new center in its beginning stages, potential for innovation was high. Though our evaluation program completed traditional evaluation tasks, such as creating logic models on the project- and center-level, we also were able to fill a role to bridge gaps in communication and leadership, which is less traditional for an evaluation team.

Using information gathered from other NIOSH ag centers and feedback from stakeholders as a basis, we practiced co-creation in the development of project- and center-level logic models, as well as in the development of indicators and our system of data collection. This process took into account pitfalls that other centers described, and we have modified it over time to best capture the activities, outputs and outcomes for each project. Our evaluation system adapted to the challenges and evolving areas of focus that research projects faced as they unfurled in the real world. We used our communications role to connect diverse projects through timely feedback by sharing quarterly reports and active engagement with the center's IOC. These helped project leaders to stay abreast of other projects' progress, but also included information about individuals and organizations that project leaders have connected with throughout each quarter. This changes the center's social network from being siloed in separate projects to being more connected, providing the opportunity for innovation and potential collaborations across disciplines, fields, and systems.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

American Evaluation Association (2016). *An evaluation roadmap for a more effective government* (October). Retrieved fromAmerican Evaluation Associationwww.eval.org/d/do/4008.

Authors (2017). *Stakeholder needs assessment.* SCCAHS2017-01Gainesville, FL: University of Florida/Southeastern Coastal Center for Agricultural Health and Safety.

Baldwin, C. K., & Lander, R. (2019). Developmental evaluator functional role activities and programmatic developments: A case study analysis. *The American Journal of Evaluation, 40*(1), 35–54. https://doi.org/10.1177/1098214017743586.

Chen, H.-T. (2001). Development of a national evaluation system to evaluate CDC-funded health department HIV prevention programs. *The American Journal of Evaluation, 22*(1), 55–70. https://doi.org/10.1177/109821400102200106.

HICAHS (2009). *The NIOSH agricultural center initiative evaluation project fiscal year 2008 report*Retrieved fromhttps://deohs.washington.edu/pnash/sites/deohs.washington.edu.pnash/files/documents/2008_ACE_Report.pdf.

HICAHS (2011). *NIOSH agricultural center initiative evaluation projects fiscal year 2010.* Retrieved fromhttp://ukcph.org/scahip252-744-1000http://www.hicahs.colostate.edu/970-491-1912http://www.swagcenter.org/sitesearch.htm903-877-5896http://www.nycamh.com/http://agcenter.ucdavis.edu/530-752-4050http://www.cdc.gov/niosh/homepage.html.

Institute of Medicine (IOM), & National Research Council (NRC) (2009). *Evaluating occupational health and safety research programs: Framework and next steps.* https://doi.org/10.17226/12639.

Kagan, J. M., Kane, M., Quinlan, K. M., Rosas, S., & Trochim, W. M. (2009). Developing a conceptual framework for an evaluation system for the NIAID HIV/AIDS clinical trials networks. *Health Research Policy and Systems, 7*(1), 12. https://doi.org/10.1186/1478-4505-7-12.

Klein, J. T. (2008). Evaluation of interdisciplinary and transdisciplinary research. *American Journal of Preventive Medicine, 35*(2), S116–S123. https://doi.org/10.1016/j.amepre.2008.05.010.

Koplan, J. P., Director, M., Program Office Barbara Holloway, E., Acting Director, M., John Ward, C. W., Editor, D., ... Higgins Peter M Jenkins, M. M. (1999). *Centers for disease control (CDC) and prevention project editor.* Retrieved fromhttps://www.cdc.gov/mmwr/PDF/rr/rr4811.pdf.

Lam, C. Y., & Shulha, L. M. (2015). Insights on using developmental evaluation for innovating. *The American Journal of Evaluation, 36*(3), 358–374. https://doi.org/10.1177/1098214014542100.

Lawrence, R. B., Rallis, S. F., Davis, L. C., & Harrington, K. (2018). Developmental evaluation: Bridging the gaps between proposal, program, and practice. *Evaluation, 24*(1), 69–83. https://doi.org/10.1177/1356389017749276.

Mâsse, L. C., Marcus, S. E., Morgan, G. D., Croyle, R. T., & Trochim, W. M. (2008). Measuring collaboration and transdisciplinary integration in team science. *American Journal of Preventive Medicine, 35*(2), S151–S160. https://doi.org/10.1016/J.AMEPRE.2008.05.020.

NORA Agriculture, Forestry, and Fishing Sector Council (2018). *National occupational research agenda for agriculture, forestry and fishing.* Retrieved from:https://www.cdc.gov/nora/councils/agff/pdf/National_Occupational_Research_Agenda_for_AgFF_May_2018.pdf.

Patton, M. Q. (2011). *Essentials of utilization-focused evaluation.* Sage Publications, Inc.

Patton, M. Q. (2016). What is essential in developmental evaluation? On integrity, fidelity, adultery, abstinence, impotence, long-term commitment, integrity, and sensitivity in implementing evaluation models. *The American Journal of Evaluation, 37*(2), 250–265. https://doi.org/10.1177/1098214015626295.

Rey, L., Tremblay, M. C., & Brousselle, A. (2014). Managing tensions between evaluation and research: Illustrative cases of developmental evaluation in the context of research. *The American Journal of Evaluation, 35*(1), 45–60. https://doi.org/10.1177/1098214013503698.

Rossi, P. H., Lipsey, M. W., & Feeman, H. E. (2004). *Evaluation: A systematic approach* (7th ed.). Newberry Park, CA: Sage Publications.

Rubio, D. M., Blank, A. E., Dozier, A., Hites, L., Gilliam, V. A., Hunt, J., ... Trochim, W. M. (2015). Developing common metrics for the Clinical and Translational Science Awards (CTSAs): Lessons learned. *CTS, 8*(5), 451–459 https://doi.org/ 10.1111/cts.12296.

Runyan, C., Garrettson, M., & Yee, S. L. (2014). Development of a set of indicators to evaluate injury control research centers. *Evaluation Review, 38*(2), 133–159. https://doi.org/10.1177/0193841X14529287.

Tash, W. R. (2006). *Evaluating research centers and institutes for success!.* WT & Associates.

Trochim, W. M., Marcus, S. E., Mâsse, L. C., Moser, R. P., & Weld, P. C. (2008). The Evaluation of large research initiatives. *The American Journal of Evaluation, 29*(1), 8–28. https://doi.org/10.1177/1098214007309280.

Wholey, J. S., Hatry, H. P., & Newcomer, K. E. (2004). *Handbook of practical program evaluation* (2nd ed.). San Francisco, CA: Jossey-Bass.

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