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Project ECHO® Evaluation 101: A practical guide for evaluating your program.

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PREFACE

Project ECHO® (Extension for Community Healthcare Outcomes) is a collaborative medical education model that aims to build workforce capacity in rural and underserved areas. Developed by clinicians at the University of New Mexico (UNM), the model is built upon four principles:

1. Use technology to leverage scarce resources;
2. Share “best practices” to reduce disparities;
3. Employ case-based learning and guided practice to support participants in mastering complexity; and
4. Monitor program outcomes.

Originally created with the goal of increasing access to care for hepatitis C in rural New Mexico, the ECHO model is now being used to address health care shortages all over the world and across diseases and specialties—ranging from autism care for children to palliative care for older adults.¹ The model relies on videoconferencing to link primary care clinicians in underserved communities (spoke sites) with an interdisciplinary team of specialist providers at academic medical centers (hubs) during virtual “teleECHO™” sessions, which include a brief educational lectures and case-based, experiential learning.²



People need access to specialty care for their complex health conditions.



There aren't enough specialists to treat everyone who needs care, especially in rural and underserved communities.



ECHO trains primary care clinicians to provide specialty care services. This means more people can get the care they need.



Patients get the right care, in the right place, at the right time. This improves outcomes and reduces costs.

Evaluations of the impact of the ECHO model have not kept pace with the growth of new and unique types of clinics. While there is some evidence that the model can successfully improve care for conditions other than hepatitis C, more evidence is needed to understand how model adaptations impact clinician effectiveness, as well as patient health, health care utilization, and health care costs.^{1,3} Understanding the impact of Project ECHO clinics on participants, the health of their patients, and the broader health care environment is critically important when making the business, economic or social case for the program. Moreover, evaluation findings can be used to engage stakeholders, adapt program activities, and ensure that scarce resources are invested efficiently and effectively.

Although there is clear value in evaluating ECHO programs, many new ECHO hubs report that they lack the time, funding, and/or expertise to carry out evaluation activities; yet, a great deal of valuable information on program implementation and impact can be gathered using limited resources. With a particular focus on supporting groups with relatively limited evaluation resources, this guide describes evaluation methods that can be used to examine the implementation, outcomes and value of Project ECHO clinics that aim to address a wide range of challenges related to health care access, delivery, treatment, and prevention, particularly in underserved communities.

WHAT TO EXPECT IN THIS GUIDE

The purpose of this guide is to support leaders of Project ECHO programs as they conduct basic program evaluations. A “one-size-fits-all” approach to evaluation is not possible given wide variation in the topics, audiences and settings of ECHO programs. **Instead, we (researchers and evaluators at The New York Academy of Medicine) aim to provide you (ECHO implementers) with practical information on evaluation techniques and best practices that can guide you in designing and carrying out your own evaluation, even when resources are limited.**

The guide was created using:

1. A review of best practices in program evaluation;
2. A review of published evaluations of Project ECHO programs;
3. Findings from interviews with leaders of ECHO hubs regarding their own evaluation experiences and recommendations; and
4. Advice from evaluation experts.

¹ For a full list of publications on the Project ECHO model, see list available on [Box.com](#).

INTRODUCTION

WHAT IS PROGRAM EVALUATION?

Program evaluation is the process of systematically examining the implementation, quality, impact and value of a program. Evaluations can take several forms (described below); this guide will primarily focus on “process,” “outcome,” and “economic” evaluations, as these are most likely to be relevant to ECHO hubs with limited evaluation resources.

Process evaluations

Process evaluations focus on how a program is implemented, including specific project activities, the number and characteristics of participants, and fidelity to the original program model.⁴ Information from a process evaluation may be used to demonstrate program accomplishments and explain outcomes. For some ECHO programs, process evaluation may be the principal focus because “outcomes” (for example, changes in patient health status) may be difficult to measure, may occur further into the future, or may be attributable to many factors, instead of one individual program.

Performance monitoring, meaning tracking program activities and regularly assessing whether the program is on target to meet its goals, can be a component of a process evaluation.⁵ Monitoring provides program managers and staff with real-time information on successes and challenges of implementation, enabling them to act quickly to address problems that arise.

Outcome evaluations

Outcome evaluations assess whether the program achieved its expected results within a given timeframe.⁶ Project ECHO outcome evaluations typically examine changes at the provider level (e.g., provider knowledge, self-efficacy, treatment practices, or professional satisfaction) or the patient level (e.g., health outcomes, health care utilization, or costs of care).

Economic Evaluations

Economic evaluations compare the expenses associated with implementing and delivering the program to the benefits or savings derived from it.⁷ Economic evaluations include cost-effectiveness analyses and return on investment (ROI) calculations. These types of evaluations can be particularly useful when “making the case” for the program to stakeholders (e.g., funders, insurers, and health care delivery systems), and when working to achieve a sustainable model for covering the costs of a program.

WHY SHOULD YOU EVALUATE YOUR ECHO PROGRAM?

- It is well-recognized that evaluation is essential in determining whether the Project ECHO model is effective in new settings or when new conditions or diagnoses are targeted, and you are likely familiar with the idea that “monitoring outcomes” is a core component of the Project ECHO model.

Implementers of Project ECHO® cite three primary benefits of assessing program impact:

1. Program improvement

Evaluation can inform decisions around program implementation, improvement, expansion and replication, for example, by providing program implementers with information on which aspects of their programs are successful and which can be improved.

2. Funding and sustainability

Findings can enable individual ECHO programs to demonstrate program outcomes to funders and provide data that can be included in grant proposals and other solicitations for continued or expanded funding.

3. Stakeholder engagement

Findings can be used to demonstrate the value of the program participation to potential participants and achieve greater buy-in from leaders of hospital systems, federally-qualified health centers (FQHCs), accountable care organizations (ACOs), and health plans.

CONSIDERATIONS BEFORE BEGINNING AN EVALUATION

Evaluation can seem daunting, especially when your team seems to have insufficient funding or evaluation expertise. Before getting started, you may want to anticipate the following challenges and work towards minimizing them.

FEASIBILITY AND SCALE

Timing, funding, evaluation expertise and data access will, in large part, dictate the scale of your evaluation; be realistic about the availability of each of these resources when planning your evaluation. For each step, assess whether the relevant data are (or will be) accessible, whether they can be analyzed with the resources available, and whether they will answer the questions that are important to you in the timeframe you have available.

Timing

It is best to design your evaluation while planning your program. Early planning allows you to build in systematic and practical processes for data collection and performance monitoring and facilitates the collection of baseline (or pre-implementation) data that may be used to assess change over time. Early evaluation planning can also strengthen the program design by providing clarity and direction to program objectives (see *Section 4.1: Clarify and Define Program Goals and Objectives*, below). However, regardless of planning, unforeseen challenges will inevitably arise during implementation, so you will likely need to revisit and adjust your plan over the course of the project.

Funding

Consider your budget before developing an evaluation plan. In ideal situations, dedicated evaluation funding can be included in the program budget. Although it might be difficult to think about allocating even a small amount of your scarce resources to activities other than program implementation, including evaluation expenses in an ECHO budget can be useful in the long run as it will enable your program to document successes, address unforeseen challenges, and advocate for a sustainable financing model. Some programs even report that they are hesitant to accept funding for ECHO without a portion dedicated to evaluation because, without evidence of effectiveness, making the case to sustain the program is too great a challenge. When not included in the original budget, some ECHO programs have successfully obtained complementary funding that is designated for evaluation from other sources.

For many programs, however, dedicated funding for evaluation is not a reality. This limitation will likely mean that the evaluation will be narrower in scope or will examine only a few aspects of the program, rather than the program as a whole. A limited evaluation can still generate very valuable information – you should not be deterred!

Whether you decide to evaluate your entire ECHO program or a single component, it is useful to consider:

- What funds do you have for evaluation?
- What capacity do you have to *collect data*, and how much staff time will this require?
- What capacity do you have to *analyze and report on the data*, and how much staff time will this require?
- What are potential barriers to accessing information and will the funding be enough to cover unforeseen challenges (e.g., a need for additional data, difficulty gaining access to data)?
- Can the evaluation be conducted with internal staff or will you need an external evaluator?

When the budget and the size of the project team are limited, integrating data collection into regular programmatic activities may help alleviate some of the burden inherent in evaluation. For example, you may already be collecting data like provider participation and number and type of case presentations for your own records, which are important for performance monitoring and process evaluation. Additional information is likely available in records or can be easily collected during clinic sessions, such as the number and type of case presentations, didactic topics and length of clinic sessions, and provider attendance.

Evaluation Expertise

The amount and type of evaluation expertise available to you will also influence the size and scale of your evaluation. Most ECHO programs are started by clinical teams at academic medical centers that do not have experience in program evaluation. Although some may have backgrounds in traditional clinical research, evaluation requires a different perspective and set of skills.⁸ Consider what expertise is missing from your team and whether colleagues in other departments within your institution or organization can offer support or resources. Support can range from actually conducting the evaluation (which will typically require payment to that department), to providing access to datasets with which they are already working, to simply offering guidance on the development of an evaluation plan or data collection instrument (e.g., a survey or a focus group guide). Alternatively, those with the resources to do so may choose to hire an external evaluator who will work with the program team to design and carry out an evaluation.

WORKING WITH EXTERNAL EVALUATORS

Some groups may prefer to hire an external evaluator to design and implement an evaluation. External evaluators may be an individual consultant, a nonprofit research institute, a university-based evaluator, or a consulting firm.

Potential benefits of working with external evaluators

- They have expertise and experience in designing an evaluation, and in conducting data collection, analysis, and reporting.
- They are often viewed by stakeholders as more objective because they have less of a stake in the success of a program.
- They bring their own team, which relieves some of the burden on program staff.

Potential challenges of working with external evaluators

- They may be limited in their understanding of the specific program goals, components and nuances.
- There will be additional costs (though the cost of an internal evaluation that uses staff time might be similar).

Tips on working with an external evaluator

- Be aware that staff will need to dedicate some time to working with the external evaluator to ensure that they have an accurate understanding of the program and that the evaluation addresses the needs of the program.
- Expect the cost of an evaluation to be from 10–25% of the cost of implementing a program, depending on the evaluation scope and design.

Data Access

Data availability is a key factor in determining the scope and scale of your evaluation. There are several data sources that might be used in evaluations of ECHO programs (see *Section 5: Data sources that are useful for Project ECHO evaluations*) and each of them has important benefits and challenges that must be considered during the planning process. Collecting your own data (“primary source”) will reduce challenges related to data access, but it requires significant staff time and some expertise to design data collection instruments, collect the data in a systematic fashion, and manage and analyze the data once collected. Alternatively, using data that is already being collected (“secondary source”) for another purpose, such as program administration, patient care, or payment (e.g., health insurance claims), reduces the staff effort required for collection. However, gaining access to external data sources can be challenging and analysis of these data can be complicated, requiring extensive data management and/or statistical expertise. Furthermore, there are often lags between when data is collected and when it is made available, which can prevent rapid analysis and reporting.

PROTECTIONS FOR PARTICIPANTS AND PATIENTS

Anytime data are collected or analyzed, especially in health fields, careful consideration must be paid to protecting the confidentiality of participants and patients. When conducting research on human subjects, approval from an independent review committee, known as an Institutional Review Board (IRB), is often required.ⁱⁱ IRBs are entities established to protect the rights and welfare of people (“human subjects”) who participate in research.

Universities and other institutions that conduct research on a regular basis usually have their own IRB. IRB submissions can be subject to full review, expedited review, or considered exempt, depending on the data being collected, perceived risk to participants, and purpose of the evaluation. In general, it is a good idea to check in with your IRB before getting started to determine the level of review needed for your evaluation.

ⁱⁱ Free training on the protection of human subjects in research is available through the National Institutes of Health at <https://phrp.nihtraining.com/users/login.php>. Completion of this or a similar training is generally required by IRBs. Check with your IRB to determine which training course will satisfy their requirements.

In making a decision as to the type and level of review required for an evaluation project, an IRB will consider the purpose(s) of your evaluation and your plan for disseminating findings.

➔ **Program improvement**

If you are conducting evaluation activities with the sole purpose of using the information to make adjustments and improvements to your program (quality assurance or improvement), your study might be exempt from IRB review. Ask your IRB administrator for more information.

➔ **Generating new knowledge to be shared with the broader community**

Approval from an IRB is generally required when your purposes are broader and you plan to share findings and lessons learned with a larger audience, often via a published report, article or presentation. Peer-reviewed journals increasingly require statements regarding IRB review be included in manuscripts considered for publication.

When reviewing your protocol, IRBs will focus on assessing risk(s) to participants. Privacy and security protections related to research on health programs and patients can be particularly stringent due to requirements to comply with the Health Insurance Portability and Accountability Act (HIPAA). Contact your IRB directly for more information on complying with HIPAA when conducting research on patient health.

TIPS AND TRICKS

WORKING WITH INSTITUTIONAL REVIEW BOARDS (IRB)

- **Contact the IRB**

If you are unfamiliar with the process for submitting a protocol, contact the IRB administrator to understand the process. A conversation with your IRB administrator will help you to determine which level of review (full, expedited, exempt) is most likely to apply to your evaluation plan.

- **Review protocols for other ECHO programs**

Consider reviewing the IRB protocols submitted by other ECHO programs to inform the development of your own. Some examples are available on Box.com, but you might also ask leaders of ECHO programs who used similar evaluation plans if they are willing to share their protocol.

- **Build in sufficient time**

IRB approval can take several weeks, depending on the institution and the type of information being collected. Ask an IRB administrator or others who have worked with your institution's IRB about the timeline for review.

DEVELOPING AND IMPLEMENTING AN EVALUATION PLAN

Creating a detailed evaluation plan is an important component of an evaluation. This plan should provide background information on your program, state your evaluation questions and how you will answer them, and describe your plan for using and sharing the information. Although you will likely adjust the plan over time, outlining your strategy during the early stages of implementation will help you to design an efficient and informative system of data collection.

In designing your evaluation, first consider the purpose of your evaluation and who the audience for the findings will be.

WILL RESULTS BE USED TO

- tweak the model and improve the program?

- make the case for sustainability to funders, policy makers, or other health care payers?

- recruit more participants, or to encourage health care facilities and systems that providing staff with the time to participate is worth the investment?

- understand the potential for program replication?

- inform the field more broadly?

Consider the perspective of various stakeholders and engage relevant partners throughout the evaluation planning process. These stakeholders may include ECHO program staff, specialists, or participants, as well as administrators of practices, FQHCs or ACOs, policymakers, health plans or funders. Not only can these stakeholders provide insight into the program objectives and what should be evaluated, but early and continued engagement will facilitate bidirectional communication and reduce the likelihood of surprises when the findings are reported.

The interests of stakeholders are not always obvious, especially in the case of Project ECHO. For example:

- Although you might assume that health insurance companies are interested in whether a program saves money, some are reportedly more interested in whether clinicians value participating in ECHO programs, since the company seeks to increase professional satisfaction among providers in order to retain high quality clinicians in their network.
- Some policymakers have expressed that, although numbers and costs are important, qualitative findings often resonate more because they provide humanistic detail and relatable stories regarding the program's impact on their constituents.

In the sections that follow, we describe steps to creating an evaluation plan, but it should be noted that the process is iterative. For example, the evaluation indicators you choose to use (step 2) will depend on program objectives (step 1) as well as the type of data that you will have available (which falls under step 3).

STEPS TO CREATING AN EVALUATION PLAN

1 Clarify and define program goals and objectives

2 Develop evaluation questions and indicators

3 Select evaluation approaches

CLARIFY AND DEFINE PROGRAM GOALS AND OBJECTIVES

Evaluation plans should flow directly from the intervention at hand, so it is important to have a thorough understanding of the problem being addressed and the program design. Begin by articulating your program goals and objectives.

- **Program goals** tend to be broad; they are generally not time limited or concrete. For many (though not all) ECHO programs, the program goal will be related to increasing access to or the quality of a specific type of specialty care (e.g., mental health care, hepatitis C care, etc.) in a particular community.
- **Program objectives** are specific and can be achieved within the timeframe of the project. Objectives can relate to activities required for effective program implementation (process objectives) or to outcomes that would be expected if the program were a success (outcome objectives).

Below are process and outcome objectives that could be relevant for various ECHO programs.ⁱⁱⁱ

- A total of 20 ECHO sessions will be conducted (bi-weekly) over the course of the calendar year.
- At least 75% of sessions will be “high quality,” defined as scoring 90% or above on the ECHO Facilitation Scorecard.
- At least 61% of patients with diabetes (aged 18–75) being treated at participating practices will have controlled cholesterol (defined as LDL cholesterol less than 100mg/dL) within one year of the start of the ECHO program.
- At least 87% of hypertensive patients (aged 18–85) being treated by clinicians at practices participating in ECHO for one year will have controlled blood pressure (i.e., systolic blood pressure less than 140 mm Hg and the diastolic blood pressure less than 90 mm Hg).
- Within six months of a practice joining the ECHO program, 72% of patients being treated in that practice who have newly diagnosed chronic obstructive pulmonary disease (COPD) will be diagnosed using a spirometry test.

ⁱⁱⁱ These examples are provided for illustrative purposes only; all objectives should be developed based on the individual program that is being evaluated. Examples were developed using quality targets reported by the Kaiser Foundation Health Plan of the Northwest (2014), which relied on the Healthcare Effectiveness Data and Information Set (HEDIS), a widely used set of health care performance measures created by the National Committee for Quality Assurance (NCQA).

TIPS AND TRICKS

SMART OBJECTIVES

Some experts recommend developing of **SMART** objectives, meaning objectives that are:

SPECIFIC: Objectives should be concrete and detailed; they state what will happen and who is responsible for making it happen.

MEASURABLE: Objectives provide clear information as to how success will be measured or defined.

ACHIEVABLE: Objectives should be feasible and easy to put into action.

REALISTIC: Objectives should take into account resource constraints, such as funding, personnel, and time frame.

TIME BOUND: A time frame helps to set boundaries around the objective.

Although the SMART guidelines are generally useful, it is worth noting that some objectives, such as participant satisfaction or self-efficacy, can be better examined through descriptions (i.e., qualitatively) rather than with numbers and statistics (quantitatively). For instance, although it may be interesting to know that a majority of clinicians would rate sessions as good or very good, it might be more useful to know which aspects of the program were most relevant, how they feel the program helped them, and where there are areas for improvement.

[See *Appendix E* for additional resources on developing of program objectives]

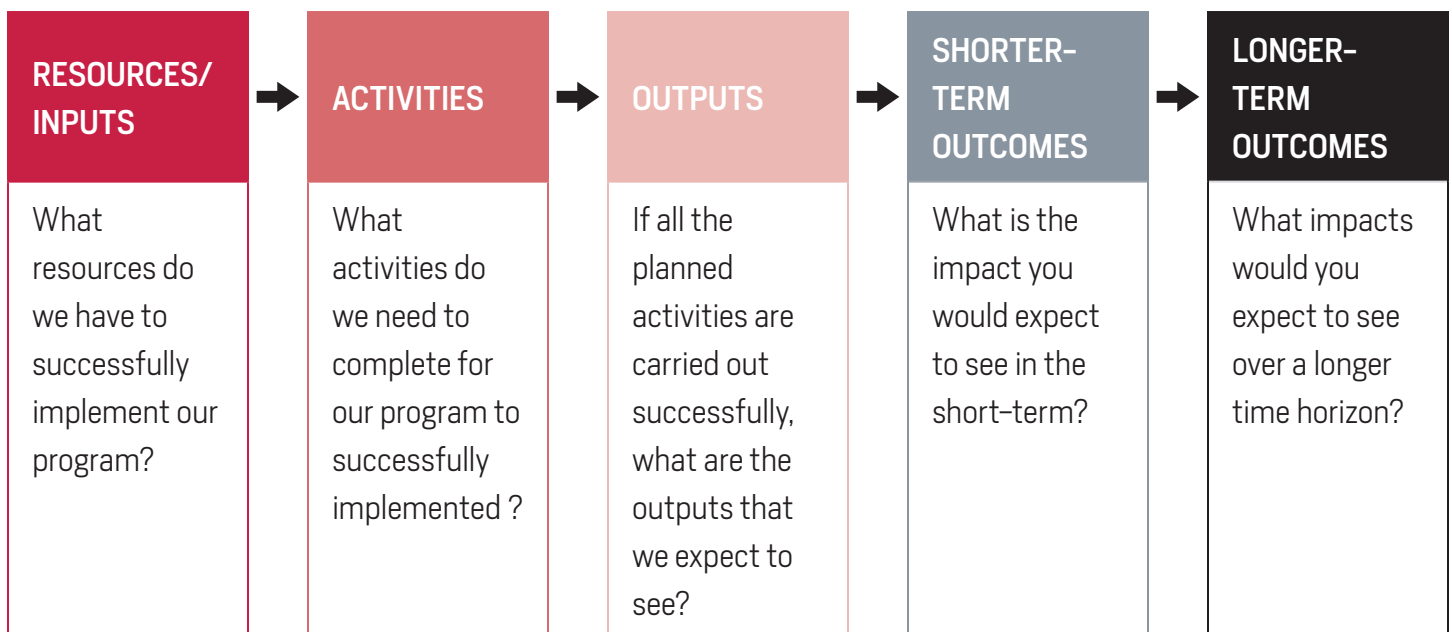
Tying it together: Logic Models

Logic models are useful tools for understanding and communicating the process through which your program aims to achieve its goals and objectives. They provide a structural framework for the evaluation and a visual representation of the relationship between a program's resources, planned activities, and expected outcomes that can be used for planning purposes.

FIGURE 1: LOGIC MODEL COMPONENTS

PROGRAM GOAL: The overall, long-term impact of your intervention on the broader community

PROGRAM CONTEXT: The health, economic, social, and political environment in which the program operates



Adapted from the W.K. Kellogg Foundation Logic Model Development Guide (2004)

Each component of the logic model contains activities, outputs or outcomes that can be tracked as part of an evaluation (see Figure 1). A process evaluation will examine the extent to which the actions outlined in the first three sections of the logic model (inputs, activities, and outputs) were accomplished, while an outcome evaluation will assess whether the last two sections (shorter, or long-term outcomes) were achieved.

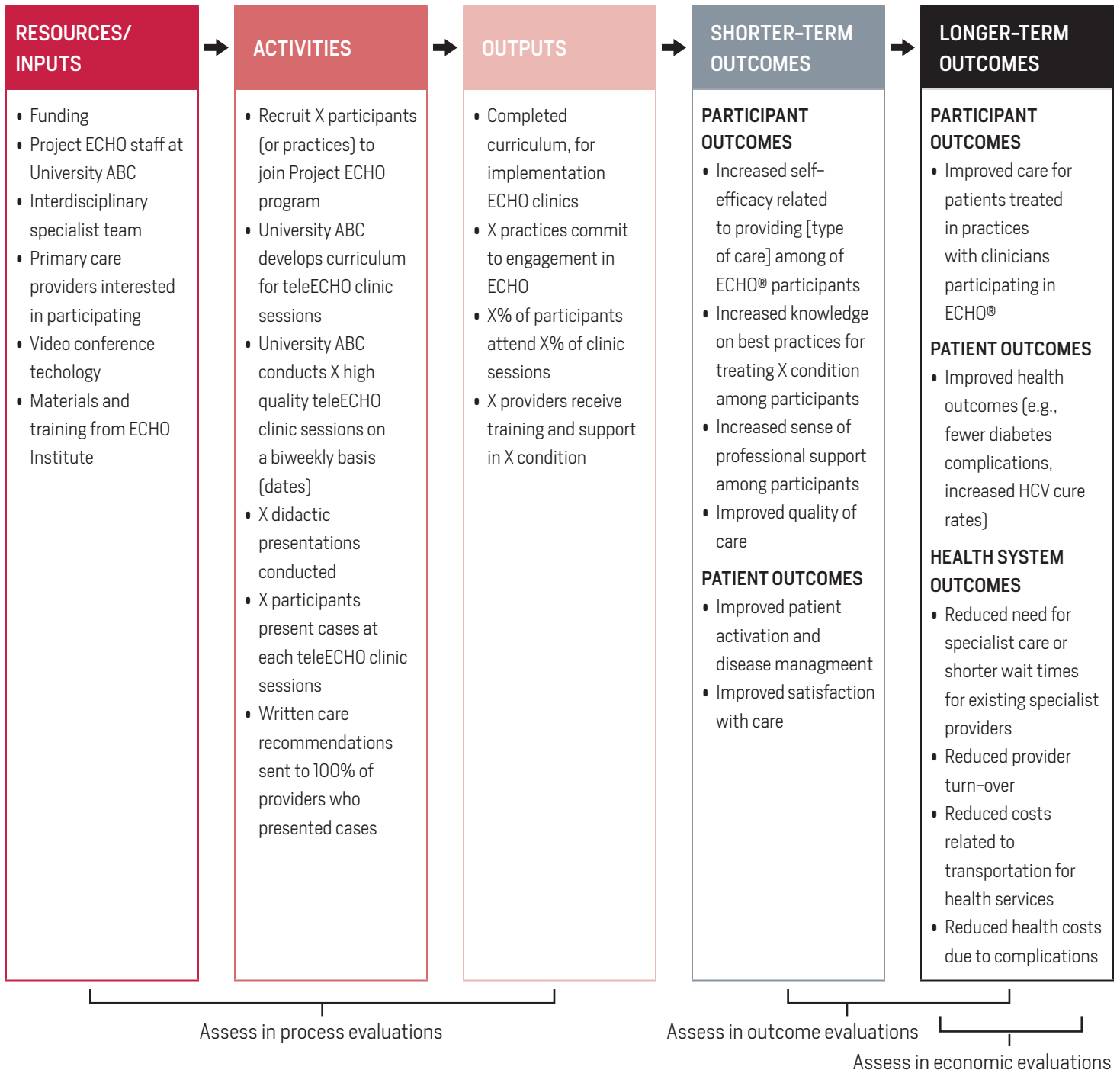
FIGURE 2: EXAMPLE OF A LOGIC MODEL FOR A PROJECT ECHO® PROGRAM*

PROGRAM GOAL:

- Increase access to high quality specialty care in underserved and rural communities
- Improve health and quality of life for patients living with X condition
- Create a more efficient and sustainable health system

PROGRAM CONTEXT:

- Disease patterns, clinician level of knowledge or training, health or health care disparities (e.g., health care providers have limited access to experts on X condition, high disease prevalence, etc.)



*NOTE: This example is for illustrative purposes only. Each program conducting an evaluation should develop a unique logic model adapted to fit the individual program. Adapted from the W.K. Kellogg Foundation Logic Model Development Guide (2004)

An economic evaluation examines the relationship between program costs and the outcomes articulated in the logic model. Note that the logic model and objectives can be effectively used to guide the remainder of the evaluation plan, so it is beneficial to obtain input from a variety of stakeholders.

Most ECHO programs focus on challenges related to limited access to specialty health care in a high-need community. As a result, logic models are likely to look similar, though each will need to be adapted to fit the unique aspects of program design and the targeted health condition. Figure 2 provides a general example of the types of information that might go in a logic model for Project ECHO.

[See *Appendix E* for additional resources related to developing and utilizing logic models]

DEVELOPING EVALUATION QUESTIONS AND INDICATORS

Evaluation questions are those questions you hope to answer through evaluation. They will be used to guide the remainder of the evaluation plan. Often, the main question is “did the program work?” In other words, did it result in the changes that were hoped for, and did it have the intended outcomes? If the program did work, you might also want to know how well it worked, for whom, and whether it was worth the investment. If it didn’t work, you might want to explore why and whether the problems seem solvable. Clearly defined program objectives and a detailed logic model will support you in articulating your evaluation questions and determining what information is needed to answer them.

Identify specific evaluation questions

Each component of the evaluation requires a clear and specific evaluation questions (see Table 1).

TABLE 1: EVALUATION TYPES AND SAMPLE QUESTIONS

EVALUATION TYPE	SAMPLE EVALUATION QUESTIONS FOR ECHO	TIMEFRAME FOR ANALYSIS AND REPORTING
<p>Performance monitoring/ Process evaluation</p>	<ul style="list-style-type: none"> • Was the program implemented effectively? <ul style="list-style-type: none"> – Has engagement and retention of clinicians reached expectations? – Are participant characteristics (e.g., type of clinician, geographic location of practice) consistent with program objectives? – Were ECHO program activities implemented successfully? (e.g., were sessions perceived as high quality? Were topics relevant to the audience? Were sessions implemented on a timely basis?) • Which components of the program have been successful? • What aspects of the program need improvement, and how can improvement be achieved? 	<p>Process evaluation and performance monitoring begin while the program is still in its early phases so that adaptations can be made and suggestions for improvement incorporated. However, monitoring of activities and quality should be ongoing throughout the life of the program.</p>

Outcome evaluation	<ul style="list-style-type: none"> • Do providers participating in the ECHO program have improved knowledge, confidence, and treatment practices related to the targeted condition? • Does provider participation in Project ECHO improve health outcomes for patients? • Does the implementation of a Project ECHO clinic increase access to high-quality care for the target condition? • Have health care costs for patients with the condition changed as a result of the ECHO program? 	<p>Final analyses for outcome evaluations take place when program activities are complete, but preliminary analyses can be completed at regular intervals throughout the project timeframe (e.g., every six months, the end of a grant period, or the end of a curriculum cycle).</p>
Economic evaluations	<ul style="list-style-type: none"> • Was this ECHO program cost-effective? • What was the return on investment for this ECHO program? • How much did it cost to treat patients using the ECHO model compared to usual care? 	<p>Economic analyses should be conducted in conjunction with or after outcome evaluations so that outcomes can be taken into account when analyzing program value.</p>

Adapted from Centers for Disease Control and Prevention. Types of Evaluation. Available at: <https://www.cdc.gov/std/Program/pupestd/Types%20of%20Evaluation.pdf>. Last Accessed: December 2, 2016

Performance monitoring and process evaluation questions focus on whether the program is being implemented as intended and can be asked throughout the evaluation. The answers to these questions are useful for quality improvement and provide insight around which components of the program are working and which need adjustment. They also provide necessary information for reporting and replication.

Outcome evaluation questions look at what changed as a result of the program. Moore, Green and Gallis⁹ propose a seven-level “Expanded Outcomes Framework” for evaluating physician-training programs that is useful for considering ECHO evaluation. In their proposed framework and in most ECHO evaluations, outcomes relate to impact on clinicians, their patients, and/or the broader health system. Table 2 provides an overview of the framework and how it can be adapted to Project ECHO evaluations.¹⁰

Economic evaluation questions focus on program costs and how they relate to program benefits (financial and other). Answers to these questions can be useful for “making the case” for program sustainability and ongoing funding. Note, however, that not all ECHO programs will result in cost reductions – in fact, some ECHO programs may increase costs by improving access to and utilization of health care (especially in the short-term). For instance, increasing access to hepatitis C care will the number of people receiving high cost medications. Although long-term health care costs for these patients might be lower (as hepatitis C is cured and less medical care is needed over the lifespan), a short-term economic evaluation is likely to find higher expenditures compared to a status quo in which few people are receiving the treatment they need.

**TABLE 2. MOORE’S EXPANDED OUTCOMES FRAMEWORK ADAPTED
FOR PROJECT ECHO**

LEVEL	CONSTRUCT	DESCRIPTION ADAPTED FOR PROJECT ECHO	POTENTIAL DATA SOURCE (FOR LOW RESOURCE GROUPS)
1	Participation & engagement	The number of clinicians who attend or participate (e.g., present cases) in each clinic session.	Program records (e.g., iECHO)
2	Satisfaction	The degree to which participants expectations of Project ECHO were met.	Clinic evaluation surveys completed after each session; key informant interviews
3a	Learning (Declarative)	The degree to which participants can reiterate the information provided in Project ECHO sessions.	Survey assessing knowledge, key informant interviews
3b	Learning (Procedural)	The degree to which participants can describe how they will apply the lessons conveyed during Project ECHO.	Surveys assessing behavioral intent, key informant interviews
4	Learning (Competence)	The degree to which participants are confident in their ability to apply the lessons from Project ECHO.	Self-efficacy questionnaires, key informant interviews, focus groups
5	Performance	The degree to which participants in ECHO apply Project ECHO lessons when treating patients.	Surveys, key informant interviews, focus groups, chart review, claims data
6	Patient health	The degree to which the health status of patients improve due to changes in treatment practices of Project ECHO participants.	Chart review, claims data, surveys or interviews with patients
7	Community Health	The degree to which Project ECHO impacts health and health care trends and patterns in the broader community.	Claims data, quality measures (e.g., HEDIS, MDS), key informant interviews, administrative records, community surveys

Adapted from Moore, D. E., Green, J. S., & Gallis, H. A. (2009). Achieving desired results and improved outcomes: integrating planning and assessment throughout learning activities. *Journal of Continuing Education in the Health Professions*, 29(1), 1-15.

DO'S AND DON'TS FOR DEVELOPING EVALUATION QUESTIONS

DO: *Consider the audience for your findings.*

Think about how evaluation findings will be used and by whom.

DON'T: *Assume you know stakeholders' interests without asking them.*

Engage stakeholders in the planning process to find out what they are interested in learning from the evaluation.

DO: *Keep it simple.*

Avoid over-committing and getting in over your head. Think about what aspects of your program are most important to evaluate and what is feasible, and stick to them. Simple, clear, and focused evaluations can provide valuable information and will be carried out more effectively than complex studies, especially when resources are limited.

DON'T: *Ask questions that cannot be answered within the timeframe of the evaluation.*

This is a common mistake made by groups without evaluation experience. Many questions, such as: "Did prevalence of lung cancer decrease as a result of my ECHO program on smoking cessation?" would take a number of years to answer. This type of question focuses more on program goals than time-limited objectives, and may be inappropriate for a short-term, low-resource evaluation.

[See *Appendix E* for additional resources related to creating evaluation questions]

Identifying Indicators

Once you have focused your evaluation, think through what type of information or evidence you will need to answer your evaluation questions. For each component that you want to measure, you will need to select a unit of measurement, often called an indicator or metric, which can tell you whether a particular activity or outcome was accomplished.¹¹ Like most aspects of evaluation, the indicators you select will depend on your questions, as well as funding, staff capacity, available expertise, and data access.

Examples of *process* indicators that have been reported in ECHO evaluations include:

- Number of program participants in attendance at each teleECHO session
- Average number teleECHO clinic sessions attended by each participant
- Number of teleECHO clinic sessions held in a calendar year
- Number of teleECHO clinic sessions attended by each member of the specialist team
- Percentage of participants who presented at least one case during a teleECHO session.
- Rating of teleECHO clinic session according to the ECHO Facilitation Scorecard^{iv}
- Number of technology problems reported by participants
- Frequency of didactic presentations that cover topics inline with program objectives

^{iv} The ECHO Facilitation Scorecard identifies essential components of high-quality ECHO clinic sessions. The latest version can be found in Project ECHO's Box.com folder and can be used as part of performance monitoring and process evaluation.

DO'S AND DON'TS FOR SELECTING INDICATORS

DO: *Choose indicators that are relevant for your program objectives and evaluation questions.*

There should be direct links from your program's objectives to your evaluation questions to the indicators you select to answer those questions. Avoid indicators that are heavily impacted by factors unrelated to your ECHO program.

DON'T: *Choose indicators that fall outside of the timeframe of the project.*

Similar to developing research questions, avoid indicators that are likely to occur far into the future and, thus, will not produce useful evaluation findings. For example, a pediatric hypertension ECHO program is unlikely to reduce the rate of heart attacks within a timeframe that can be reasonably evaluated.

DO: *Choose indicators that can be collected using available data sources.*

Unfortunately, access to data can be a major challenge in evaluations. Regardless of how relevant a particular indicator is, each must have a data source in order to be used.

DON'T: *Focus too much on indicators that are rare or have multiple causes.*

This common mistake can prevent you from detecting changes related to your program. Gathering sufficient data on events that are rare (e.g., foot amputations related to diabetes, infant mortality) is expensive and likely not feasible within the timeframe of your evaluation project. Instead, consider relevant indicators that are clearly linked to (or precursors of) those ultimate program outcomes (e.g., number of diabetic patients with controlled blood sugar levels, or number of parents who report placing infants on their back to sleep).

Examples of *outcome* indicators reported by ECHO programs include:

- Rate of antipsychotic prescriptions filled by older adults with geriatric mental health conditions
- Percent of older adults who were physically restrained in the last 90 days
- Average score on the Patient Health Questionnaire (PHQ-9)[▼] score of patients treated by ECHO providers

Examples of *economic* indicators for ECHO programs include:

- Total cost of care for patients of participating providers who have the targeted health condition
- Costs of emergency room visits for pediatric patients of ECHO participants who have a diagnosis of asthma
- Costs accrued due to 30-day hospital readmissions among patients with heart failure who are treated by participants in Project ECHO

HARMONIZED METRICS: POWER IN NUMBERS

Project ECHO stakeholders have discussed the development of a set of harmonized metrics that all ECHO programs can use as part of their evaluation. This would likely be a set of specific survey questions assessing participant outcomes that are common across most (though not all) ECHO programs, such as reduced professional isolation or improved professional satisfaction. The use of harmonized metrics would enable researchers to conduct an evaluation of the ECHO model using a large sample (which is important for statistical significance) and data across ECHO programs. Ideally, these questions could be incorporated into the ECHO technology platform to facilitate data collection and ensure consistency across programs. Contact the ECHO Institute for an update on the status of the development of harmonized metrics.

[See *Appendix E* for additional resources related to selecting indicators.]

[▼] The PHQ-9 is a validated instrument for screening, diagnosing and monitoring the severity of depression.

SELECTING EVALUATION APPROACHES

Once you have identified indicators, it is time to design a strategy for collecting your data in a manner that will answer your evaluation questions. This involves considering sources of relevant data and evaluation design approaches.

Data Sources

All indicators used in the evaluation will need a data source and a method of obtaining or collecting the information described in the indicator. For example, you will need to consider how to obtain information on the number of participants in ECHO sessions or the number of providers who complete autism screenings with pediatric patients.

The feasibility of obtaining data, costs associated with gaining access, and quality of the data (e.g., completeness, accuracy) all vary depending on the data source. Here, we broadly discuss types of data sources, and the benefits and challenges for each. In *Section 5: Data sources that are useful for Project ECHO evaluations*, we provide additional detail on various sources of data and the benefits and challenges to using each.

Quantitative Evaluation Methods

Quantitative data includes information that is reported numerically (e.g. weight, blood pressure, number of hospitalizations, participation rates, health care costs) as well as information that is counted or measured for analytic and reporting purposes (e.g. scores on a survey, proportion of participants with a particular characteristic).

Because they rely on numeric information, quantitative methods lend themselves to:

- Assessment of whether specific targets were met;
- Comparisons between groups; and
- Broader generalizations (or assumptions) around the impact of the program.

For example, you might assess whether the average number of participants in teleECHO sessions increased over time to evaluate the success of participant engagement efforts, or compare scores of ECHO participants and non-participants on a hypertension knowledge survey to determine whether participants learned

TIPS AND TRICKS

SELECTING AND COLLECTING DATA

- **Collect data systematically**

The quality of your data is key to the credibility of the findings that you report. Collecting data in a systematic fashion will increase confidence that the data is comprehensive and accurate.

- **Plan ahead**

Think about data needs prior to starting the project and integrate data collection into the project infrastructure. Early planning can enable you to collect data efficiently and systematically from the start.

- **Choose quality over quantity**

Consider data completeness and quality—a small amount of good data is better than a large amount of bad data.

- **Balance evaluation goals and data access**

Selection of data sources is an iterative process. Indicators should inform data sources, but access and quality may in turn limit the indicators that you can choose and the methodologies available.

- **Consider the rigor**

The most rigorous evaluation methods will increase confidence that the results you find are, in fact, due to your program. However, very rigorous evaluations can be more complex and costly to conduct; determine what level of rigor your evaluation requires based on the needs of your stakeholders, the audience for your findings, and your realities around funding, expertise, and data access.

- **Store data securely**

From the beginning, create and maintain a system that ensures that data is stored securely and that protects the privacy and security of both participating clinicians and their patients.

important lessons from teleECHO sessions. This data is analyzed using a variety of statistical techniques that range in complexity (see *Section 6.1: Quantitative Analysis for more information*).

Although quantitative data is often useful, many important aspects of programs cannot be quantified; sometimes, numerical data provide only a partial story that lacks sufficient insights into why a certain outcome did or did not occur. For example, using quantitative data, you may learn that 80% of ECHO participants experienced an increase in self-efficacy, or that 50% of patients experienced a particular health outcome after their health care provider joined ECHO. However, these findings do not elucidate which program components most contributed to participants' increase in self-efficacy, or how providers relied on the program to improve patient health outcomes.

Qualitative Evaluation Methods

Qualitative data, which are centered on words rather than numbers, offer detail-rich information that describes or explains findings and allows for more nuanced reporting, thereby helping to address the concerns noted above. These data can provide information on the reasons certain outcomes were or were not achieved, as well as insight into unexpected consequences of the program and barriers or facilitators of program success or failure. In addition, qualitative data allow you to:

- Engage program participants, staff and others in the evaluation process;
- Effectively utilize data from a small sample of participants; and
- Collect information for case studies and testimonials that may be useful for sustaining your program.

Qualitative data are best collected via interviews or focus groups, when follow-up questions can be used to encourage participants to elaborate on topics and explore themes, though open-ended survey questions may also be used. Interview and focus group data should be recorded and transcribed. Transcription can be completed internally or outsourced to a company that provides transcription services. Data are analyzed through techniques that systematically identify important patterns and themes. For more information on analyzing qualitative data, see *Section 6.2: Qualitative Analysis*.

Primary and Secondary Evaluation Data

“Primary source” data are newly collected, specifically for the purpose of evaluation. In Project ECHO evaluations, these often include surveys, interviews, and focus groups developed or conducted for evaluation purposes.

“Secondary source” data are those that are collected for another purpose and are being “repurposed” for the evaluation. Program records from ECHO clinics that collect information on attendance, topics covered, and case presentations are often a useful source of secondary data, as are health insurance claims, lab tests, publicly reported quality metrics, and electronic health records.

See *Section 5: Data sources that are useful for Project ECHO evaluations* for more information on various methods of collecting data for Project ECHO evaluations. Also, see *Appendix A* and *Appendix E* for more information on data collection methods.

Selecting a Design

In conjunction with choosing data sources, you must decide on an evaluation design. For process evaluations, this might simply mean thinking through the frequency of data collection and analysis. However, for outcome evaluations, design may be more complex as it will influence the level of confidence that stakeholders will have in your findings. This is because certain designs allow you to more reasonably attribute the changes you see in participating providers or their patients directly to your program and rule out other factors that may also impact outcomes (see Table 3, Page 34).

Pre-Post Designs

Most low-resource evaluations rely on pre-post designs, meaning that data are collected from participants before the program is implemented (“pre” or baseline), and again after the program is implemented (“post” or follow-up). Pre and post data are then compared in order to assess whether any changes took place. In ECHO evaluations, this often means surveying participants about their knowledge, treatment and referral practices and/or professional training prior to implementing Project ECHO, and again after they participated in the program. It might also mean examining secondary data (e.g., claims data, EHRs) from before and after the program to examine changes in treatment practices and health outcomes.

Although pre–post evaluations are a great place to start when it comes to evaluating ECHO programs—and are very common in evaluation generally—your ability to confidently draw conclusions from them may be limited because you cannot be certain that changes are attributable to your specific program. It is possible that forces external to the program caused the changes. For example, in New York State, local health reform efforts are encouraging practices to shift towards a value-based health care system, which could cause significant changes in outcomes of interest to ECHO evaluators, such as patient health outcomes, health care costs, and professional satisfaction among participants, regardless of their participation in ECHO. Thus, in an evaluation of the program, it may appear that Project ECHO participants increased their job satisfaction and patients fared better, when in reality this may have been a trend for all providers and patients in the community due to other health reform initiatives.

Another danger in using pre–post designs is the fact that, in general, data that is below or above average will be closer to the true average the next time it is measured. This phenomenon is often called regression to the mean and may also limit your ability to attribute improvement in scores after the program to the ECHO program itself. So, for example, if you survey ECHO participants before they begin participating in ECHO and they seem to have very low levels of knowledge related to providing care for patients with your targeted condition, than the next time they are surveyed, they are likely to be closer to average, even with no intervention.

Loss to follow up, meaning the inability to collect follow–up data for all individuals in the baseline sample, is also a limitation of pre–post designs that rely on primary data. Offering incentives can be helpful in increasing retention. Alternatively, it may be more realistic to conduct analyses that aggregate baseline data and follow–up data so that tracking individual participants is not required. In other words, you could compare the mean score on a knowledge survey among participants who completed the survey at baseline to the mean score on the survey at follow–up, even if the individuals in each group were different.

Designs Using Control or Comparison Groups

A widely accepted method for increasing confidence in your evaluation findings is collecting the same data from a control or comparison group that you collect from participants in the program. Control or comparison groups consist of individuals who are similar to those receiving the intervention (e.g., participants in Project ECHO) but

have not participated in the program. These individuals may be on a waitlist, practice outside of your program's catchment area, or simply have chosen not to participate (though it is worth considering whether this means they are inherently different than those who did choose to participate, known as "selection bias").

Unfortunately, obtaining data for a comparison group can be difficult, time consuming and costly. When using primary data, this design requires data collection from two groups (which requires effort dedicated to recruitment and resources to provide participation incentives). When using secondary data, finding a control or comparison group will likely require access to a broader range of data, as well as additional analytical or statistical expertise to ensure the comparison group is well-matched to the population of ECHO participants.

Retrospective Designs

You may decide to evaluate your ECHO program after implementation has already begun, which prohibits the collection of baseline data. Some design options that work retrospectively include:

- **Reflective surveys**

Using surveys, you can ask participants to compare their current knowledge, self-efficacy, or treatment practices to those before they began the program. For example: *Compared to 6 months ago, my current level of confidence in my ability to accurately diagnose [x] condition is ...* This design is especially useful for measuring concepts like knowledge and self-efficacy, as evaluators have found that participants often do not realize how much they did not know until after they participated in the program.

- **Qualitative interviews or focus groups**

Using interviews or focus groups, you can directly ask participants for their perspectives on and descriptions of how the program influenced their practice and that of their colleagues, as well as any noticeable changes in patient health outcomes.

- **Secondary data**

Use secondary data that cover the full span of your project (e.g., health insurance claims data, electronic health records).

Although these designs can be useful, note that retrospective evaluations that use primary data collection are subject to "recall bias," as they rely on the ability of respondents accurately recall their prior experiences and perspectives.

Mixed Method Designs

Ideally, evaluations should consist of multiple data sources that employ both qualitative and quantitative methods; these multi-component evaluations are often referred to as *mixed-method evaluations*. Not only does a mixed method approach provide a more comprehensive and precise understanding of a program and its outcomes, it also can increase confidence that your findings are valid. This is because using a mixed method approach allows you to “triangulate” findings, which means comparing and linking findings from different sources and different perspectives when drawing conclusions about your program (see Figure 3). Doing so will strengthen your evaluation and make your findings more useful to you and your stakeholders.

FIGURE 3: TRIANGULATION OF FINDINGS IN MIXED METHOD EVALUATIONS

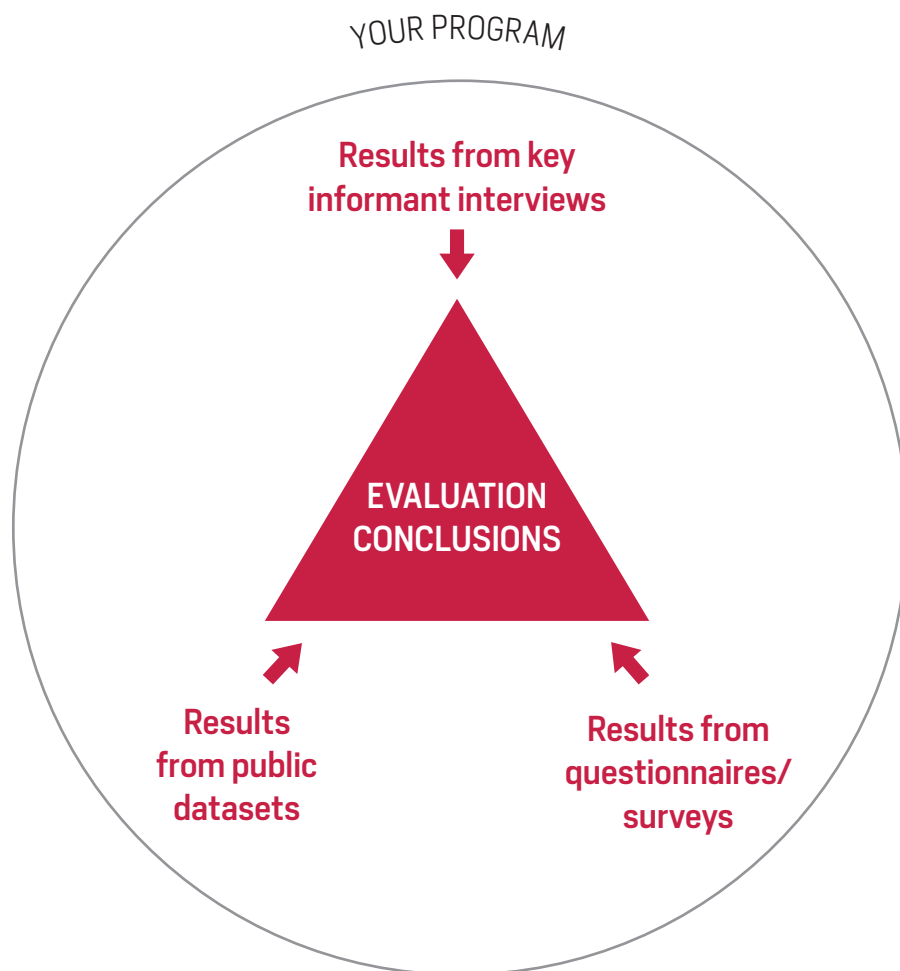


TABLE 3: ADVANTAGES AND DISADVANTAGES OF EVALUATION DESIGNS

EVALUATION DESIGN	DEFINITION	ADVANTAGES	DISADVANTAGES
Pre-Post	Collecting data from before and after a program was implemented.	<ul style="list-style-type: none"> • Lower cost • More objective assessment of changes resulting from the program 	<ul style="list-style-type: none"> • Cannot be certain that changes identified were due to program participation (and not external factors) • Uncertain results due to loss to follow-up
Control or Comparison Group	Collecting data from individuals who received the intervention (e.g., participated in Project ECHO) and from a similar group of people who did not receive the intervention.	<ul style="list-style-type: none"> • Greater confidence that observed changes were a result of participation in your program 	<ul style="list-style-type: none"> • Higher cost • Often difficult to access data on non-participants, especially primary data • Challenges related to carefully matching intervention and control groups
Retrospective	Collecting data only after program was implemented.	<ul style="list-style-type: none"> • Lower cost • Can be planned after implementation has already begun • Reflective questions may be more accurate for measuring certain indicators (e.g., competence) 	<ul style="list-style-type: none"> • Cannot objectively assess changes over time • Subject to recall deficiencies and bias
Mixed method	Utilizing data from multiple sources to identify and corroborate evaluation findings	<ul style="list-style-type: none"> • Greater confidence in the validity of findings • Greater flexibility if unforeseen challenges arise with one component of the evaluation • Ability to report findings in ways that resonate with different audiences 	<ul style="list-style-type: none"> • Each additional data source increases costs associated with data collection and/or analysis

[For additional resources on evaluation designs, see *Appendix E*.]

IMPLEMENT THE EVALUATION

After carefully planning your evaluation, it is time to actually implement it!

If using primary data, this means:

- **Obtaining IRB approval**

Be sure to leave a sufficient amount of time for approval, as some IRBs require several months to review and make a decision on protocols.

- **Finalizing data collection forms and protocols**

Ensure that all recruitment materials data collection tools are approved by the IRB. Print any relevant forms, develop and pilot-test surveys, assign data collection and data management roles, and ensure privacy protections are in place.

- **Training data collection staff**

Train all staff members engaged in data collection; be sure they are familiar with the overall goals of the evaluation, the data collection tools, and best practices for collecting the data. Aim for questions (and follow-up questions) to be asked in a consistent manner; anticipate issues that are likely to come up during data collection and train staff to handle them appropriately.

- **Recruiting evaluation participants (from whom data will be collected)**

Plans for recruitment should be outlined in your IRB protocol. Recruitment of ECHO participants usually entails an announcement during a teleECHO session requesting participation and several emails or phone calls (initial and follow up) to participants requesting their permission to be surveyed interviewed, or to attend a focus group. The process of recruiting patients for data collection efforts tends to be more time-consuming and expensive due to privacy considerations. If planning to recruit patients, begin by engaging providers (for access to patients) early in the evaluation process. Regardless of whether you are engaging program participants or their patients, be sure to collect any required consent forms in advance of data collection.

- **Collecting the data**

Engage participants and gather your data. Use incentives to encourage participation, be flexible and persistent (but avoid nagging or harassing providers), and take steps to make participation as easy as possible.

If using secondary data, implementing the evaluation may mean working with partners to develop a concrete plan and procedures for data access, data security, and data analysis. It will also mean taking the time to understand the data and its structure and limitations. Be flexible with your analysis plan and understand that it may change depending on the availability of data.

TIPS AND TRICKS IMPLEMENTING YOUR EVALUATION

- **Use project management tools to get and stay organized**
Consider using project management tools and resources to be sure the evaluation stays on track and on time, and that all members of the evaluation team understand their role and responsibilities. For example, GANTT charts are a recommended method of visually representing a schedule and timeline for work to be completed.
- **Manage your data**
Thinking about data management and analysis before and during data collection will save time in the long run. For example, collecting data electronically saves time on data entry, and structuring program records (such as case presentation forms) strategically will allow for easy data extraction.
- **Plan, plan, plan – and then do**
Embarking on an evaluation can seem overwhelming, and planning it out carefully is important. However, it is important not to get “lost in the weeds” worrying about a perfect data collection method and the most rigorous evaluation design. Evaluations, especially those being conducted on a pilot program or with few resources, take place in the real world and are rarely perfect – they still provide important information.

(continued PG 37)

TIPS AND TRICKS: IMPLEMENTING YOUR EVALUATION (cont.)

- **Analyze early and often**

If you have to wait until the end of the project for evaluation results, you are likely to miss important learning (and reporting) opportunities. Conducting preliminary analyses can allow you to understand if your data collection approach and tools are working, while also providing useful data that demonstrate ongoing accomplishments. Even if you must wait for “post” survey results to measure outcomes, pre surveys provide important information on participant characteristics and baseline needs.

- **Revisit and adjust**

Planning is important, but if basic assumptions of your program or your evaluation change over time (for example, lower than expected participation rates), then your evaluation plan should change too. You may want to adapt your evaluation to better understand why the program changed the way it did, and how that affected participants' experience in the program. Furthermore, if participation rates are low, you might want to focus on qualitative rather quantitative research methods.

DATA SOURCES THAT ARE USEFUL FOR PROJECT ECHO EVALUATIONS

Choosing your data sources is one of the most important decisions you will make in your evaluation. The type of data used in an evaluation must be consistent with the research questions and the kind of analyses that can be done. Each type of data comes with benefits and challenges that should be carefully weighed before being incorporated into an evaluation plan. Here, we describe a number of sources for evaluation data. This list is not exhaustive; instead, it is a list of those data sources that have proven useful in lower-resource ECHO evaluations. For information on real-world examples of the use of these data sources in ECHO evaluations, refer to *Appendix A*.

PRIMARY DATA SOURCES FOR ECHO EVALUATIONS

Primary data sources are those collected specifically for evaluation purposes. We describe below several types of primary data sources that have been used as components of evaluations of Project ECHO programs. Note that data collection can be time consuming for both program staff and participants; therefore, you should carefully consider available resources when selecting primary data sources.

Interviews

Interviews are a useful way to gather qualitative data from a variety of stakeholders. They involve asking open-ended questions and getting answers from participants. Interviewees are asked to reflect on previous experiences, report on changes in their knowledge, attitudes, or behaviors, and consider how the program could be improved in the future. Although subject to bias (meaning that individuals' recall or reporting may not be true or accurate), the detailed data collected through interviews can provide valuable information on how and why a particular program worked or did not work.

As with all data collection methods, your overarching evaluation questions and objectives will guide the interview process; they determine who you will want to interview (e.g., program administrators, providers, other staff) and what questions to ask. For process evaluations, questions might focus on implementation activities, challenges, successes, and areas for improvement. Outcome evaluation questions might focus on changes in knowledge, self-efficacy, treatment practices, and patient health. In addition, with sufficient funding, patients can be interviewed regarding health outcomes and their perceptions of Project ECHO.

Interviews can be conducted in person, via phone, or via videoconference after the program has been implemented and interviewees have had sufficient experience with it to provide feedback and reflection. Before the interviews, you will need to develop an interview guide containing open-ended questions and prompts (also called “probes”) that encourage full responses and clarification. It is important to note that, this document should truly be a guide: it is recommended that interviews are conducted in a conversational manner. Thus, depending on responses, interviewers should feel comfortable adlibbing follow-up questions, or asking for more detail on a particular response.

Interviews are generally audio recorded and transcribed (with the permission of the participant), which ensures that all information is accurately captured and helps you to analyze the data systematically (see Analysis Section.) However, if there is not sufficient funding for transcription, (either by existing staff or an outside transcription company) detailed note-taking can be used to record themes that arise.

Benefits and challenges of using interviews include

BENEFITS

- Can be used for collecting nuanced data that cannot be easily quantified
 - No baseline required; can be used for programs that have already been implemented or have been in existence for a long time
 - Provides an opportunity to engage with stakeholders
-

CHALLENGES

- Can be time consuming, both in terms of conducting the interviews and analyzing the data
- Scheduling time to conduct the interview can be a challenge, particularly for providers
- Privacy may be of concern, especially when interviewing patients
- All data are self-report and therefore susceptible to bias

For examples of ECHO evaluations utilizing interview data, see *Appendix A*.

For additional resources on conducting interviews for the purpose of evaluation, see *Appendix E*.

Focus Groups

Focus groups involve group discussions. They usually have 6–12 participants and last between one and two hours. By engaging multiple people in a shared discussion, focus groups encourage self-disclosure and data richness as participants build on and react to comments made by others. Although focus groups are not good for eliciting detailed accounts from specific individuals, the group format often facilitates a level of information sharing beyond what might occur through individual interviews.

Focus groups are led by a facilitator who follows a focus group guide that contains questions meant to frame the discussion. The facilitator asks follow up questions and

probes, when necessary. Although funding may dictate the number of focus groups you can conduct, groups will ideally be conducted until you reach “data saturation,” meaning the same themes arise in each new group and no new themes are identified.

Similar to interviews, you will want to develop a focus group guide specific to your program and your evaluation questions. The guide should consist of open-ended questions, along with any anticipated follow up questions for clarity (probes). Facilitators should be very familiar with the guide and with the project so they can follow-up on important points, quickly respond when participants provide unanticipated information, and ensure the discussion stays on track.

Below are some benefits and challenges of using focus groups in an evaluation.

BENEFITS

- Fairly efficient way to collect qualitative data from multiple people at once
- Provides rich, nuanced data, as participants bond with one another and build off each other’s comments
- Useful method of assessing how program participants prioritize ideas, or which ideas generate the most enthusiasm or traction.

CHALLENGES

- Facilitation requires training and experience
- Limited generalizability beyond those engaged in the group(s)
- Data are time consuming to analyze
- Individual personalities can influence group processes and perceptions, biasing the results

For additional detail and advice around using focus groups in ECHO evaluations, see *Appendix C*. For examples of previous ECHO evaluations that utilized focus groups, see *Appendix A*. For additional resources on conducting focus groups for the purpose of evaluation, see *Appendix E*.

TIPS AND TRICKS

COLLECTING DATA VIA INTERVIEWS OR FOCUS GROUPS

- **Consider who is best suited to conduct the interviews or facilitate the focus groups.** When possible, avoid using someone who is intimately involved in administering the program, as participants may not feel comfortable giving negative feedback.
- **Establish rapport and avoid using jargon.**
- **Avoid leading questions** that could result in biased responses. For instance, instead of asking “were the sessions too long?” ask “what did you think about the length of the sessions?”
- **Use open-ended questions** to elicit detailed information. Avoid questions that can be answered by a simple yes or no.
- **Prepare “probes” or follow-up questions** that can elicit clarity and rich, detailed information. Encourage interviewees to provide detail on the reasoning behind their conclusions and ask for examples whenever possible [e.g. “Can you give me an example of a time you used that lesson with a patient?” or “Can you tell me about specific changes you noticed in the patient after you changed her medication?”].

Observations

Observations are a method of gathering data by watching activities or behavior that takes place during or after a program has been implemented. When planning to conduct observations, consider what specifically you want to know and design a system of data collection that would enable observers to collect that data in a consistent manner. Most commonly, this will consist of a checklist or a recording sheet where observers can note the extent to which certain essential components of the program were carried out as planned.

For ECHO evaluations, observation tends to be most useful for assessing levels of engagement, the quality of teleECHO clinic sessions, and fidelity to the ECHO model, all of which may be important components of a process evaluation. For example, you might observe the quality of the teleECHO facilitation (e.g., mechanics of sessions) or to what extent participants are engaged during videoconferences. The ECHO Institute has developed a “Facilitation Scorecard” that programs have used as part of an evaluation to assess quality of the clinic and adherence to the model (available on Box.com). Still, observations cannot provide information on stakeholder perspectives; as such it is best to use them in combination with other data collection methods.

Benefits and challenges of using observations include:

BENEFITS

- Facilitates increased understanding of program operations
- Requires minimal time or data collection burden on participants
- Offers an alternative to self-report, which may be biased

CHALLENGES

- Evaluator presence can lead those being observed to alter their behavior (termed the “Hawthorne effect”)
- Require careful planning and note taking, otherwise, observations will lack structure and data will be unreliable and difficult to interpret.
- Can be time consuming and expensive, especially if the goal is observation of multiple sites or activities.

For examples of ECHO evaluations that utilized observations, see *Appendix A*.
For additional resources related to using observations in evaluations, see *Appendix E*.

Surveys or questionnaires

Surveys, also called questionnaires, are one of the most common methods of collecting data for evaluation purposes. They are often considered a simple and fairly inexpensive method of collecting basic information on participant characteristics, as well data on changes in knowledge, attitudes and behavior. Surveys can be administered multiple times over the course of a program and can be used to assess change over time.

In Project ECHO evaluations, surveys are most often used to gather information from program participants in order to learn more about their opinions of the program itself and/or changes they experienced related to:

- Knowledge of best practices in patient care
- Attitudes toward patients with particular conditions
- Confidence and self-efficacy, or the belief in one's ability to provide effective and high-quality care for patients with the target condition or diagnosis
- Changes in treatment practices related to caring for patients with the targeted condition or diagnosis.

Surveys can also be administered to other stakeholders. For instance, patients of ECHO participants could be surveyed to assess changes in patient satisfaction and/or health outcomes the resulted from their provider participated the program. However, access to patients is often challenging and costly due to privacy concerns.

Survey design can be difficult, so it is worthwhile to check if there is an available pre-existing survey instrument that meets your needs. Pre-existing surveys are useful because they have generally been pilot-tested, which reduces problems with question clarity that can harm data quality. Some pre-existing surveys may be also validated, meaning that researchers have tested them and demonstrated that they measure what they claim to measure.

In reviewing pre-existing surveys, consider whether the questions are consistent with your project and evaluation objectives, if the survey has been used with populations similar to yours, whether there is free access (or a charge for use), and whether any adaptations to the survey are allowable. If there is no survey that fits your needs, you will need to design your own. Regardless of the type of survey you choose (pre-existing or one you develop yourself), consider your evaluation questions, the population you will be surveying (e.g., education level, familiarity with electronic

media, etc.) and resources available to you (staff time needed for developing and administering the survey, survey design experts at your university, etc.) when selecting questions to include and determining how frequently the survey will be administered.

Surveys can be conducted electronically using a web-based platform, such as Survey Monkey or RedCap (most common and most affordable), or by telephone, via paper handouts, or in-person. To assess change overtime, you will need to use a survey with questions that can be asked to participants before they begin the program (“baseline”) and again at either the completion of the program or at a specified follow-up time.

Benefits and challenges of using surveys or questionnaires include:

BENEFITS

- Useful for collecting data from a large number of respondents fairly quickly
- Can be administered remotely (e.g., online, mobile devices, telephone)
- Data can be kept confidential or anonymous, which encourages respondents to be more honest.
- Facilitates the collection of quantitative results that can be tested for statistical significance, which may be prioritized by some stakeholders

CHALLENGES

- May be difficult to obtain a sufficient number of responses
- Generally not suited to obtaining information on “why” a particular outcome occurred, or to understand novel or unexpected phenomena.

See *Appendix B* for important considerations when using surveys in ECHO evaluations. Also, see *Appendix A* for examples of ECHO programs that use surveys as part of their evaluations. For additional resources on developing and using surveys for program evaluation, see *Appendix E*.

SECONDARY DATA SOURCES FOR ECHO EVALUATIONS

Secondary data refers to data collected for purposes other than your evaluation. They may be directly related to the implementation of your program (e.g., program records, case presentations) or they may be gathered by an external entity (e.g., insurance claims, administrative data). Relying on secondary data might save time and money as it reduces the need to dedicate staff time to developing tools and collecting data. Unfortunately, there are also challenges with using secondary data; it can be difficult to gain access to the sources themselves due to data protection and privacy issues, they may not contain sufficient information needed to answer your evaluation questions, and it may be difficult to translate the data collection and management processes into a format that is useful for your purposes. Below, we describe some examples of secondary data sources and how they have been used by ECHO programs to conduct evaluations.

Program records

Program records consist of data available from program implementation, including information on participant engagement, program activities, and program cost. They are particularly useful in that they require little or no additional data collection effort, especially with advanced planning around systematic documentation and organization of the data.

Program records often contain information that is useful for process evaluation, such as activities that were conducted during recruitment, attendance, and participation. In fact, the Project ECHO data and technology platform is designed specifically to support data collection for this purpose. For example, records of attendance at teleECHO clinic sessions should be available through the ECHO technology platform that most programs use. Slides and notes from didactic lessons, case presentation forms and documentation of the specific recommendations for each case presented may also be important sources of information as they provide data on the topics that were covered during each session.

Program records may also be useful for outcome and economic evaluations of Project ECHO programs. For example, surveys conducted for the purposes of

providing Continuing Medical Education (CME) credits may contain information on knowledge gain from the program, follow-up presentations on cases might provide information on patient health outcomes that result from adoption of specialist recommendations, and project budgets are important for conducting cost-effectiveness and ROI analyses.

Records from case presentations may also prove useful. They provide detail on the types of cases that were discussed by the ECHO team and participants and the topics that were covered in the program. Some researchers have used case presentation forms and follow-up presentations to track whether care recommendations were followed and changes in patient health outcomes.

Benefits and challenges of using program records include:

BENEFITS

- Program staff can easily obtain program-specific information without significant additional work
- Provide descriptive information program activities, making them useful for performance monitoring and process evaluation.

CHALLENGES

- Some information is superficial, such as counts and lists
- Because they are implementation-focused, may be limited with respect to measuring outcomes
- If staff are not invested in careful documentation of activities, may contain missing or unreliable information

For examples of evaluations that have used program records in an evaluation, see *Appendix A*. For additional resources on using program records in evaluations, see *Appendix E*.

Other datasets

Many other datasets collected by outside entities might be relevant to your program evaluation and informative with respect to the selection and monitoring of outcomes. Datasets range from health condition registries (e.g., diabetes) to government administrative databases (e.g., state-level inpatient hospitalization data). Some of these datasets are available for free to the public (e.g., National Health Interview Survey, American Community Survey, Behavioral Risk Factor Surveillance System), some are available to the public on a limited basis (e.g., Medical Expenditure Panel Survey, all-payer claims databases), and some require negotiation with the entity that collects and owns the data (e.g., Medicaid data, insurance claims from private health plans).

Secondary datasets vary in terms of the frequency with which they are collected, as well as the lag time between when the data are collected and when the data are available to external researchers or evaluators. For instance, some data, such as the Minimum Data Set 3.0 (which is collected by the Centers for Medicare and Medicaid Services and contains information on nursing home quality) is updated on a quarterly basis, and is available free of charge to the public with a six-month delay. However, state-level hospitalization databases can take over a year to be released to researchers, who can only gain access after going through an application approval process through the relevant state agency. You will also need to consider the level at which you will be able to access the data; in many cases, these data need to be analyzed at the facility level because identifiable data at the patient or provider level is not available.

Large datasets also vary with respect to data quality and complexity, and you will need to understand data limitations before incorporating them into your evaluation. To assess data limitations, consider the process for data collection (including who is responsible for documenting and reporting the data) and the likelihood of missing data or data discrepancies. For instance, the Uniform Data System (UDS) for FQHCs can be compiled either from a central database by an administrator for a large FQHC that has many individual sites, or from each site individually. Certain sites may have administrators trained in extracting the relevant data, while others may not. These different processes are likely to produce variation in the accuracy of the data. This does not mean that the data cannot be used, but it does mean that the data will only be accurate for certain indicators. Consult with others who have used the data in the past to better understand nuances and pitfalls of secondary datasets.

Some benefits and challenges of using other, larger datasets include:

BENEFITS

- Can be used for context and benchmarking patient characteristics and outcomes
 - May contain patient level information, which can otherwise be costly and difficult to collect, particularly at a similar scale
 - May be familiar to policymakers and administrators, thereby increasing their confidence in evaluation findings
-

CHALLENGES

- Information of interest may not be available in datasets
- Recent data may not be immediately available due to lags in data collection and processing
- Datasets are usually large and, therefore, may require experts with a background in database management and statistics
- Datasets are commonly de-identified prior to transfer, which can make it difficult to link changes in health outcomes to a specific program

For examples of ECHO evaluations that relied on large datasets, see *Appendix A*. For additional resources on using large datasets in evaluations, see *Appendix E*.

TIPS AND TRICKS

WORKING WITH LARGE DATASETS

- **Build in extra time and funding.**

If requesting data from an outside organization, understand that this will take time and may be costly. Some entities (e.g., government) may have a strict process for application and transfer of data, including limitations on identifying information. Others, such as private payers with an interest in Project ECHO, may be amenable to data requests, though specifics will likely require negotiation.

- **Talk to others who have used the datasets.**

Most datasets have nuances that take time to learn; researchers who are already familiar with the datasets can provide an overview of these details, saving you time during the analysis phase.

- **Consider data quality.**

Be aware of issues related to data quality, particularly if the data are self-reported or collected with the purpose of, for example, delivering a service than for research purposes.

Health Record Reviews: Electronic or Chart

Reviews of medical records, often called chart reviews, are a common method of collecting data for epidemiological, medical and patient health outcome research. Data from medical records can be collected retrospectively (looking back over time to collect necessary information), prospectively (data are gathered on an ongoing basis throughout the project period), or a combination of the two.¹²

Begin by ensuring that your work complies with any research regulations or guidelines in place at the health care institutions from which data are being collected. During the planning stage, standardize the data collection and/or extraction process. You should have a clear understanding of the variables to be studied and where they can be found in the records, who is responsible for recording the information, how

consistently the information is reported and/or recorded. For example, will you be tracking specific symptoms that are reported by patients, and can you be sure that data on these symptoms will be reported consistently across records? Or, will you be tracking whether a specific diagnostic test is run consistently for all patients with a specific condition? It will be helpful to review a few charts and consult with clinicians at each site to be sure that you are familiar with the type and quality of data that can be extracted from patient records.¹³

Benefits and challenges of using electronic health records or chart reviews include:

BENEFITS

- Provides concrete information on treatment practices and patient health outcomes before and after the intervention was implemented
- Can be conducted retrospectively or prospectively
- Access to patient-level data and outcomes, which can be difficult to otherwise obtain

CHALLENGES

- Patient confidentiality regulations and protections can make it difficult to gain access to records
- Data may be incomplete or difficult to interpret if data entry practices vary significantly
- Difficult to pull information from charts in a consistent manner (in other words, may have poor inter-rater reliability).

For examples of ECHO evaluations that relied on large datasets, see *Appendix A*. For additional resources on using large datasets in evaluations, see *Appendix E*.

MAKING SENSE OF YOUR EVALUATION DATA

Now that you have collected your evaluation information, you must determine the best strategy for organizing and analyzing your data. The right analysis approach will help you understand and interpret your findings.

In determining how to make sense of your data, ask yourself:

- What kind of data do you have?
- What expertise do you have for analysis and reporting?
- What are your evaluation questions?
- In what data is your target audience most interested?
- How will you present the data?
- What type of analysis can be conducted with your data?
- What software is available to you?

Answering these questions will help you think about appropriate analytic approaches.

Keep in mind that this section does not contain sufficient information to transform you or your evaluator into a statistician. Instead, the section is meant to provide basic information about the different procedures for handling and analyzing various forms of data, and to refer you to additional resources that can provide more detailed guidance. At a minimum, this section may help you to better communicate with statisticians or others doing more complex analyses.

Refer to *Appendix E* for more resources on data analysis.

QUANTITATIVE ANALYSIS

Quantitative analysis involves working with numeric data, such as rating scales or frequencies. Quantitative analyses answer questions related to what happened, to whom it happened, and when or how often it happened. Basic quantitative analyses common to evaluation research include descriptive analyses and inferential analyses.

TIPS AND TRICKS

SETTING UP YOUR DATABASE FOR QUANTITATIVE ANALYSES

Although quantitative analysis can be complex, a well-organized database will make the analysis easier.

- Assign a unique identifier to each individual in your dataset. For example, if your analysis is of patient data, each patient would have a unique patient ID number. If your analysis is at the provider level, each provider would have a unique provider ID number.
- Label variables (e.g., “gen” for “gender of participant”), label values (e.g., 1 = child, 2 = adult) and denote the format of each variable (i.e., numeric or string).
- Include all information about an individual in one row of your database, rather than having the same person appear in multiple rows.
- Limit response options so that invalid information cannot be entered (e.g., restricting zip code options to the local area).
- Code text responses into a numerical form so that they are easier to analyze (e.g., 0=No, 1=Yes or 0=Male, 1=Female).

Descriptive Analyses

Descriptive statistics simply describe what the data shows. They can be used to report basic information about your program participants, their level of engagement, and characteristics of their patients. Descriptive statistics also provide an overview of the data and patterns within it, which can be helpful to understand before engaging in more advance analyses.

See below for examples of descriptive statistics that might be useful for ECHO evaluations:

DESCRIPTIVE STATISTIC	ECHO EVALUATION EXAMPLE
<p>FREQUENCY A count of the number of times a particular event or data point appears in a dataset.</p>	<ul style="list-style-type: none"> • Number of teleECHO clinic sessions held
<p>MEAN The average value in a dataset.</p>	<ul style="list-style-type: none"> • Average age of patients treated by ECHO participants
<p>MEDIAN The middle value (or mid-point) in a dataset.</p>	<ul style="list-style-type: none"> • Median number of participants in an ECHO session
<p>MODE The most frequently occurring value in a dataset.</p>	<ul style="list-style-type: none"> • The most common number of cases presented in a weekly session over a 6-month ECHO program
<p>RANGE The difference between the minimum and maximum data point.</p>	<ul style="list-style-type: none"> • The minimum and maximum number of participants in ECHO sessions over a six-month period

Inferential Analyses

Inferential statistics help you to understand and draw conclusions from your data. For example, you might analyze whether there is a relationship between the number of hours participants spend attending sessions and improved clinical knowledge, or whether there is a relationship between provider participation in Project ECHO and improved health outcomes for patients.

In general, inferential statistics are used to determine whether there is a relationship or association between variables of interest. When there is a relationship, inferential statistics can be used to determine whether the relationship is likely real (referred to as “statistically significant”) or whether it could have been due to chance. Several factors influence the likelihood of significance, including the strength of the relationship, the amount of variability in the data, and the number of people in the sample.

Inferential statistics should be calculated using statistical analysis software, such as STATA, SAS, R (which is free), or SPSS. However, such programs require a bit of expertise, and some may find it easier to conduct basic analyses using Microsoft Excel, which also has some statistical capabilities.

Some below for examples of inferential statistics:

INFERENCEAL STATISTIC	EXAMPLE EVALUATION QUESTIONS
<p>CHI-SQUARE</p> <p>This is used to determine the strength of the relationship between two categorical (non-numerical) variables.</p>	<ul style="list-style-type: none"> • Are nurse care managers more likely to participate in Project ECHO than physicians? • Do participants from rural settings report greater satisfaction with Project ECHO than participants from urban settings?
<p>CORRELATIONS</p> <p>These are used to measure whether a relationship exists between two numeric variables. Usually, the strength of the correlation is measured using a statistic called Pearson’s r correlation coefficient, which can range from -1 to +1. A positive correlation (<i>r is greater than 0</i>) means that as one variable increases, the other also increases. A negative correlation (<i>r is less than 0</i>) means that as one variable increases, the other variable decreases.</p> <p>It is important to remember that correlation does not mean that one variable “causes” the other, only that a relationship exists between the two.</p>	<ul style="list-style-type: none"> • Is there a relationship between the number of hours participants attend Project ECHO sessions and knowledge scores? • Is there a relationship between number of ECHO sessions attended and percent of patients who receive care in line with best practices?

[continued PG 56]

INFERENCEAL STATISTIC

EXAMPLE EVALUATION QUESTIONS

T-TESTS

These are used to determine whether there is a significant difference between two means. The independent samples t-test is used to compare one group's mean value to another groups mean value. The paired t-test is used when each observation in one group is paired with a related observation in the other group or when measures are taken at two points in time within the same group (in such cases a person is paired with him or herself).

- Are knowledge scores different between urban and rural Project ECHO participants? (independent sample t-test)
- Do participants report higher levels of job satisfaction after attending Project ECHO training sessions? [paired t-test]

ANALYSIS OF VARIANCE (ANOVA)

This is similar to a t-test, but used to compare whether three or more groups have significantly different means.

- Are there differences in scores on knowledge surveys according to the educational background (MD vs. NP vs. RN) of the respondent?
- Did Project ECHO have a different impact on provider self-efficacy based on the on geographic location of the respondents' practice site (i.e., rural, suburban, urban)?

REGRESSION

This is used to determine whether one variable is a predictor of another. Common types of regressions include:

Logistic regression

used when your dependent variable is categorical

Linear regression

used when your dependent variable is numeric and continuous

- Is length of participation in Project ECHO a predictor of improved confidence (*use logistic regression if confidence, which is your dependent variable, is categorical e.g. yes/no*)?
- Is length of participation in Project ECHO a predictor of improved knowledge (*use linear regression if knowledge score which is your dependent variable is continuous*)?

TIPS AND TRICKS

QUANTITATIVE DATA ANALYSES

- Before performing any quantitative data analysis, read and understand the data you want to use.
- Allow your evaluation questions and the statistical expertise available to you guide your analysis plan. If you need to conduct complex statistical analysis beyond the expertise of your team, consider engaging experienced researchers or evaluators.
- Statistical significance can be hard to obtain if you have a small number of cases. Instead, use descriptive analyses and consider complementing quantitative findings with qualitative methods that are more informative for small samples.

See *Appendix E* for additional resources on quantitative data analysis.

QUALITATIVE ANALYSIS

Analysis of qualitative data involves the identification, examination, and interpretation of patterns and themes in textual data (e.g., interview or focus group transcripts, narratives within medical or program records, and open ended survey questions). According to Bernard,¹⁴ qualitative analysis is focused on “the search for patterns in data and for ideas that help explain why those patterns are there in the first place”.

Qualitative data analysis should be a systematic and iterative process. It involves reading and familiarizing oneself with the data, developing a coding scheme (including code definitions), applying codes to relevant portions of the text, identifying themes, and interpreting your results. The process can be somewhat fluid, so you will likely move back and forth between steps, particularly in the early stages of analysis.

TIPS AND TRICKS

PLANNING FOR QUALITATIVE DATA ANALYSIS

- **Review your evaluation questions.**

They will be important in guiding your analysis.

- **Start early.**

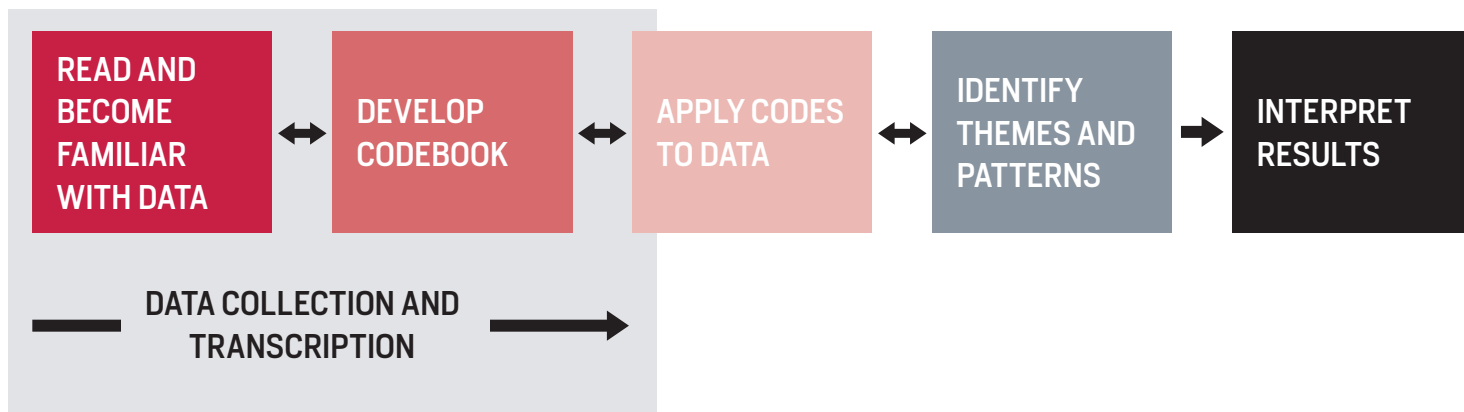
Start reviewing data as soon as they become available. Although you may not want to make significant changes based on a single focus group or interview, early findings can serve as a pilot that guides refinements to the data collection process. Starting early may also help to ensure that the work gets done, as analyzing qualitative data is very time-consuming.

- **Determine the level of rigor required for your evaluation and assign staff time accordingly.**

Although best practice in qualitative data analysis requires two or more people to participate in the coding and analyses, this may not be feasible due to resource limitations.

- **Obtain the necessary tools for data analysis.**

If you have small amounts of data, they can be analyzed manually or using Microsoft Word or Excel. However, qualitative analysis software (such as Nvivo or Atlas TI) is very useful once the amount of data grows. Software packages can be expensive to purchase, but most universities offer access to faculty and students for free or at a reduced cost. Even if paying full price, the software will likely pay for itself in labor saved and will result in a more reliable and trusted analysis.



Coding the Data

Before you begin any analysis of qualitative data, read and re-read several of the documents to be coded (“source documents”) to familiarize yourself with the content. After reviewing source documents, you can begin the process of coding your data. “Coding” refers to the process of identifying and labeling blocks of text, essentially creating an electronic filing system that helps you to systematically retrieve the information you need when you need it. For example, you might code text for “professions,” if you will want to examine how different professions and specialties respond to an ECHO clinic.

Coding necessitates a “codebook,” consisting of a list of codes and their definitions. The codebook will include pre-identified codes created based on the questions you asked participants or your own expectations regarding the data, as well as codes that identify themes that arise from the data themselves (see Table 4). Multiple codes can be applied to a single block of text, so code definitions should be broad. You may also include codes that cut across themes (e.g., knowledge, satisfaction, recommendation). Initial codebooks can be adapted once or twice as the codes are applied, but each change requires recoding previously-coded documents, so aim to make adaptations early and avoid repeated changes.

TABLE 4: EXAMPLES OF CODES FOR QUALITATIVE DATA ANALYSIS

CODE	DEFINITION	EXAMPLE TEXT RESPONSE
Meds	Participant mentions medications, including prescriptions, patient adherence, and outcomes	<p>“Before I began attending Project ECHO sessions, I typically prescribed [X medication] to treat depression, but I learned from the ECHO clinics that [Y medication] is actually more effective and has fewer side effects for patients who are seniors. So, now for my older patients, I prescribe Y instead of X.”</p> <p><i>(Codes: Meds, Knowledge)</i></p>
Knowledge	Participant discusses the program’s impact on his/her knowledge related to new treatments, best practices, or caring for the target population	
Screening	Participant mentions screening, including screening-related practices, uptake, and results	<p>“After Dr. A discussed how common depression is among adolescents, and how it sometimes manifests differently in teens than in adults, I started to screen all my adolescents for depression instead of only those who seem to be exhibiting symptoms, so I guess that was one lesson I really took to heart.”</p> <p><i>(Codes: Screen, Knowledge)</i></p>
Access	Participant describes access to care, or barriers or facilitators related to accessing care	<p>“I honestly didn’t have anyone to refer my depressed patients to, or my schizophrenic patient to. There are really only three primary care doctors who serve this community. There aren’t any psychiatrists within 30 miles of us.” <i>(Codes: Access)</i></p>

TIPS AND TRICKS

CODING YOUR DATA

- **Keep coding simple.**
Use short, clearly defined and consistent codes to make analysis easier
- **Test it out early.**
Review and revise your coding scheme early in the analysis process. You can add, collapse, expand and revise the coding categories at that point. However, do not continue to change your codes or you will end up duplicating your efforts.
- **Keep an open mind.**
Be on the lookout for new or unexpected themes that may arise in the data. Avoid making assumptions about what should be there or what you expect to find.
- **Work with others.**
Discuss data and codes with others who are familiar with the program or topic. Multiple perspectives are very helpful!
- **Focus on the data, not the codes.**
Remember that the data are most important, not the codes or code names. The codes are simply a way to organize and easily access the data. Always go back to the data captured within a code for analysis and reporting.

Identifying Themes and Interpreting Results

Once you have completed your coding, identify key themes and patterns within the data. Themes that are often of interest in program evaluations include:

- Participant perspectives on the purpose and value of the program
- Descriptions of outcomes from the program
- Assessment of the strengths and weaknesses of the program's design or implementation; and
- Lessons learned.

To identify themes, extract and review data from one code at a time, or from two or more codes that frequently overlap, in order to more clearly examine participant perspectives on each theme or aspect of the program. Pulling out coded data and reviewing themes individually reduces a huge set of data into more manageable pieces.

When reviewing the data, look for patterns related to:

- **Similarities and differences**
Consider when they arise and for whom they occur.
- **Frequencies**
Assess whether a particular idea is common or rare within the data.
- **Sequences**
Note the order in which ideas are discussed, and whether certain themes precede others.
- **Correspondence**
Consider whether there is a relationship between key themes and other activities or events.
- **Causation**
Assess whether participants regularly indicate a cause or contributing factor to key themes or ideas.¹⁵

One of the most difficult aspects of working with qualitative data is extracting the important patterns in a way that is systematic, comprehensive and relevant to your evaluation, as even small evaluations can end up with a large amount of qualitative data. Be selective and choose a limited number of key themes based on:

1. How frequently the theme was discussed by participants; and
2. Relevance to your program, your evaluation questions, your funder (or future funders), and other stakeholders.

The frequency of a particular theme is reported as an assessment of how often or rarely a particular idea arose in the data. Although numerical counts are not encouraged (as the nature of qualitative data prohibits use of quantitative or statistical analyses), certain information from qualitative sources (e.g., participant characteristics, participation of particular activity, experience of a specific outcome) may be quantifiable and useful to describe the study population or the strength of a particular theme.

After themes are identified, discuss preliminary findings and interpretations with program stakeholders. Consider how lessons learned can be applied to various program components, and to what extent qualitative and quantitative findings are consistent with each other.

ECONOMIC ANALYSIS

In addition to tracking the influence of an ECHO program on participants and the patients they serve, there is increasing interest in assessing whether there are cost savings associated with the program and, if so, whether those savings offset the cost of operation. These questions refer to the “business case” or the “return on investment” (ROI) of an ECHO program.

Making the Business Case for an ECHO Program

A useful operational definition of a “business case” for health care quality programs is provided by Leatherman et al.:

“A business case for a health care improvement intervention exists if the entity that invests in the intervention realizes a financial return on its investment in a reasonable time frame, using a reasonable rate of discounting. This may be realized as “bankable dollars” (profit), a reduction in losses for a given program or population, or avoided costs. In addition, a business case may exist if the investing entity believes that a positive indirect effect on organizational function and sustainability will accrue within a reasonable time frame” (p. 18) ¹⁶

Some ECHO programs have a clear social or economic case, meaning that they offer a benefit to society in general (e.g., healthier patients, happier health care providers) but lack a clear business case for the program’s sponsor. For example, a diabetes management ECHO program led by a hospital might result in fewer complications related to uncontrolled diabetes (foot amputation, neuropathy, retinopathy), which would likely reduce health care expenditures in the long-term. However, those cost savings would not directly benefit the hospital; in fact, the hospital might lose money if they operate in a fee-for-service environment. Instead, savings from this program would likely accrue to a health plan many years after the initial investment was made, or to government if the patients affected also relied on publicly-funded health insurance (e.g., Medicare or Medicaid). An employer may also benefit if more effective diabetes management results in higher productivity. Although stakeholders (including health plans, hospitals, or other funders) consider a range of benefits (other than costs) when making decisions around Project ECHO, the mismatch in terms of who pays for, who administers, and who benefits from an ECHO program can lead to difficulties in establishing sustainable financing structures.

Defining Return on Investment (ROI)

One of the most effective ways to make a business case for a health care intervention is to calculate the ROI of the program. ECHO stakeholders often calculate the financial ROI of ECHO programs to assess whether the program is a good investment, whether it should be continued, how it might become sustainable, and whether the model should be adapted to address other health care shortages in the community.

ROI is a ratio of “return” to a given “investment” (see Equation 1).¹⁷ Return here refers to the monetary value of the benefits of the program, while investment refers to costs associated with delivering the program. Traditional ROI calculations are purely financial and only include return and investment from activities that can be quantified in dollar terms.

$$1. \quad \text{ROI} = \frac{\textit{Return}}{\textit{Investment}}$$

In interventions focused on health care delivery and quality interventions (like most Project ECHO programs), the return in an ROI calculation typically refers to the net savings accrued from changes in health care utilization (e.g., fewer hospitalizations, fewer medications, fewer emergency room visits), whereas investment refers to the cost of delivering the program (see Equation 2).

$$2. \quad \text{ROI of ECHO program} = \frac{\textit{Net savings from changes in health care utilization}}{\textit{Costs of delivering ECHO program}}$$

Net savings from changes in health care utilization can be estimated from data directly provided by program participants (e.g., via surveys or case presentations), or from administrative data on patients or others impacted by the program (e.g., health insurance claims data, electronic health records).

Calculating ROI enables you to determine whether spending money on a particular program will likely result in future savings. It also allows you to compare the relative value of several different programs. For instance, if a given dollar invested in program A has a larger return than the same dollar invested in program B, then the organization theoretically should invest in Program A. Of course, this is only true if the ROI estimates include the most relevant, quantifiable benefits and costs. Non-monetary benefits or costs are also important factors that should be considered when deciding where to invest resources.

Estimating Return

Expected benefits (and the associated dollar value) will vary depending on the ECHO program being evaluated; some programs may reduce total health care costs for patients with a particular condition (often through reductions in hospitalizations, emergency room visits, or travel costs for obtaining specialty care), while others may focus on preventing the development of a condition in the first place.

To estimate return, first enumerate all the benefits of a program (a list of common benefits identified for ECHO programs is available on Box.com). Then, systematically assess how they can be measured and valued for the ROI calculation. Monetary values associated with ECHO benefits can be determined through actual data (e.g., claims data on hospitalization costs) or through a literature review (e.g., the average cost for an inpatient hospitalization for a Medicare beneficiary, or the average cost of a particular course of treatment). In the end, your estimated return will be the sum of all the costs that were averted through the program.

Some benefits of ECHO programs may take place far into the future, rather than within the project period being studied. For example, an ECHO program targeting diabetes may teach clinicians how to prevent and manage diabetes by helping patients eat healthy, exercise, and adhere to their medications. In this case, increased use of high-cost prescriptions may lead to increased health care costs during the early years of the program. However, a reduction in diabetes complications (e.g., foot amputations, blindness, neuropathy) in the long-term may be large enough to show net savings. In this case, you may need to estimate future health care utilization and costs to fully capture the return or value of the program.

When ECHO programs target conditions for which health care utilization and costs must be estimated into future years, return estimates can be based on forecasts or computer simulation models designed to capture disease progression (though inflation will need to be taken into account).^{18, 19} For example, a forecasting or computer simulation model might predict that 10 out of 1,000 patients with diabetes will develop retinopathy in the next year. However, we might estimate that the ECHO program will result in a 30 percent reduction in the number of patients who develop retinopathy in the next year (meaning 3 cases of retinopathy were averted by the ECHO program). In this case, we could estimate return (or net health care savings) as follows:

$$\text{Return} = (\# \text{ of averted retinopathy cases}) \times (\text{average cost of care for one patient with retinopathy over a one-year period})$$

Estimates can be obtained from the results of existing models or from data reported in peer-reviewed journal articles or other reputable sources. It is also worth noting that, depending on evaluation resources available, new models to estimate health care utilization and costs can be developed. In general, you will want to engage an experienced health economist or health services researcher in evaluations that use forecasting or modeling as these analyses become complex quickly.

Some important benefits of programs like Project ECHO, such as improved provider satisfaction or fewer days of missed work, do not have an obvious monetary value. There are two ways to incorporate these benefits into your final ROI analysis. The first is to track non-monetary benefits and use them to evaluate whether your final ROI calculation is under or overestimating return. Reporting non-monetary benefits along with the ROI results will provide a more detailed and nuanced picture of your program. The second method of accounting for non-monetary program benefits is to examine the economic literature and/or work with an economist to assign a monetary value to a given benefit. For example, economists have estimated that depression costs society \$44 billion annually due to lost productivity (meaning absences from work and lost productivity while at work).²⁰ However, monetizing benefits can lead to a more complex analysis; thus, it may be more feasible for lower-resourced programs to focus solely on those benefits with an obvious monetary benefit.

Estimating Investment

To estimate the cost of an ECHO program, add up all expenses related to running the program for a specific period of time. Relevant expenditures may include the cost of staff and specialist time dedicated to developing and delivering the program, the cost of time participants spend attending ECHO sessions, costs associated with performance monitoring and evaluation (e.g., contracting an outside evaluator or internal staff time), expenses related to hardware, software, supplies and overhead, and indirect costs.

Costs for program delivery should be estimated using the same timeframe that was used to estimate return. For example, if the ECHO clinic is delivered for six months then the period to assess net savings could be six months after the program began

or after the first cohort completed the program. Of course, it is useful to take into account the length of time required for the benefits (return) to become visible in the available data when choosing your timeframe.

Putting it all Together

Once you have estimated your return and investment figures, divide the estimated net savings by the estimated investment to obtain your ROI. The ROI can then be interpreted based on whether the value is negative or positive, and whether it is greater or less than one.

- A negative ROI indicates that your program resulted in a loss of money (or higher health care costs) rather than savings (or reduced health care costs).
- A positive ROI that is greater than one indicates that there is a net savings resulting from your program.
- An ROI that is between zero and one indicates that the program saved money (reduced health care costs), but not enough to cover the cost of delivering it; in other words, the program costs more than it saves.

The final ROI calculation can be interpreted as: *For every dollar invested in the program, and estimated \$_____ is [saved/lost]*. ROI can also be interpreted as a percentage (i.e., the funder saw a ___% return on an investment). Note that stakeholders will have different thresholds around the level of ROI that is sufficient to convince them to invest in a program; a positive ROI is not always enough.

HYPOTHETICAL ROI EXAMPLE:

An ECHO program focused on improving access to care for mental health conditions analyzes claims data from a health plan and finds that, compared to beneficiaries being treated by non-ECHO providers, those treated by ECHO providers experience fewer emergency room visits and fewer hospitalizations, leading to lower costs associated with both services. To calculate their ROI, they conduct the following analysis:

Return (health care costs saved)

\$200,000 (emergency room savings) + \$400,000 (hospitalizations savings) = \$600,000

Total Investment:

\$140,000 (staff time) + \$30,000 (fringe) + \$20,000 (indirect) + \$10,000 (supplies) = \$200,000

ROI:

$\$600,000 / \$200,000 = 3$

In this case, ROI is positive and equal to 3, which can be interpreted as “every \$1 invested in this ECHO program generates \$3 in return (health care savings).”

Sometimes, ROI is reported as a *net benefit*, which would be the idea that spending \$1 generates an *additional* \$2 after covering program costs.

The example above is somewhat simplistic, but it provides the basic information required to estimate the return on investment that might be expected from a program designed to reduce hospitalizations. We also could have added changes in other health care expenditures (e.g., medication, primary care visits), extended the period during which net savings are calculated using forecasting or simulation, or used more conservative estimates of hospitalization costs (which would result in a more conservative ROI).

TIPS AND TRICKS

ROI CALCULATORS

- Some may find online ROI calculators useful in providing a general sense of how much value you are getting from a given investment in an ECHO program.
- Although they provide imperfect estimates, these calculators may provide some preliminary results that can be compared to your own ROI calculations that are based on more complete data.
- For examples of relevant ROI calculators available online, see *Appendix E*.

Making Assumptions when Estimating Return on Investment

There are many assumptions that need to be made in ROI calculations, since not all data are readily available. As was discussed above, you might make assumptions around the average cost of a hospitalization, emergency room visit, or particular course of treatment. You might also make assumptions regarding the calculation of health care utilization and costs, comparison or control groups used, and timeline of the program.

While assumptions are common in ROI calculations, you should develop a clear and transparent plan regarding the assumptions used in your calculations to ensure they are deemed appropriate by stakeholders. For example, a health plan may not be interested in returns that occur five years after the program is implemented if they know that most patients change health plans every three years. It is also helpful to conduct sensitivity analyses, which means running the same analyses using different assumptions (e.g., both an optimistic and a conservative estimate of cost savings) to understand how various assumptions and scenarios affect the ROI.

See *Appendix E* for additional resources on calculating return on investment.

USING EVALUATION FINDINGS

Using and disseminating findings are the final components of an evaluation.

Evaluation findings can be used to:

- **Improve your program.**
Results may indicate a need to modify program format, adapt your curriculum, or implement strategies to increase program engagement and participation.
- **Demonstrate accountability.**
Documentation of required activities and outputs is often a requirement for grant funding. Process evaluations can be key components of these reports.
- **Build awareness and educate others.**
As recognition for the Project ECHO model grows, so will interest in your findings. Evaluation results will likely be of interest to a variety of stakeholders across sectors, including those not directly involved in your program (e.g., the broader ECHO community, academia, professional societies, policy makers, funders and peers).
- **Engage new participants and stakeholders.**
Demonstrating the benefits of your ECHO program can be key to increasing buy-in. Administrators of organizations such as FQHCs, ACOs, and hospital systems may be particularly interested in understanding the business or economic case for investing staff time in program participation.
- **Enhance program sustainability.**
Demonstrating the ability of an ECHO program to achieve specific and clearly defined outcomes that are of interest to administrators, funders, policymakers, and others is essential to program sustainability. Both qualitative findings regarding improved patient and provider outcomes and a detailed analysis of ROI have been noted as important methods of “making the case” for ongoing support of ECHO programs.

Findings from an evaluation can be disseminated through presentations to stakeholders, reports or other publications. ECHO leaders have also indicated the importance of sharing findings through informal discussions with stakeholders

and with leaders in health care delivery and health policy. Different sources of data (qualitative and quantitative) will appeal to different stakeholders, and any reporting or presenting of information must take the audience, their priorities and their understanding of the material into account. An administrator at a FQHC might be most interested in professional satisfaction among providers, as her main goal in engaging with the program may have been to reduce physician turnover. A policymaker, on the other hand, may prefer a qualitative understanding of how the program impacts his constituents so that he can present a compelling case for funding to the broader community. Alternatively, the leader of an ACO may be singularly focused on achieving a sufficient level of savings in health care costs to offset the cost of administering the program.

When presenting quantitative findings, use easy-to-read charts, tables and graphs to make complex data analyses comprehensible. Present terms like ROI in plain language. Reports or presentations based on qualitative research should summarize findings and present illustrative quotes. Not only does sharing actual (de-identified) quotes offer a uniquely compelling perspective that cannot be captured via a summary, it also elevates the voices of relevant stakeholders and ensures they are part of the record when decisions around programming are made.

When sharing your evaluation results, consider which findings and communication styles will be most effective and relevant for your target audience. While publishing articles in peer-reviewed journals is an important and well-respected method of dissemination within the academic community, a shorter report that clearly and concisely describes findings might be more accessible to non-academic audiences, including many of your stakeholders. Writing blogs, posting on social media, and publishing articles in traditional news sources are also effective methods of communicating your findings to a broader audience, which is important in building interest in your program. Developing outreach materials containing clear, visual graphics that convey outcomes of interest to administrators (e.g., provider satisfaction or self-efficacy, reductions in cost) can be effective in garnering new interest in your program.

CONCLUSION

This guide was designed to support leaders of ECHO hubs with limited evaluation resources in assessing the implementation, quality, outcomes and ROI of their ECHO program. Every ECHO program is different, and each will have unique questions related to program outcomes, improvement, expansion, and sustainability. The aim of this guide is to provide ECHO programs with support around:

- The justification for evaluation
- Development and implementation of an evaluation plan
- Nuances related to planning and conducting ECHO evaluations in real-world settings
- Evaluation approaches that are particularly useful for ECHO programs, especially related to data collection and analysis; and
- Strategies for reporting and disseminating findings to stakeholders

The rapid growth of Project ECHO suggests that many clinicians, funders, policymakers, and health care administrators already see great promise in the model. However, it is important that the evidence base grows along with implementation, both for quality assurance purposes and to understand how and when the model works and does not work. Incorporating evaluation into your work is an essential step towards ensuring that health care resources are directed in a way that will provide maximum benefit to patients, providers, and the broader health care system.

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REFERENCES

- ¹ Arora, S., Kalishman, S., Dion, D., Som, D., Thornton, K., Bankhurst, A., ... & Komaramy, M. (2011). Partnering urban academic medical centers and rural primary care clinicians to provide complex chronic disease care. *Health Affairs*, 30(6), 1176–1184.
- ² University of New Mexico School of Medicine. (2016). Project ECHO: Model. Available at: <http://echo.unm.edu/about-echo/model/>, last accessed January 13, 2016.
- ³ Zhou, C., Crawford, A., Serhal, E., Kurdyak, P., & Sockalingam, S. (2016). The Impact of Project ECHO on Participant and Patient Outcomes: A Systematic Review. *Academic Medicine*, 91(10), 1439–1461.
- ⁴ Centers for Disease Control and Prevention. Types of Evaluation. Available at: <https://www.cdc.gov/std/Program/pupestd/Types%20of%20Evaluation.pdf>. Last Accessed: December 2, 2016
- ⁵ Centers for Disease Control and Prevention. Types of Evaluation. Available at: <https://www.cdc.gov/std/Program/pupestd/Types%20of%20Evaluation.pdf>. Last Accessed: December 2, 2016
- ⁶ Centers for Disease Control and Prevention. Types of Evaluation. Available at: <https://www.cdc.gov/std/Program/pupestd/Types%20of%20Evaluation.pdf>. Last Accessed: December 2, 2016
- ⁷ Centers for Disease Control and Prevention. Types of Evaluation. Available at: <https://www.cdc.gov/std/Program/pupestd/Types%20of%20Evaluation.pdf>. Last Accessed: December 2, 2016
- ⁸ Scriven, M. (2003/2004). Differences between evaluation and social science research. *The Evaluation Exchange Harvard Family Research Project*, 9(4).
- ⁹ Moore, D. E., Green, J. S., & Gallis, H. A. (2009). Achieving desired results and improved outcomes: integrating planning and assessment throughout learning activities. *Journal of Continuing Education in the Health Professions*, 29(1), 1–15.
- ¹⁰ Zhou, C., Crawford, A., Serhal, E., Kurdyak, P., & Sockalingam, S. (2016). The Impact of Project ECHO on Participant and Patient Outcomes: A Systematic Review. *Academic Medicine*, 91(10), 1439–1461.
- ¹¹ Rogers T, Chappelle EF, Wall HK, Barron-Simpson R. Using DHDSO Outcome Indicators for Policy and Systems Change for Program Planning and Evaluation. Atlanta, GA: Centers for Disease Control and Prevention; 2011. Available at: https://www.cdc.gov/dhdsp/programs/spha/evaluation_guides/docs/using_indicators_evaluation_guide.pdf
- ¹² Matt, V., & Matthew, H. (2013). The retrospective chart review: important methodological considerations. *Journal of educational evaluation for health professions*, 10.
- ¹³ Abel Ickowicz, M. D. (2006). A methodology for conducting retrospective chart review research in child and adolescent psychiatry. *J Can Acad Child Adolesc Psychiatry*, 15(3), 127.

- ¹⁴ Bernard, H. R. (2011). *Research Methods in Anthropology: Qualitative and Quantitative Approaches. Introduction to Qualitative and Quantitative Analysis*. Rowman Altamira: Lanham, MD.
- ¹⁵ Saldana, J. (2009). *The Coding Manual for Qualitative Researchers*. Sage Publications: London. Available at: http://stevescollection.weebly.com/uploads/1/3/8/6/13866629/saldana_2009_the-coding-manual-for-qualitative-researchers.pdf. Last accessed: February 16, 2017.
- ¹⁶ Leatherman S, Berwick D, Iles D, Lewin LS, Davidoff F, Nolan T, Bisognano M. The business case for quality: case studies and an analysis. *Health Aff (Millwood)*. 2003;22(2):17-30.
- ¹⁷ NACDD (National Association of Chronic Disease Directors). (2009). *A Practical Guide to ROI Analysis*. Atlanta, GA: National Association of Chronic Disease Directors.
- ¹⁸ Li Y, Kong N, Lawley MA, Pagán JA. Using systems science for population health management in primary care. *J Prim Care Community Health*. 2014 Oct;5(4):242-6.
- ¹⁹ Prezio EA, Pagán JA, Shuval K, Culica D. The Community Diabetes Education (CoDE) program: cost-effectiveness and health outcomes. *Am J Prev Med*. 2014 Dec;47(6):771-9.
- ²⁰ Stewart, W. F., Ricci, J. A., Chee, E., Hahn, S. R., & Morganstein, D. (2003). Cost of lost productive work time among US workers with depression. *Jama*, 289(23), 3135-3144.

APPENDIX A

DATA COLLECTION

METHODS: EXAMPLES

FROM ECHO PROJECTS

It may be helpful to review evaluations conducted by other ECHO programs to determine what data is relevant and realistic for you to collect and analyze in your own program. The examples provided here demonstrate how various data sources have been used by others to evaluate Project ECHO programs (or their components). Note that this is not meant to be an exhaustive list of the many ways particular types of data have been used; instead, the goal is to describe some concrete examples that can be provide guidance in developing your own evaluation. See the ECHO Institute's Box.com platform for sample evaluation materials (e.g., surveys, interview guides) from other Project ECHO programs.

PRIMARY DATA SOURCES FOR PROJECT ECHO EVALUATIONS

INTERVIEW: asking a series of open-ended questions to an individual for the purpose of gathering detail-rich qualitative data.

Benefits and challenges of using interviews include:

BENEFITS

- Can be used for collecting nuanced data that cannot be easily quantified
 - No baseline required; can be used for programs that have already been implemented or have been in existence for a long time.
 - Provides an opportunity to engage with stakeholders
-

CHALLENGES

- Can be time consuming, both in terms of conducting the interviews and analyzing the data
- Scheduling time to conduct the interview can be a challenge, particularly for providers
- Privacy may be of concern, especially when interviewing patients
- All data are self-reported and therefore susceptible to bias

Interviews with ECHO participants are a fairly common method of gathering data for both process and outcome evaluations. For example, an evaluation conducted by The New York Academy of Medicine in partnership with the Project ECHO GEMH (Geriatric Mental Health) team at the University of Rochester Medical Center utilized interviews for quality improvement purposes and to assess changes in participating clinicians' knowledge, attitudes and behaviors resulting from their program. Questions related to process and performance monitoring examined participants' perceptions of the accessibility and quality of the program, including the technology platform, the timing and length of the teleECHO clinics, and whether there were aspects of the program that the participants would recommend changing (process evaluation). Interview questions also examined participants' self-reported changes in knowledge, self-efficacy, treatment practices and professional satisfaction, and the spread of knowledge from Project ECHO beyond themselves to their colleagues. Participants were also asked to what extent they saw changes in patient health outcomes as a result of lessons or recommendations from Project ECHO (outcome evaluation).

ECHO evaluations can also include interviews with patients. For instance, the Ontario Chronic Pain ECHO Program is in the process of conducting interviews with patients. They plan to collect data on patient satisfaction with the care they receive, as well as patient-reported changes in pain and function levels, mood, sleep and quality of life three months after their providers completed their participation in the program. Interviews with patients are less common than interviews with participating clinicians, due to the added time and cost of outreach and overcoming privacy concerns.

FOCUS GROUP: a facilitated group discussion conducted with the goal of gathering qualitative information from several people (usually six to twelve people) at once.

Benefits and challenges of using focus groups include:

BENEFITS

- Fairly efficient way to collect qualitative data from multiple people at once
- Produces rich, nuanced data, as participants bond with one another, and build off each other's comments
- Useful method of assessing how program participants prioritize ideas, or which ideas generate the most enthusiasm or traction.

CHALLENGES

- Facilitation requires training and experience
- Limited generalizability beyond those engaged in the group(s)
- Data are time consuming to analyze
- Individual personalities can influence group processes and perceptions, biasing the results

Several ECHO programs have incorporated focus groups examining participant experiences into their evaluations. For example, as part of an evaluation of an endocrinology ECHO program that trains community health workers in New Mexico, the University of New Mexico conducted four focus groups with a total of 21 program participants. The groups were conducted in-person at a training session held for this particular ECHO program. During the groups, participants described their perceptions of how the program influenced their confidence and competency related to providing care to patients, as well as their access to the supportive resources they needed to do their work effectively.¹

Similarly, the Missouri Telehealth Network (MTN) has been involved with evaluating many of the ECHO programs taking place in their state (which range from autism to endocrinology to dermatology), and they regularly incorporate focus groups into their evaluation work. Through these groups, MTN explores participant satisfaction and

areas for program improvement. Facilitators ask participants to discuss their reasons for participating in the selected ECHO program, whether the program is meeting their needs, and where there is room for improvement. Because their participants are dispersed across the state, they schedule the groups to take place immediately after a teleECHO session (for only about 30 minutes) via teleconference, which enables clinicians to participate remotely.

For more information on using focus groups for Project ECHO Evaluations, see *Appendix C*.

OBSERVATION: a method of gathering data by watching and documenting events or behavior that take place during or in relation to a program.

Benefits and challenges of using observations include:

BENEFITS

- Facilitates increased understanding of program operations
- Requires minimal time or data collection burden on participants
- Offers an alternative to self-report, which may be biased

CHALLENGES

- Evaluator presence can lead those being observed to alter their behavior (termed the “Hawthorne effect”)
- Require careful planning and note taking, otherwise, observations will lack structure and data will be unreliable and difficult to interpret.
- Can be time consuming and expensive, especially if the goal is observation of multiple sites or activities.

Observations have proven useful for Project ECHO programs evaluating fidelity (adherence to the ECHO model) and implementation of the ECHO model. For instance, as part of a process evaluation of their program, ECHO Autism of the University of Missouri used a 25-item Facilitation Score Card to examine fidelity as part of a larger evaluation of their ECHO program. The scorecard examined key indicators of model adherence and facilitator engagement of participants. Observers of teleECHO sessions watched clinics and rated each indicator according to a 5-point scale (1 = “strongly disagree” to 5 = “strongly agree”). The percent of items rated as “strongly agree” or “agree” out of the total number of items assessed was used to calculate a fidelity score for each clinic. Through observations, they found that 80% of their teleECHO sessions achieved fidelity to the model.² Assessing fidelity is an important quality assurance component of process evaluations; veering too much from the standard implementation of an evidence-based model means that the program being implemented is not actually evidence-based. Sample fidelity scorecards for the ECHO model are available on Project ECHO’s Box.com.

SURVEY OR QUESTIONNAIRE: A series of questions asked in order to gather information from individuals, often about their personal characteristics or their knowledge, attitudes or behaviors.

Benefits and challenges of using surveys or questionnaires include:

BENEFITS

- Useful for collecting data from a large number of respondents fairly quickly
- Can be administered remotely (e.g., online, mobile devices, telephone)
- Data can be kept confidential or anonymous, which encourages respondents to be more honest
- Facilitates the collection of quantitative results that can be tested for statistical significance, which may be prioritized by some stakeholders

CHALLENGES

- May be difficult to obtain a sufficient number of responses
- Generally not suited to obtaining information on “why” a particular outcome occurred, or to understand novel or unexpected phenomena.

Surveys are the most common method of collecting data for Project ECHO evaluations. A majority of the published studies on ECHO programs report on data collected via surveys; in addition, programs often conduct surveys as part of their performance monitoring plans.³

As part of their evaluation, a University of Chicago ECHO program targeting uncontrolled hypertension in FQHCs relied on several previously developed questionnaires. To assess changes in knowledge, the group used a pre-existing, validated survey assessing hypertension knowledge among primary care providers. After discussions with the researchers who created and validated the survey, the University of Chicago ECHO team adapted the questionnaire and eliminated unnecessary questions in order to reduce the burden on evaluation participants. The group also adapted a self-efficacy survey that was previously created by the ECHO Institute (focused on hepatitis C) to fit their needs in assessing changes related to managing hypertension.⁴ Although on a different topic, the group found it was a useful starting point to developing their own survey, as it had been previously tested and used in similar evaluation studies.

The University of Ontario Chronic Pain ECHO program plans to utilize several pre-existing, validated questionnaires to survey patients who are treated by participating clinicians to examine changes in their health outcomes before and after the program. They intend to ask patients to complete the Brief Pain Inventory (BPI) to assess the severity of chronic pain and its impact on daily functioning,⁵ the nine-item Patient Health Questionnaire⁶ (PHQ-9) to assess depression and depressive symptoms, the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) to assess general patient health status, and the Outcome Patient Satisfaction questionnaire to assess patient satisfaction with care. It is important to note that the research team received funding specifically for this evaluation, and that patient surveys generally require more resources (staff, funding and time) than surveys of participating providers.

For more information on using surveys for Project ECHO Evaluations, see *Appendix B: Survey Toolkit*. Additionally, an archive of survey questions that have been used in Project ECHO evaluations is available on Box.com.

SECONDARY DATA SOURCES FOR ECHO EVALUATIONS

PROGRAM RECORDS: data available from program implementation activities, including information on participant engagement, program activities, and program cost.

Benefits and challenges of using program records include:

BENEFITS

- Program staff can easily obtain program-specific information without significant additional work
- Provide descriptive information program activities, making them useful for performance monitoring and process evaluation.

CHALLENGES

- Some information is superficial, such as counts and lists
- Because they are implementation-focused, may be limited with respect to measuring outcomes
- If staff are not invested in careful documentation of activities, may contain missing or unreliable information

Several programs have published process evaluation data focused on participation and engagement, which comes from program records. For example, in 2012, the University of Washington reported process evaluation data on their ECHO program for hepatitis C, such as the number of video sessions held, the number of program participants, and the number of patients managed by participants.

Project ECHO AGE is focused on improving care for patients with behavioral problems related to dementia and/or delirium and implemented by clinicians at Beth Israel Deaconess Medical Center and their partners. Project ECHO AGE utilized case presentation forms to understand the impact of their program on patient health. The forms, completed by participating clinicians in advance of presenting a case, collected patient demographics and medical history. Because a majority of cases were presented more than once, the team had access to follow up data on patient health before and after their case was presented in an ECHO session. Through this data, researchers assessed 1) symptoms that led the provider to present patient case; 2) types of recommendations provided; 3) clinical outcomes post-case presentation; and 4) hospitalization and mortality post-case presentation.⁷

OTHER DATASETS: datasets collected by an outside entity for purposes that are not directly related to your particular program. These can range from health insurance claims data, to mandated quality metrics from regulatory agencies, to community, city, or state-wide surveys.

Benefits and challenges of using other, larger datasets include:

BENEFITS

- Can be used for context and benchmarking patient characteristics and outcomes
 - May contain patient level information, which can otherwise be costly and difficult to collect, particularly on a large scale
 - May be familiar to policymakers and administrators, thereby increasing their confidence in evaluation findings
 - Advance planning for collection of baseline data is often not required as data is continuously collected
-

CHALLENGES

- Information of interest may not be available in datasets
- Access to the data may be costly and is restricted; restrictions can take significant time to overcome and may limit the analyses you can conduct
- Recent data may not be immediately available due to lags in data collection and processing
- Datasets are usually large and may therefore require experts with a background in database management and statistics for analyses
- Datasets are often de-identified prior to transfer, which makes it difficult to link changes in health outcomes to a specific program

ECHO programs have used a variety of external data sources to evaluate their programs. For example, in 2016, evaluators examined Beth Israel Deaconess Medical Center's ECHO-AGE program using the Minimum Data Set (MDS) 3.0, a clinical assessment completed repeatedly for all nursing home residents in the United States. The dataset provides information on a variety of quality indicators established by the Centers for Medicaid and Medicare Services. Using these data, the evaluation team assessed changes in antipsychotic prescriptions and use of physical restraints, change in need for assistance with activities of daily living, severe pain, pressure ulcers, severe weight loss, loss of bladder or bowel control, catheter insertion, urinary tract infections, depressive symptoms, and falls with major injury. Because the data are aggregated and identifiable at the nursing home level, evaluators could create two groups of facilities: an intervention group (consisting of those who participated in the program) and a control group (consisting of facilities that were similar to those that participated in terms of size, location, and other indicators, but that did not participate in the program).⁸

In 2012, the University of Chicago conducted a retrospective analysis of Medicaid claims data to examine changes in prescribing habits of participating clinicians before and after participation in their hypertension management ECHO program and their pediatric ADHD ECHO program. Using the same dataset, they were also able to compare participants' prescribing behavior to that of non-participating clinicians.⁹

In 2015, The New York Academy of Medicine used data from an insurance plan with significant coverage in upstate New York as part of their external evaluation of the University of Rochester Medical Center's Project ECHO GEMH (geriatric mental health) program. Using data aggregated at the practice level, they compared health care utilization and costs for patients with the targeted mental health conditions before and after the program was implemented. They also compared pre and post data for patients without GEMH conditions to assess spillover effects and general market trends.¹⁰

HEALTH RECORD REVIEWS:

ELECTRONIC AND/OR CHART: data gathered from a review of patient health or medical records, which often includes diagnostic tests performed, treatment provided, patient symptomatology, and patient health outcomes.

BENEFITS

- Provides concrete information on treatment practices and patient health outcomes before and after the intervention was implemented
- Can be conducted retrospectively or prospectively
- Access to patient-level data and outcomes, which can be difficult to otherwise obtain

CHALLENGES

- Patient confidentiality regulations and protections can make it difficult to gain access to records
- Data may be incomplete or difficult to interpret if data entry practices vary significantly
- Difficult to pull information from charts in a consistent manner (in other words, may have poor inter-rater reliability).

As part of an early pilot evaluation, the ECHO team at the University of Chicago reviewed the records of approximately 20 patients whose providers had presented their cases in a Project ECHO program focused on controlling hypertension. To access these records, the team developed a protocol with detailed information on privacy protections for patients, and worked closely with administrators at participating federally-qualified health centers (including medical and administrative leadership) to obtain their approval. The ECHO team then developed a chart review and extraction tool that they used to review the records. Researchers were able to compare blood pressure rates of case presentation patients to those of patients treated by hypertension specialists.

With funding from the Health Resources and Services Administration (HRSA), the University of Missouri's ECHO Autism program is conducting a large-scale evaluation that relies on chart review to collect information on changes in provider behavior resulting from program participation. Through chart review, evaluators will extract information from 150 practices on adherence to best practices related to developmental and autism screening, screening for co-morbidities among children with autism, and medication monitoring for those children who are prescribed atypical antipsychotic medications.

For additional resources on each of these data sources, see Appendix E: Additional Resources.

REFERENCES

- ¹ Colleran et al. (2012). Building Capacity to Reduce Disparities in Diabetes. Training Community Health Workers Using an Integrated Distance Learning Model. *The Diabetes Educator*, 38(3), 386–396.
- ² Mazurek, M. O., Brown, R., Curran, A., & Sohl, K. (2016). ECHO Autism A New Model for Training Primary Care Providers in Best-Practice Care for Children With Autism. *Clinical pediatrics*, 0009922816648288.
- ³ Zhou, C., Crawford, A., Serhal, E., Kurdyak, P., & Sockalingam, S. (2016). The Impact of Project ECHO on Participant and Patient Outcomes: A Systematic Review. *Academic Medicine*, 91(10), 1439–1461.
- ⁴ Masi, C., Hamlish, T., Davis, A., Bordenave, K., Brown, S., Perea, B., ... & Johnson, D. (2012). Using an established telehealth model to train urban primary care providers on hypertension management. *The Journal of Clinical Hypertension*, 14(1), 45–50.
- ⁵ Bann, C., Dodd, S. L., Schein, J., Mendoza, T. R., & Cleeland, C. S. (2004). Validity of the brief pain inventory for use in documenting the outcomes of patients with noncancer pain. *The Clinical journal of pain*, 20(5), 309–318.
- ⁶ Kroenke K, Spitzer R L, Williams J B (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of General Internal Medicine*, 16(9): 606–613.
- ⁷ Catic, A. G., Mattison, M. L., Bakaev, I., Morgan, M., Monti, S. M., & Lipsitz, L. (2014). ECHO-AGE: an innovative model of geriatric care for long-term care residents with dementia and behavioral issues. *Journal of the American Medical Directors Association*, 15(12), 938–942.
- ⁸ Gordon, S. E., Dufour, A. B., Monti, S. M., Mattison, M. L., Catic, A. G., Thomas, C. P., & Lipsitz, L. A. (2016). Impact of a Videoconference Educational Intervention on Physical Restraint and Antipsychotic Use in Nursing Homes: Results From the ECHO-AGE Pilot Study. *Journal of the American Medical Directors Association*, 17(6), 553–556.
- ⁹ Masi et al. (2012). Using an Established Telehealth Model to Train Urban Primary Care Providers on Hypertension Management. *Journal of Clinical Hypertension*, 14(1), 45–50.
- ¹⁰ Fisher et al. (2016). Telementoring Primary Care Clinicians to Improve Geriatric Mental Health Care. *Population Health Management*.

APPENDIX B

SURVEY TOOLKIT

Surveys are one of the most common methods used by ECHO programs to collect data for evaluations because they are typically an inexpensive method of gathering data from a larger number of participants, and basic data analyses can be conducted fairly quickly. Because of their popularity and utility for programs with limited evaluation resources, this appendix provides additional detail on utilizing surveys effectively in Project ECHO evaluation.

THINGS TO CONSIDER WHEN WORKING WITH SURVEYS

Before conducting a survey, ask yourself:

1. Who will you be asking to take the survey, and will enough people respond?
2. What information do you want to know?
3. Can you use an existing survey, or will you need to create a new one?
4. How can you encourage people to respond to your survey?
5. How will you administer the survey and collect the data?
6. How will you analyze the survey data?

Various considerations related to each of these questions are described below.

1. Who will we be asking to take the survey, and will enough people respond?

Project ECHO evaluations usually survey participating clinicians. Although obtaining patient level information is often desirable, gaining access to patients who are impacted by the program is normally a challenge (and resource intensive) due to privacy concerns.

When surveying clinicians, consider the job responsibilities, training and educational background of participants. A survey for physicians will likely have different questions than a survey for health care administrators, which will have different questions than a survey for community health workers. If surveys are to be used with people in multiple roles, aim to make the questions broad enough that they are relevant to all survey respondents.

Note that surveys are best when collecting data from relatively large samples. If you only expect to collect information from a few people, you might consider interviews instead.

2. What information do you want to know?

Surveys are typically conducted to learn more about individuals' knowledge, attitudes and behavior (see *Survey Design*, below, for more information on each of these domains).

When surveys are used with ECHO participants, they often ask questions assessing:

- Opinions about the program itself
- Changes in knowledge around best practices in patient care
- Shifts in attitudes toward patients with particular conditions
- Changes in confidence and self-efficacy, or the belief in one's ability to provide effective and high-quality care for patients with the target condition or diagnosis
- Modifications to treatment practices related to caring for patients with the targeted condition or diagnosis.

Surveys of patients, on the other hand, might include questions related to

- Their level of satisfaction with the care they receive
- Treatments they have been prescribed, and/or
- Their current health status (or whether they experienced specific health outcomes).

Most surveys also ask participants a few questions about their background and/or demographics in order to be able to describe who is in the sample. Consider what information you will actually use (and how you will use it) before including questions in the survey. You might be interested in data related to a participating clinician's practice setting, educational background or training, or years of experience in the field; or, you might ask about a patient's age, gender, health status, etc.

3. Can we use an existing survey, or will we need to create a new one?

There are three types of surveys you might want to use in your ECHO evaluation:

- i. A pre-existing, validated survey
- ii. A previously developed survey that has been pilot-tested but not validated, or
- iii. A new survey developed specifically for your program.

Each type of survey has advantages and disadvantages.

i. Pre-existing, validated surveys

A validated survey is one that other researchers have tested and demonstrated that it measures what it claims to measure. Using such questionnaires may save time and resources, reducing the need to wordsmith questions and pilot test new instruments. They also allow you to compare your findings with those from other studies and may make it easier to publish your results. Examine peer-reviewed literature to find validated surveys related to your field, or discuss whether such surveys exist with experts. See *Appendix B* for examples of ECHO evaluations that have used pre-existing, validated questionnaires.

Despite benefits, working with validated surveys poses certain challenges:

- Some validated surveys are proprietary and require you to pay to use them
- Many have strict rules that forbid even minor adaptations; and
- Many are validated for only one population, which may be different from your population; validation in one population or for one condition does not mean it is validated for others.

ii. Previously developed survey (pilot-tested but not validated)

Several ECHO programs have developed surveys as part of their own evaluations. Prior usage means that the questions were pilot tested, which improves question clarity and helps reduce data irregularities. As a result, it may be easier to use or adapt a previously developed measure to fit the needs of your evaluation, rather than starting from scratch.

Although some previously developed questionnaires are available on Box.com, you may also want to contact ECHO programs that have done similar work who may be willing to share surveys that they used in the past. They may also be able to share any lessons learned after they used the instruments, which can help you avoid

unexpected pitfalls. Still, you should always assess an instrument for quality and fit for your particular program before using it.

iii. New survey developed specifically for your program

In some cases, existing and relevant surveys may not exist, or those that exist may not capture the information that you feel is important. If this is the case, you may want to develop a survey that is specifically targeted to your program.

If you decide to develop your own survey, be sure to review some basic literature on survey development and to pilot test the instrument before administering it. This can improve data quality and reduce errors that result from unclear questions. See *Survey Design* section, below, for more information, along with Appendix E for additional resources on survey development.

4. How can we encourage people to participate?

Surveys are only useful if you can obtain responses from a sufficient proportion of participants (known as the response rate). If a program reaches 50 providers but only 5 complete the survey (which represents a 10% response rate) you will not be able to draw reliable conclusions from the data, as such a low response rate suggests that findings are not representative of the group at large. A response rate of 50% or higher is recommended, but many ECHO programs have found that achieving it can be a challenge. In general, programs with more engaged providers find it easier to achieve a high response rate.

In reality, people are busy and it can be difficult to achieve a response rate that allows you to be confident in your results. Some tips for improving response rates include:

- **Keep it short.**

Participants do not want to complete long surveys; if they get bored or frustrated, responses are likely to be incomplete.

- **Provide incentives.**

Providing an incentive to participate, even if it is small, increases the likelihood that participants will respond to the survey. Some examples of suggested incentives include: gift cards, textbooks related to care for the targeted condition, and access to your institution's academic library.

- **Follow up.**

People are busy and survey requests can often be overlooked. Be sure to plan time to follow up with participants multiple (i.e., three to five) times to encourage participation.

- **Administer surveys strategically.**

Some ECHO programs have found that administering surveys electronically during teleECHO clinic sessions can encourage participation and reduce the time burden that surveys require. Others suggest holding a luncheon during an in-person meeting when surveys can be distributed, or identifying an “ECHO champion” at each participating site who will be responsible for gathering responses from participants.

5. How will we administer the survey?

Surveys can be conducted electronically using a web-based platform, or via handouts, telephone, or in-person interviews. There are pros and cons to each method, and you should consider your resources as well as the needs of your respondents when determining which you will use.

Administering surveys electronically reduces staff time needed for data entry and management, as platforms like survey monkey or RedCap automatically create databases from the responses submitted (check with your IRB to make sure your software is compliant). Using these platforms also allows you to build in controls for data quality, such as skip patterns (e.g., if the answer is no, automatically skip to question 10) and validation rules (e.g., no negative numbers allowed for age). However, surveys requested via email are easily ignored, which can lead to poor response rates.

Administering the survey over the phone or in-person is best when literacy or comprehension is a concern, since the questions are read out loud and explanations for common questions can be provided. These methods, or a printed handout, are also preferred when respondents are less comfortable with computer software. However, they also require greater staff time related to administration and data entry.

6. What kind of analysis will we be doing?

The types of questions you include in your survey and your evaluation design will dictate the type of analyses you can conduct. If you plan to compare data collected before the intervention (“pre” or baseline) to data collected after the intervention (“post” or follow-up), then you will want to make sure that both the baseline and follow up surveys contain the exact same questions.

However, if you will only be collecting data after the intervention, you will want to create a reflective survey. A reflective survey asks participants to compare their current experiences (related to, for example, knowledge, self-efficacy, or treatment practices) to those they remember from before they began the program.

See *Section 4.3: Selecting Evaluation Approaches* for more information on evaluation designs.

SURVEY DESIGN

Developing and administering your own survey enables you to collect information that is specific to your program and fits with your evaluation goals. Yet, designing a survey is difficult—the types of questions asked and the way they are phrased can have a significant impact on data quality. Reviewing literature on best practices in survey design will support you in designing a reliable and valid survey. Additionally, some ECHO specific considerations related to designing a survey to look at Project ECHO outcomes (i.e., knowledge, attitudes, behavior) are noted below.

Measuring Knowledge

Surveys can be a useful method of objectively evaluating changes in knowledge that result from your program. Such questions should cover topics that are specifically covered in your Project ECHO program. Unlike survey questions on attitudes or behaviors, knowledge questions generally have “right” answers.

Knowledge surveys should be developed and administered with caution.

- Avoid phrasing questions to sound “test-like.” Unfortunately, fears related to performance could discourage those who think they will not do well or do not like being tested from participating.

- Focus on key concepts discussed frequently throughout your ECHO program, rather than detailed or minor lessons that were not discussed at length.
- Include an option for “don’t know.” This can help reduce the “test-like” feeling while also discouraging people from guessing, which can lead to poor data quality.

Measuring Attitudes

Surveys are also useful to examine attitudes (especially of ECHO participants). Some attitudinal questions in ECHO evaluations focus on the perspectives of program participants on the quality, utility or relevancy of the ECHO program. Others aim to assess the impact of the program on participants’ professional satisfaction, perception of available professional support, or self-efficacy. Some ECHO evaluations have also examined whether participation in Project ECHO changed respondents’ opinions of patients who have the targeted health condition or diagnosis (especially those that are often stigmatized, such as mental illness or substance use disorder).

Self-efficacy, or a person’s confidence in his or her ability to successfully complete a specific task (in this case, provide effective patient care in line with best practices for the target condition) is considered a pre-requisite to engaging in behavior change and is the participant outcome that has been most commonly examined in ECHO evaluations. If you are planning to assess self-efficacy, remember to seek examples of similar surveys from others, as many groups have spent a considerable amount of time developing self-efficacy survey questions for surveys.

Although most surveys are best administered using a pre-post design (as they are usually considered more objective), a reflective survey may actually be a better way to measure change in self-efficacy. Experienced ECHO evaluators have found that most clinicians feel fairly confident in their ability to provide high quality care before beginning a program, possibly unsurprising since most have already been caring for patients with the targeted condition. However, after they participate, clinicians often report that the program increased their confidence. Therefore, self-efficacy questions on follow-up surveys should ask participants to retroactively compare their current confidence levels to confidence levels prior to the program.

EXAMPLE: MEASURING ATTITUDES

Please use the scale below to report how much you agree or disagree with the following statement:

My participation in Project ECHO has reduced my professional isolation.

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree

People with substance use disorders are not interested in quitting

1. Strongly disagree
2. Disagree
3. Neither agree nor disagree
4. Agree
5. Strongly agree

Compared to 6 months ago, how confident are you in your ability to care for geriatric patients who have mental health conditions using behavioral interventions?

1. Less confident compared to 6 months ago
2. Equally confident compared to 6 months ago
3. More confident compared to 6 months ago

Measuring Behavior Change

Behavior change in Project ECHO programs typically refers to changes in treatment practices. For example, surveys might ask participants about changes in how they prescribe medications, how they screen or diagnose a particular condition, or when they make referrals to external providers. They might also ask whether the clinician has implemented recommendations made by the specialist team or whether they plan to do so in the future. Questions about behavior change that already took place should be asked in past tense and include a timeframe.

EXAMPLES: MEASURING BEHAVIOR CHANGE

In the last 3 months, how frequently did you discuss advanced directives with geriatric patients who came in for an appointment?

1. Never
2. Rarely
3. Sometimes
4. Often
5. Always

MEASURING BEHAVIORAL INTENT

In the next 3 months, how likely are you to use new information you learned in Project ECHO while treating a patient?

1. Extremely unlikely
2. Unlikely
3. Neutral/Don't know
4. Likely
5. Extremely likely

In the case of ECHO, there may be a delay between the time clinicians learn a given lesson and when they are able to utilize the new information (due to the fact that months might pass before the provider sees a patient with a particular condition). As a result, it may also be helpful to include questions about behavioral *intent*, meaning how the clinician intends to change his/her practice in the future. Studies have shown that changes in behavioral intent lead to changes in behavior.¹ Questions about behavioral intent should ask about the likelihood of a behavior and should also include a timeframe (e.g., in the next few months, how likely are you...).

DO'S AND DON'TS FOR DEVELOPING SURVEY QUESTIONS

DO: *Keep it simple.*

Aim to create clear, concise questions and avoid using jargon that may be unfamiliar to respondents.

DON'T: *Use double-barrel questions.*

Do not include more than one idea in a single question. For instance, the example below inserts two ideas into one question when it asks about both improvements in treatment and ability manage patients.

DO: *Use special formatting within questions.*

Highlighting important parts of a question that might be easily missed can help ensure it is interpreted correctly.

DON'T: *Use a scale that is unclear.*

When using scales, be sure that the differences between categories are easily understood and the differences in the meaning of each response category is clear. It is best, when possible, to use an existing scale (often called Likert scales) that has been previously used in research. In the example below, the difference between “Agree a little bit” and “Agree somewhat” is unclear.

DOS AND DON'TS FOR DEVELOPING SURVEY QUESTIONS (cont.)

EXAMPLE OF SURVEY QUESTION DON'TS

Project ECHO has improved the kind of treatments I provide to patients with asthma and I am better able to manage patients who have a variety of respiratory conditions.

- a. Don't agree
- b. Agree a little bit
- c. Agree somewhat
- d. Agree

EXAMPLE OF SURVEY QUESTION DO'S

Project ECHO has improved my ability to treat patients with asthma.

- a. Strongly disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly Agree

Additional reading and resources

In sum, surveys are useful tools to gather information for evaluations. For more information on developing and utilizing surveys for evaluation purposes, see *Appendix B* and *Appendix E*, as well as sample surveys developed by others on Box.com.

REFERENCES

- Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological bulletin*, 132(2), 249.

APPENDIX C
FOCUS GROUP
TOOLKIT

Focus groups are an valuable way to collect qualitative data, allowing you to incorporate the words, voices, and perspectives of participants into your evaluation. They are ideal for exploring the perspectives and experiences of ECHO stakeholders, enabling you to understand how or why a particular process worked (or did not work) or a particular outcome occurred (or did not occur). Focus groups allow you not only to understand the experiences of individuals, but also how those experiences relate to those described by others. This appendix provides additional detail on focus groups and how they can be useful in Project ECHO Evaluations.

FOCUS GROUP OVERVIEW

Focus groups generally consist of six to twelve participants and usually last between one and two hours. Although facilitators are present to help guide the conversation, the goal of a focus group is to encourage participants to engage with each other. Not only does this often lead to increased self-disclosure and data richness, interaction between participants can facilitate the discovery of unanticipated information and themes, while also providing an efficient method of collecting information from multiple people at once.

THINGS TO CONSIDER WHEN PLANNING FOCUS GROUPS:

- 1.** Who will you recruit to participate?
- 2.** What information do you want to know?
- 3.** When and where will you host the focus group?
- 4.** How many groups can you feasibly conduct?
- 5.** How will you recruit a sufficient number of people to participate?
- 6.** Who will facilitate the group?

1. Who will you recruit to participate?

In ECHO evaluations, focus groups are most often held with clinicians (or others) who participated in the program. They could also be conducted with health care administrators or other stakeholders. For example, in order to explore the broader impact of Project ECHO on a health care setting, you may want to conduct a focus group with providers who did not participate in ECHO sessions or with patients who get care at the site.

2. What information do you want to know?

To plan for a focus group, you will need to develop a focus group guide. The guide should contain approximately 15 open-ended questions designed to elicit descriptive responses from participants on the topics that interest you and your stakeholders. Facilitators are not expected to follow the guide word-for-word; paraphrasing, probing questions, and *ad hoc* additions are expected. For each question, follow-up prompts should be prepared to support the facilitator in encouraging discussion and eliciting the detail sought via the groups.

Sample focus group questions might include:

- Which lessons from teleECHO sessions have been most relevant to your practice?
- What can Project ECHO do to better engage community providers during the teleECHO sessions?
- How has participation in Project ECHO changed the treatment you provide to patients?
- What would you change to improve the program?

Note that it is helpful to begin the group with an introductory, easy question (e.g., *how did you first hear about Project ECHO?*) before moving into questions that require deeper thought and a greater sense of trust. You can also use various voting methods to prioritize ideas or understand the relative importance of a given topic. However, keep in mind that a single focus group will only represent a small sample of participants, so without conducting multiple groups, your ability to draw conclusions is limited.

3. When and where will you host the focus group?

Ideally, focus groups should take place in-person, as face-to-face meetings support the collaborative and interactive nature of these groups. The location and time should be convenient for the participants, who are generally seated around a table to encourage discussion. Evenings or weekends are often easiest for people to attend—though lunchtime can work well for staff at a single site.

In-person groups may be feasible for some ECHO programs that take place within one city or metropolitan area, or for programs that have an introductory training session to welcome participants to the group. However, a majority of ECHO programs invite participants from across a large region and in-person focus groups are not be feasible. In these cases, some have found success holding focus groups via videoconference (similar to the ECHO sessions themselves). Videoconferencing reduces travel time required and enables participants to more easily fit the group into their busy schedules. Such groups are generally scheduled during lunch, or during (or immediately after) an ECHO clinic.

4. How many groups can you feasibly conduct?

Best practices in focus group research indicate that you should continue conducting groups until you reach “data saturation,” meaning the same themes arise in each new group and no new themes are identified. However, depending on funding, the size of the program and the number of willing participants, this may not be feasible.

For groups with limited resources that need to plan for a concrete number of groups, experts recommend aiming to conduct multiple groups while taking into account the size of the program. Larger programs should conduct a minimum of three focus groups, as this allows for assessment of consistency across responses, but the reality is that small programs may only have enough participants to hold one or two. Some ECHO programs have conducted just one focus group and still found valuable information. Regardless of the number of focus groups conducted, keep in mind that findings are only representative of the group you interviewed and cannot be attributed to, for example, all participants in a particular program.

5. How will you recruit (a sufficient number of) people to participate?

Given busy schedules, it can be difficult to plan a time when a sufficient number of stakeholders can attend a focus group, and even more difficult to plan several of them. In addition to choosing a convenient time and location, providing an incentive can encourage people to participate—and can help to ensure those who sign up actually attend the group. An incentive can be anything from cash to continuing medical education (CME) credits to academic library access. Offering additional perks, such as lunch or free transportation, is also helpful.

To recruit participants, send emails, make announcements or reach out directly via phone. Explain the process and time involved, and ask that participants commit to participating in advance. Call or email participants one or two days in advance of the group to remind them of the time and location, and confirm that each still plans to attend. Aim to recruit three to five more people that you want to attend. If you are unable to recruit a large enough group, consider conducting individual interviews instead.

6. Who will facilitate the group?

Focus groups require two facilitators: a primary facilitator who guides the discussion, and a secondary facilitator who handles logistics, manages late-comers, takes notes, and supports the primary facilitator in guiding the discussion. When resources permit, aim to select a facilitator who is not intimately involved in administering the program; doing so will promote honesty in responses and help participants feel more comfortable giving negative feedback.

Facilitators should be very familiar with the focus group guide and the objectives of the project so they know when to probe and when to encourage the conversation to move on. They are also responsible for fostering a dynamic and rich discussion and keeping the group on topic and on track. Common challenges faced by facilitators include:

- **Managing group dynamics:**

Some participants will want to dominate the conversation while others will be quieter and less inclined to share. Facilitators should encourage all group members to speak up and ensure that everyone remains respectful of each other throughout the conversation.

- **Tracking time:**
Engaged groups can discuss and debate a single topic at length; facilitators must ensure that the group moves through the topic guide within the allotted time frame without stifling the conversation.
- **Staying on-topic:**
Group discussions can often digress from the original topics; facilitators must be able to steer the conversation back without appearing dismissive or antagonistic.
- **Avoiding the general:**
Participants will often speak about topics in general terms, for example saying something worked well or poorly, without providing an explanation; facilitators must recognize when there are opportunities to ask follow-up questions and elicit more detailed information and specific examples from participants.
- **Encouraging alternative viewpoints:**
Participants may feel the need to agree with the dominant speaker or the group; facilitators should be aware of this tendency, and make a point of asking if others have alternative views. Asking the question can remind group members that alternatives are valid and encourage people with different perspectives to speak up.
- **Identifying inconsistencies:**
Facilitators should be able to recognize inconsistencies in opinions among group members and ask appropriate follow-up questions to clarify and ensure that the data accurately represents participants' perspectives.
- **Coping with unexpected issues:**
Late-comers, unanticipated group size (too small or too large), and domineering participants are just a few of the things that can disrupt a group, and facilitators must be able to handle these challenges effectively.

Starting the group by providing discussion guidelines provides an opportunity to describe focus group processes and the occasional need for facilitators to redirect the conversation (for more detail on guidelines see the next section).

CONDUCTING A FOCUS GROUP

When participants arrive (or sign-on) for a focus group, have your materials (and food) prepared and ready. You will want to have prepared:

- Informed consent or information sheets
- A high-quality audio recorder
- A brief demographic survey
- Incentives and a form to record their receipt

WHY SURVEY MY FOCUS GROUP?

Although you may not need to collect identifying information, it is often helpful to ask focus group participants to complete a brief survey. Surveys allow you to quantify and report on relevant participant characteristics (e.g., practice setting, educational training, demographics).

After forms (consent and survey) are completed, groups should begin with a brief discussion of the purpose of the group, a reminder that they are being recorded, and a review of basic guidelines. Common guidelines center around:

- **Confidentiality.**
Facilitators should ask group members not to share information outside of the group, but should also note that confidentiality cannot be guaranteed once group members disperse. As such, group members should not share information that they worry would be reported outside the group.
- **Reminders about patient information.**
Facilitators should remind group members to avoid sharing identifiable patient information.

- **Equal “air time”.**

Facilitators should remind the group that everyone is encouraged to participate is important in setting the stage for the group. It can also be helpful to explain that the facilitator might interrupt if someone is dominating the conversation and might “call on” those that have remained silent over the course of the discussion.

- **Facilitator responsibility.**

Facilitators can inform the group that s/he is responsible for keeping the conversation on track and ensuring that there is sufficient time for all the topics included in the guide. Therefore, she or he might have to interrupt participants if a conversation is too lengthy or off topic.

Next, the lead facilitator poses questions from the focus group guide to the group, asking questions in a manner that follows the natural flow of the conversation as much as possible. If the conversation naturally moves to a topic that appears later in the guide, the facilitator can adapt the sequence and come back to other questions later. Ideally, the conversation feels like a natural discussion among group members, with only the occasional interjection from facilitators. When successful, the data elicited in focus groups can be valuable components of an evaluation, providing a detailed understanding of the perspectives, experiences, opinions and priorities of participants.

ADDITIONAL READING AND RESOURCES

In sum, focus groups can be a great way to collect qualitative data for ECHO evaluations. For examples of ECHO programs that have used focus groups in their evaluations, see *Appendix B*. For additional information on conducting focus groups for evaluation purposes, see *Appendix E*.

APPENDIX D

GLOSSARY OF KEY TERMS

ACCOUNTABLE CARE ORGANIZATION (ACO)

A group health care professionals or organizations who work together to provide coordinated care to patients. They generally form value-based payment arrangements with insurers (i.e., Medicare) in which both parties agree that payment will be based on specific quality metrics, rather than the number of services provided.

ACTIVITIES

Processes, techniques, tools, events, technology, and actions performed by staff members or partners of the program in order to achieve established objectives.

ANONYMOUS

Identifiable information is not collected during the data collection process, making it impossible to link data with a specific individual.

BASELINE (“PRE” PERIOD)

The period of time when data is collected prior to the implementation of the program.

BIAS

Lack of objectivity due to study design and/or the subjective experiences, perspectives and prejudices of the individuals participating in the study.

BUSINESS CASE

An analysis of the benefits and costs of an intervention from the perspective of the organization investing in it.

CATEGORICAL VARIABLE Categorical variables are discrete or qualitative in nature – these variables have preset, non-numerical responses. These can be “nominal” variables – meaning that responses are distinct categories (e.g., gender, race/ethnicity, profession) or “ordinal” variables, meaning that, although not numerical– they can be ordered (e.g., responses that range from agree to disagree).

CLOSED-ENDED QUESTIONS Closed-ended questions provide discrete, multiple-choice answers that respondents can select.

CODEBOOK A codebook contains instructions for the standardization of data elements and details how the evaluation will utilize accumulated data as well as ensure the alignment of said data with identified evaluation indicators. While quantitative codes name and describe each item, qualitative codes categorize the data into themes.

COMPARISON GROUP A group comprised of individuals with characteristics similar to those participating in a program, but who are not enrolled. Data on this group can be compared to data from the intervention group in order to assess whether changes observed in the intervention group can be attributed to participation in the program.

CONFIDENTIAL Although identifiable data (i.e., name) is collected for evaluation purposes, data is not be shared or linked directly participants.

CONTEXTUAL FACTORS	Contextual factors are elements of the program’s surroundings that could impact program participants. Those elements could be political, social, economic or physical.
CONTINUOUS VARIABLE	A variable that can be any numerical value within a given range of values. For instance, body weight or the average score on a test are continuous variables.
COST-EFFECTIVENESS	An assessment of the ability of a program to achieve results relative to the cost of implementation.
COVARIATE	A covariate is a variable that might explain some or all of the perceived changes in the dependent variable or might be linked to the dependent variable.
DATA RELIABILITY	When the measurements obtained from the data remain consistent throughout the duration of the program.
DATA SOURCES	The source of information that will inform your evaluation (e.g., surveys, focus groups, interviews, observations, program records, etc.).
DESCRIPTIVE STATISTICS	Statistics that describe the data, for example, frequency counts, measures of central tendency (mean, medians and modes), measures of dispersion (range, standard deviation), percentages and rates.

DEPENDENT VARIABLE Can also be described as an outcome or effect. Usually observed to see if a program influenced any changes the variable might have experienced.

ECONOMIC CASE An analysis of the benefits and costs of an intervention that fall on patients, employers, and society in general (rather than a specific funding entity)

ECONOMIC EVALUATION Compare the expenses associated with implementing and delivering the program to the benefits or savings derived from it

ELECTRONIC HEALTH RECORD OR CHART REVIEWS A method of data collection that involves gathering information from the health and medical records of patients, which may include diagnostics, treatments and health outcomes.

EVALUATION Figuring out how effective and efficient a program is by systematically collecting and analyzing data in an effort to continuously improve the program.

EVALUATION PLAN Specific explanation of the implementation process of the evaluation as well as the program description, evaluation goals and methods and analysis plan.

EVALUATION QUESTIONS Questions to be investigated during the evaluation process that were developed and refined through collaboration with evaluation stakeholders.

FEDERALLY-QUALIFIED HEALTH CENTER (FQHC)

A health center that qualifies for enhanced reimbursement from Medicare and Medicaid under Section 330 of the Public Health Service Act. In order to receive this designation, the health center is required to 1) serve a community with few health care resources (known as medically-underserved, 2) offer care on a sliding scale, 3) provide comprehensive care (either on-site or through referral arrangements with other providers), 4) incorporate a quality assurance program and, 5) have a board of directors.

FIDELITY

Adherence to a program model and its core components.

FOCUS GROUP

A method of collecting qualitative data in which several people come together for a facilitated group discussion around their thoughts, opinions and perspectives around a particular topic.

FOLLOW-UP (“POST” PERIOD)

Period of data collection after the implementation of the program.

INDICATORS

Indicators are markers of progress towards the change you hope to achieve through your or program.

INFERENCE STATISTICS

A set of analyses that can be used to assess the existence of a relationship between variables, such as a correlation, chi-square, t-test, or analysis of variance (ANOVA).

INPUTS	Resources like finding sources, partners, staff, or program materials that are put into the program.
INSTITUTIONAL REVIEW BOARDS	Institutional Review Boards (IRBs) are entities set up to protect the rights and welfare of people who participate in research. Evaluations of programs involving Native Americans/Alaska Natives also require permission from their tribal governments.
INTERMEDIATE OUTCOMES OR SHORT-TERM OUTCOMES	Changes or benefits, usually within one to two years of the immediate outcomes.
INTERVIEWS	A method of data collection and qualitative research that involves partially-structured interview guides.
LOGIC MODEL	A logic model is a graphic representation of the theory of change that illustrates the linkages among program resources, activities, outputs, audiences, and short-, intermediate-, and long-term outcomes related to a specific problem or situation.
LONG-TERM OUTCOMES	Lasting changes with organizational, community, or systems-level benefits (e.g., organizational practices or policies, new or modified legislation, improved social conditions). Sometimes, these outcomes may be referred to as impact.
MEAN	Equivalent to an average. Calculate a mean by adding up values and dividing the sum of the values by the total number of units in your sample.

MEDIAN The middle value in a data set; this means that half the data are greater than the median and half are less. One way to compute the median is to list all scores in numerical order, and then locate the score in the center of the sample. If there are two middle scores, you need to average them to determine the median.

MODE The most frequently occurring value in a dataset.

METHODOLOGY A set or system of methods and procedures that you use to answer your evaluation questions.

MIXED METHODS STUDY Involve the intentional use of two or more different kinds of data gathering and analysis tools—typically a combination of qualitative (e.g., focus groups and interviews) and quantitative (e.g., multiple choice surveys and assessments)—in the same evaluation.

OBJECTIVES Statements of the results the program aims to achieve that are specific and can be achieved within the timeframe of the project. Objectives can relate to activities required for effective program implementation (process objectives) or to outcomes that would be expected if the program were a success (outcome objectives). Each program will have multiple objectives.

OBSERVATIONS A method of gathering data by watching and documenting events or behavior that take place during or in relation to a program.

OPEN-ENDED QUESTIONS	Questions that encourage responses that contain detailed information, rather than a single-word answer (e.g., “yes” or “no,” “good” or “bad”).
OUTCOMES	Anticipated results of a program.
OUTCOME EVALUATION	Evaluation that assesses whether the program achieved its expected results within a given timeframe.
OUTPUTS	Direct and concrete results of the program’s activities which are often presented in the form of documentation on the progress of activity implementation.
PROCESS EVALUATION	Evaluation that focuses on how a program is implemented, including specific project activities, the number and characteristics of participants, and fidelity to the original program model.
QUALITATIVE DATA	Information in the form of textual data like interview or focus group transcripts, narratives within medical or program records and open ended survey questions which allows for more nuanced analysis.
QUANTITATIVE DATA	Information that is numerical and that allows for calculations and statistical analyses to be conducted.
RANGE	Describes the spread in your data (the difference between the minimum and maximum).

RETURN ON INVESTMENT (ROI)	Ratio of the monetary value of program benefits to the cost of implementing the program.
SAMPLE	The group of individuals from whom data for an evaluation is gathered.
SELF-EFFICACY	An individual's beliefs about his/her own ability to carry out an activity effectively.
SMART OBJECTIVES	<u>S</u>pecific, <u>M</u>easurable, <u>A</u>ttainable, <u>R</u>ealistic, and <u>T</u>imely program objectives.
SHORT-TERM OUTCOMES	Immediate changes or benefits expected—usually within one to two years—as a result of successful implementation of the program.
SOCIAL CASE	An analysis of the benefits of a program to society without consideration of any associated costs.
STAKEHOLDER	Any person, group or entity that has an interest in the strategy, initiative, or program being evaluated or in the results of your evaluation, including program administrators, program staff, program participants and their patients, funders, policymakers, and others.
STANDARD DEVIATION	A measure of spread from the mean or the variability within a data set.

**STATISTICALLY
SIGNIFICANT**

A result finding that there is difference between two or more groups that is unlikely to be due to random chance. Various statistical techniques are used to determine whether a particular finding is statistically significant or not.

**SURVEY OR
QUESTIONNAIRE**

A series of questions asked in order to gather information from individuals, often about their personal characteristics or their knowledge, attitudes or behaviors.

THEMES

Themes are patterns that you find in your qualitative data. The general rule is that a theme is formed when there are three or more pieces of evidence pointing to the same idea. For example, if three interviewees felt the videoconferencing software was difficult to use, that would be a theme.

TRIANGULATION

Comparing and linking findings from multiple (including quantitative and qualitative) sources.

VALIDITY

How effectively an instrument measures the ideas and concepts that it is supposed to measure.


APPENDIX E

ADDITIONAL RESOURCES

OVERVIEW

This resource guide includes additional resources on evaluation topics such as logic models, data collection, analysis and reporting of results. It also includes links to data tools and databases that may be relevant to the ECHO program.

Basic Evaluation

 Better Evaluation (2013). Framework Overview. Retrieved from:
<http://www.betterevaluation.org/en/plan>

This website contains resources related to planning and executing an evaluation using the Better Evaluation Rainbow Framework. It covers topics ranging from defining what is to be evaluated, describing activities, outcomes, impacts and contexts, managing an evaluation, understanding causality, synthesizing data from evaluation, reporting findings, and ensuring that evaluation results are used in the future.


Catholic Health Association of the United States. (2015). Evaluating your community benefit impact. Retrieved from: <https://www.chausa.org/communitybenefit/evaluating-community-benefit-programs>

This guide provides an overview of evaluation basics for hospitals implementing programs that aim to improve the health of the community they serve.


Centers for Disease Control and Prevention. (2011). Introduction to program evaluation for public health programs: A self-study guide. Retrieved from: <http://www.cdc.gov/eval/guide/cdcevalmanual.pdf>

This “how to” guide provides support for program managers of community health interventions in planning, designing, implementing and using evaluation. It provides a basic and well-respected evaluation framework developed by the Centers for Disease Control.

[Resources marked with the symbol “” are resources that are highly recommended.]

 Community Toolbox. (2016). Our Evaluation Model, Evaluating Comprehensive Community Initiatives. Part J. Evaluating Community Programs and Initiatives. (Chapters 36–39). Retrieved from: <http://ctb.ku.edu/en/table-of-contents/evaluate/evaluation/framework-for-evaluation/main>

Discusses issues involved in, and recommendations for implementing, evaluation of community initiatives. Sections also address developing an evaluation plan, characteristics of a good evaluation and considerations in choosing an evaluator.

 Glenaffric Ltd. (2007). Six steps to effective evaluation: A Handbook for programme and project managers. Joint Information Systems Committee. Retrieved from: <http://www.jisc.ac.uk/media/documents/programmes/reppres/evaluationhandbook.pdf>

Provides steps on 1) identifying stakeholders, (2) describing the program, (3) designing the evaluation, (4) gathering evidence, (5) analyzing results, and (6) reporting findings.

Pawson, R. (2003). Nothing as practical as a good theory. *Evaluation*, 9, 471–490. doi: 10.1177/1356389003094007

This article, written for evaluation beginners, explains what evaluation is. Methods of evaluation are discussed in great detail and are supplemented with real examples.


Preskill, H & Jones, N. (2009). A Practical Guide for Engaging Stakeholders in Developing Evaluation Questions. Robert Wood Johnson Foundation Evaluation Series. Retrieved from: <http://www.rwjf.org/pr/product.jsp?id=49951>

Provides a five-step process and worksheets for involving stakeholders in developing evaluation questions.

(Resources marked with the symbol  are resources that are highly recommended.)


Salazar, L. F., Crosby, R. A., & DiClemente, R. J. (2015). *Research methods in health promotion*. John Wiley & Sons.

This textbook covers a broad range of methods for conducting evaluation research of health programs.


 W.K. Kellogg Foundation Evaluation Handbook (2010). Retrieved from: <http://www.wkkf.org/resource-directory/resource/2010/w-k-kellogg-foundation-evaluation-handbook>

Covers many evaluation topics, from evaluation planning through to utilizing evaluation results. Spanish version also available.

Process Evaluation

 Centers for Disease Control and Prevention. Developing Process Evaluation Questions. Retrieved from: <https://www.cdc.gov/healthyyouth/evaluation/pdf/brief4.pdf>

This short brief provides definitions and examples of process evaluation questions.

 Linnan, L., & Steckler, A. (2002). *Process evaluation for public health interventions and research*. San Francisco: Jossey-Bass.

This book offers an overview of the history, purpose, strengths, and limitations of process evaluation and includes illustrative case material of the current state of the art in process evaluation.

Saunders, R.P., Evans, M.H. and Joshi, P. (2005). *Developing a Process-Evaluation Plan for Assessing Health Promotion Program Implementation: A How-To Guide*. SAGE Journal, 6(2) 1-1.


This article describes and illustrates the steps involved in developing a process evaluation plan for any health promotion program.

[Resources marked with the symbol “” are resources that are highly recommended.]


Outcome Evaluation

Friedman, M. [2002]. *The Results and Performance Accountability Implementation Guide*. Retrieved from: <http://www.raguide.org/>

This guide includes tutorials, questions and answers, case studies and links to other resources on performance outcomes.

 Schalock, Robert L. [2001]. *Outcome-Based Evaluation*, Second Edition. Dordrecht, Netherlands: Kluwer Academic Publishers

This textbook provides an in-depth discussion of outcome-based research for 1) program evaluation, 2) effectiveness evaluation, 3) impact evaluation and 4) policy evaluation.

 Strengthening Nonprofits. [2010]. A Capacity Builder's Resource Library: Measuring Outcomes. Retrieved from: <http://strengtheningnonprofits.org/resources/guidebooks/MeasuringOutcomes.pdf>

This manual provides a comprehensive discussion of developing and implementing an outcome evaluation, along with a toolkit and resources that provide additional guidance.

The Urban Institute Outcome Indicators Project Materials. Retrieved from: <http://www.urban.org/policy-centers/cross-center-initiatives/performance-management-measurement/projects/nonprofit-organizations/projects-focused-nonprofit-organizations/outcome-indicators-project>


This set of materials provides support around the development of performance and outcome indicators for common program areas, such as health risk reduction, as well as taxonomy (or listing) of outcomes that are often relevant to nonprofit programs.

[Resources marked with the symbol “” are resources that are highly recommended.]


Economic Evaluation

Drummond MF, O'Brien B, Stoddart GL, Torrance GW. (1997). *Methods for the Economic Evaluation of Health Care Programs, 2nd ed.* Oxford Medical Publications, Oxford University Press, New York.

This book includes chapters on collecting and analyzing data, as well as presenting and using results economic evaluation.

 Economic Evaluation for Global Health Programs. Retrieved from: https://depts.washington.edu/cfar/sites/default/files/uploads/01_Levin_Economic%20Evaluation%20for%20Global%20Health%20Interventions%20OCFAR%20workshop%202013.pdf

This paper defines various methods of economic evaluation, the operational steps for organizing them, and a strategic approach to economic evaluation in the field.

 National Association of Chronic Disease Directors. (2009). A Practical Guide to ROI Analysis. Atlanta, GA: National Association of Chronic Disease Directors. Retrieved from: <http://c.ymcdn.com/sites/www.chronicdisease.org/resource/resmgr/services/roi-1.pdf>

This guide provides public health professionals with the resources and tools needed to understand the concepts and processes involved in calculating return-on-investment (ROI), as well as other methods to assess a program's economic impact when ROI is not possible or appropriate.

Sewell, M., and Marczak, M. Using Cost Analysis in Evaluation. Retrieved from: <http://ag.arizona.edu/sfcs/cyfernet/cyfar/Costben2.htm>


This online article provides a basic overview of cost allocation, cost-effectiveness analysis and cost-benefit analysis. Points out the advantages and disadvantages of these approaches and provides step-by-step instructions for each.

(Resources marked with the symbol “” are resources that are highly recommended.)


WHO Guide to Cost-Effectiveness Analysis. Retrieved from: http://www.who.int/choice/publications/p_2003_generalised_cea.pdf

This guide aims to provide policymakers and researchers with a clear understanding of the concepts and benefits of utilizing cost-effective analysis.


Project Objectives and Logic Models

 Centers for Disease Control and Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention, Division of STD Prevention. Developing Measurable Program Goals and Objectives. <https://www.cdc.gov/std/Program/pupestd/Developing%20Program%20Goals%20and%20Objectives.pdf>

This brief provides a basic overview of best practices in articulating program goals and objectives for the purposes of evaluation.

 Centers for Disease Control and Prevention, Division of Heart Disease and Stroke Prevention. (n.d.). *Evaluation guide: Developing and using a logic model*. Retrieved from: http://www.cdc.gov/dhdsp/programs/spha/evaluation_guides/docs/logic_model.pdf

This series of guides provides support around effectively developing and using logic models.

 Innovation Network. (n.d.). Point K Tools: Logic model builder. Retrieved from: <https://www.innonet.org/news-insights/resources/point-k-logic-model-builder/>

This web-based workbook assists individuals in building a logic model for their program.

[Resources marked with the symbol “” are resources that are highly recommended.]

Knowlton, L. W. & Phillips, C.C. (2012). *The logic model guidebook: Better strategies for great results*, (Second edition). Los Angeles, CA: SAGE Publications.

This guide provides users with practical support to develop and improve logic models that reflect knowledge, practice, and beliefs.

Program Development and Evaluation. (n.d.). Logic Model Materials. University of Wisconsin – Extension. Retrieved from: <http://www.uwex.edu/ces/pdande/evaluation/evallogicmodel.html>

Includes a number of resources related to developing logic models including “Enhancing Program Performance with Logic Models.”


Substance Abuse & Mental Health Services Administration, Center for Substance Abuse Prevention. (2007). A Manual for Developing Competitive SAMHSA Grant Applications. Retrieved from: <http://store.samhsa.gov/product/Developing-Competitive-SAMHSA-Grant-Applications/SMA07-4274>

This manual contains easy-to-follow training materials to help program staff develop and use logic models for program planning, implementation and evaluation.


Sundra, D., Scherer, J., & Anderson, L. (2003). A guide on logic model development for CDC’s Prevention Research Centers. Centers for Disease Control and Prevention. Retrieved from <https://www.bja.gov/evaluation/guide/documents/cdc-logic-model-development.pdf>

This guide examines what a logic model is and the benefits of using one.

(Resources marked with the symbol “” are resources that are highly recommended.)

-  Taylor–Powell, E. & Henert, E. (2008). Developing a logic model: Teaching and training guide. Madison, WI: University of Wisconsin – Extension. Retrieved from: <https://fyi.uwex.edu/programdevelopment/files/2016/03/lmguidcomplete.pdf>

This guide explains what a logic model is, the benefits of logic models, and how to develop a logic model.

-  W.K. Kellogg Foundation. (2004). Logic model development guide. Retrieved from: <http://www.wkkf.org/knowledge-center/resources/2006/02/wk-kellogg-foundation-logic-model-development-guide.aspx>


This guide aims to give staff of nonprofits and community members alike sufficient orientation to the underlying principles of "logic modeling."

DATA SOURCES AND INSTRUMENTS

General

Reisman, J., Gienapp, A., & Stachowiak, S. (2007). A handbook of data collection tools: A companion to "A guide to measuring advocacy and policy." Annie E. Casey Foundation. Retrieved from: http://orsimpact.com/wp-content/uploads/2013/08/a_handbook_of_data_collection_tools.pdf


This guide provides users with examples of practical tools and processes for collecting useful evaluation data.

-  Taylor–Powell, E & Steele, S. (1996). Collecting Evaluation Data: An Overview of Sources and Methods. Retrieved from: <https://learningstore.uwex.edu/Assets/pdfs/G3658-04.pdf>

This document discusses options for collecting information and reasons for choosing various approaches.

[Resources marked with the symbol  are resources that are highly recommended.]

Focus Groups

 Centers for Disease Control and Prevention. [2008]. Data Collection Methods for Program Evaluation: Focus Groups. Evaluation Briefs, 13. Retrieved from: <https://www.cdc.gov/healthyyouth/evaluation/pdf/brief13.pdf>


This brief provides an overview of utilizing focus groups for data collection in evaluations, including guidelines around appropriate usage and the advantages and disadvantages associated with their use.

Dick, B. [2010]. Structured Focus Groups. Retrieved from: <http://www.aral.com.au/resources/focus.html>

Provides step-by-step description of how to conduct a structured focus group.

Krueger, R.A. [1998]. Analyzing and Reporting Focus Group Results. Sage Publications Focus Group Kit, #6.

This booklet presents advice on ways to summarize information gathered from focus groups and present findings in ways that are sensitive to audience needs.

 Morgan, D. L. [1996]. Focus groups as qualitative research. [Vol. 16]. Sage publications.


This book provides detail on best practices in using focus groups in qualitative research.

[Resources marked with the symbol “” are resources that are highly recommended.]


Surveys

American Association for Public Opinion Research (AAPOR). Retrieved from: <http://www.aapor.org>


This website provides information on best practices and standard definitions for survey research. Includes links to other survey research organizations.

 Centers for Disease Control and Prevention. (2008). Data Collection Methods for Program Evaluation: Questionnaires. *Evaluation Briefs*, 14. Retrieved from: <https://www.cdc.gov/healthyyouth/evaluation/pdf/brief14.pdf>

This brief provides an overview of surveys (also referred to as questionnaires) as a method of data collection. It includes guidelines around how they can be used appropriately, along with a discussion of the advantages and disadvantages associated with using them in evaluations.

 Centers for Disease Control and Prevention. (2010). Data Collection Methods for Program Evaluation: Increasing Questionnaire Response Rates. *Evaluation Briefs*, 21. Retrieved from: <https://www.cdc.gov/healthyyouth/evaluation/pdf/brief21.pdf>

This brief offers a basic overview of survey (or questionnaire) response rates and how they can be improved when using surveys/questionnaires to collect data for program evaluations.

 Dillman, D A., Smyth, Jolene D., Christian, Leah M. (2009). *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method*, Third Edition. John Wiley & Sons, Inc.

Recommended textbook on developing and implementing surveys.

[Resources marked with the symbol  are resources that are highly recommended.]

Fink, A. (2003) *The Survey Kit Series*. Second Edition. Sage Publications.

This series of 10 booklets addresses basic content of survey development and analysis in an easy to follow format. Also provides useful information about some qualitative research techniques such as interviews, focus groups, observational analysis, and content analysis.


Floyd J. Fowler Jr. (2002). *Survey Research Methods*, 5th edition. Sage Publishing.

This textbook provides information on sampling, sampling errors, correcting for nonresponse, advantages of alternative approaches to data collection, ethical issues in survey research, and advice to increase the validity and reliability of interviews and mail surveys.

McDowell, I. (2006). *Measuring Health: A Guide to Rating Scales and Questionnaires*. NY: Oxford University Press.


This guide provides in-depth reviews of over 100 of the leading health measurement tools and serves as a guide for choosing among them.

Interviews

 Better evaluation. Interviews. Retrieved from: <http://www.betterevaluation.org/en/evaluation-options/interviews>

This website provides an overview of the different types of interviews that are useful for evaluation, as well as resources for selecting the right type of interview for your evaluation.

[Resources marked with the symbol “” are resources that are highly recommended.]


 Centers for Disease Control and Prevention. (2009). Data Collection Methods for Program Evaluation: Interviews. *Evaluation Briefs*, 17. Retrieved from: <https://www.cdc.gov/healthyyouth/evaluation/pdf/brief17.pdf>

This brief provides an overview of utilizing interviews for data collection in evaluations, including guidelines around appropriate usage and the advantages and disadvantages of using the method.

United States General Accounting Office. Program Evaluation and Methodology Division. Using Structured Interviewing Techniques. Retrieved from: <http://www.gao.gov/products/PEMD-10.1.5>

A report on designing and pre-testing interview approaches, training interviewers, contacting persons to interview, conducting the interview and analyzing the data, including analysis of open-ended questions.

Observations

 Centers for Disease Control and Prevention. (2008). Data Collection Methods for Program Evaluation: Observation. *Evaluation Briefs*, 16. Retrieved from: <https://www.cdc.gov/healthyyouth/evaluation/pdf/brief16.pdf>

This brief provides an overview of observations as a method of data collection in evaluations, including guidelines around appropriate usage and the advantages and disadvantages of using the method.

Taylor-Powell, E., Steele, S. (1996). Collecting Evaluation Data: Direct Observation. Program Development and Evaluation, University of Wisconsin-Extension. Retrieved from: <http://learningstore.uwex.edu/assets/pdfs/g3658-5.pdf>

This report describes the value of using direct observations in program evaluations and provides an overview of the process of collecting data using observations.

[Resources marked with the symbol  are resources that are highly recommended.]

Document Review (e.g., electronic health records)

Centers for Disease Control and Prevention. (2009). Data Collection Methods for Program Evaluation: Document Review. *Evaluation Briefs*, 18. Retrieved from: <https://www.cdc.gov/healthyyouth/evaluation/pdf/brief18.pdf>

This brief provides an overview of collecting evaluation data from existing documents, including when to conduct document reviews as well as advantages and disadvantages of relying on existing documents for evaluation data.

Gearing, R. E., Mian, I. A., Barber, J., & Ickowicz, A. (2006). A Methodology for Conducting Retrospective Chart Review Research in Child and Adolescent Psychiatry. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, 15(3), 126–134. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2277255/>


This journal article describes a nine-step process for conducting chart reviews. Although geared towards child and adolescent psychiatry research, it is relevant to evaluation research on a range of conditions.

Vassar, M. & Holzmann, M. (2013). The retrospective chart review: important methodological considerations. *Journal of educational evaluation for health professions*, 10. Retrieved from: <https://www.e-sciencecentral.org/articles/?scid=SC000000493>

This journal article reviews important methodological considerations for conducting chart reviews in evaluation research.

[Resources marked with the symbol “” are resources that are highly recommended.]


QUALITATIVE DATA ANALYSIS

 Centers for Disease Control and Prevention. (2009). Analyzing Qualitative Data for Evaluation. *Evaluation Briefs*, 19. Retrieved from: <https://www.cdc.gov/healthyyouth/evaluation/pdf/brief19.pdf>

This brief includes an overview of qualitative data. It discusses planning for qualitative data analysis; methods of analyzing qualitative data; and the advantages and disadvantages of using qualitative data in program evaluations.

Corbin, J., & Strauss, A. (2008). *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory* (3rd ed.). Thousand Oaks, CA: Sage

This textbook provides information on qualitative data analysis, with a focus on the commonly-used grounded theory approach.

 The Pell Institute. (2017). *Evaluation Toolkit: Analyzing Qualitative Data*. Retrieved from: <http://toolkit.pellinstitute.org/evaluation-guide/analyze/analyze-qualitative-data/>

This toolkit offers tips on analyzing qualitative data.

Silverman, D. (2006). *Interpreting qualitative data: Methods for analyzing talk, text and interaction*. Sage Publications.


This textbook offers users the kind of hands-on training in qualitative research required to guide them through the process.

[Resources marked with the symbol “” are resources that are highly recommended.]

QUANTITATIVE DATA ANALYSIS

Centers for Disease Control and Prevention. (2009). Analyzing Quantitative Data for Evaluation. *Evaluation Briefs*, 20. Retrieved from: <https://www.cdc.gov/healthyyouth/evaluation/pdf/brief20.pdf>

This brief includes an overview of quantitative data. It discusses planning for quantitative data analysis; methods of analyzing quantitative data; and the advantages and disadvantages of using quantitative data in program evaluations.

 Pell Institute. (2017). Evaluation Toolkit. *Analyzing Quantitative Data*. Retrieved from: <http://toolkit.pellinstitute.org/evaluation-guide/analyze/analyze-quantitative-data/>

This toolkit offers tips on analyzing quantitative data.

StatSoft Electronic Statistics Textbook (2010). Retrieved from: <http://www.statsoft.com/textbook/stathome.html>

This text covers basic and more advanced statistical techniques, including topics such as data mining. Includes a “statistical advisor” to help you select appropriate approaches to use.

 Trochim, W. (2006). The Web Center for Social Research Methods. Retrieved from: <http://www.socialresearchmethods.net>


This website provides social survey research/evaluation advice. Click on the “Selecting Statistics” icon for suggestions on selecting appropriate statistical techniques. Click on “Knowledge Base” for information on program evaluation and data analysis approaches. Content includes foundations of research, sampling, measurement, evaluation design, statistical analysis, and writing reports.

[Resources marked with the symbol “” are resources that are highly recommended.]


United States General Accounting Office, Program Evaluation and Methodology Division. (1992). Quantitative Data Analysis: An Introduction. Retrieved from: <http://www.gao.gov/products/GAO/PEMD-10.1.11>

This report provides basic information on evaluation design and methods of quantitative analysis to those without statistical expertise. Topics include calculating descriptive statistics and associations among variables, along with estimating population parameters, determining causation and avoiding pitfalls in data analysis.

EVALUATION REPORTING AND DISSEMINATION OF RESULTS

 Canadian International Development Agency. (2002). How to Perform Evaluations – Evaluation Reports. Retrieved from: <http://www.oecd.org/dataoecd/51/60/35138852.pdf>

This brief provides tips and checklists for writing each section of an evaluation report.

 Centers for Disease Control and Prevention. (2013). *Evaluation reporting: A guide to help ensure use of evaluation findings*. Retrieved from: http://www.cdc.gov/dhbsp/docs/evaluation_reporting_guide.pdf

This guide covers: (1) key considerations for effectively reporting evaluation findings; (2) essential elements for evaluation reporting; (3) importance of dissemination; and (4) tools and resources.

Emery, A. (n.d.). Ann's blog: *Equipping you to collect, analyze, and visualize data* [Blog archives]. Retrieved from: <http://annkemery.com/blog/>

This blog, written by the chair of the American Evaluation Association's data visualization interest group, provides tips on presenting data in a pictorial or graphical format.

[Resources marked with the symbol  are resources that are highly recommended.]

Evergreen, S. (2013). *Presenting data effectively: Communicating your findings for maximum impact*. Thousand Oaks, CA: SAGE Publications.


This book focuses on the guiding principles of presenting data in ways that effectively engage and inform audiences.

Holm-Hansen, C. (2008). Communicating evaluation results. Wilder Research. Retrieved from: <http://www.wilder.org/wilder-research/publications/studies/program%20evaluation%20and%20research%20tips/communicating%20evaluation%20results%20-%20tips%20for%20conducting%20program%20evaluation%20issue%2014,%20fact%20sheet.pdf>

This publication offers tips on organizing and analyzing quantitative and qualitative data, as well as tips for writing reports.

Minter, E., & Michaud, M. (2003). Using Graphics to Report Evaluation Results. Program Development and Evaluation, University of Wisconsin-Extension. Retrieved from: <https://learningstore.uwex.edu/Assets/pdfs/G3658-13.pdf>

This booklet provides a brief overview of how to choose among common types of graphics and ensure that they accurately represent your data.

 Torres, R. T., Preskill, H.S., & Piontek, M.E. (2004). *Evaluation strategies for communicating and reporting: Enhancing learning in organizations*, (Second edition). Thousand Oaks, CA: SAGE Publications.

This book includes worksheets and instructions for creating a detailed communicating and reporting plan based on audience needs and characteristics.

(Resources marked with the symbol “” are resources that are highly recommended.)

SECONDARY DATA SOURCES AND TOOLS

Data Tools

Centers for Disease Control and Prevention. Community Health Status Indicators [CHSI]. Retrieved from: <http://wwwn.cdc.gov/communityhealth>

This an interactive web application that produces health profiles for all 3,143 counties in the United States. Each profile includes key indicators of health outcomes.

Centers for Disease Control and Prevention. Wide-ranging Online Data for Epidemiologic Research [WONDER]. Retrieved from: <http://wonder.cdc.gov>

This system provides users access to statistical research data published by CDC, as well as reference materials, reports, and guidelines on health-related topics.

 County Health Rankings. Retrieved from: <http://www.countyhealthrankings.org/>

This site provides access to 50 state reports, ranking each county within the 50 states according to its health outcomes and the multiple health factors that determine a county's health.

 Health Indicators Warehouse. Retrieved from: <http://www.healthindicators.gov/>

The purpose of the site is to (1) provide a single source for national, state, and community health indicators; (2) meet needs of multiple population health initiatives; (3) facilitate harmonization of indicators across initiatives; and (4) link indicators with evidence-based interventions.

[Resources marked with the symbol  are resources that are highly recommended.]

ROI Calculators

Agency for Healthcare Research and Quality. Asthma Return-on-Investment Calculator. Available at: <https://www.ahrq.gov/cpi/centers/ockt/kt/tools/asthroisumm.html>


This web-based tool was designed to support public health practitioners and policy makers in estimating the cost savings and financial benefits of improving the quality of asthma care at the state level. The tool focuses on educational programs targeting disease management, and provides information on care utilization, cost, and asthma prevalence.

American Medical Association. Diabetes Prevention Program Cost Saving Calculator. Available at: <https://ama-roi-calculator.appspot.com/>

An online calculator designed to evaluate the ROI of programs that aim to prevent diabetes in pre-diabetic patients over a three-year period.

America's Health Insurance Plans. Making the Business Case for Smoking Cessation. Available at: <http://www.businesscaseroi.org/roi/apps/calculator/calcintro.aspx>

This online tool was designed to support health insurance plans and employers in estimating the ROI related to encouraging smoking cessation and providing coverage for related treatment to employees or beneficiaries.

 Center for Health Care Strategies. Return on Investment Forecasting Calculator. Available at: <http://chcsroi.org>

A web-based tool created to help Medicaid stakeholders identify the cost-savings potential of various quality initiatives. The tool supports users in completing a step-by-step process to calculate ROI forecasts for Medicaid quality initiatives generally as well as a separate tool specifically for assessing ROI for new care delivery models that rely on health or medical home.

[Resources marked with the symbol “” are resources that are highly recommended.]


Ensuring Solutions to Alcohol Problems. The Substance Use Disorder Calculator. Available at: <http://www.alcoholcostcalculator.org/sub/>

This online calculator can be used to examine current costs related to alcohol and substance use disorders as well as cost savings associated with reducing the number of untreated individuals.

Wellsteps Wellness Solutions. ROI Calculator. Available at: https://www.wellsteps.com/roi/resources_tools_roi_cal_health.php

A web-based ROI calculator specifically designed to assess ROI for worksite wellness programs that promote healthy lifestyles that result in changes in wellbeing (i.e., obesity and smoking rates). The calculator looks at impact of changes in wellness on health care costs and productivity.

Select Secondary Data Sources

 All Payer Claims Database Council: State Summary Map. Retrieved from: <https://www.apcdouncil.org/state/map>

This website offers a state-by-state summary on the current status and availability of large-scale databases that systematically collect health care claims data from a variety of health care payers, often referred to as “all-payer claims databases.”

American Community Survey. Retrieved from: <https://www.census.gov/programs-surveys/acs/>

The American Community Survey is designed to support policy makers and community leaders in understanding basic information on their community. It contains information on occupations, educational attainment, veteran-statuses, housing, and more. Data is available at the state and county levels, as well as for some metropolitan areas.

[Resources marked with the symbol “” are resources that are highly recommended.]

Area Health Resource Files (AHRF). Retrieved from: <https://datawarehouse.hrsa.gov/topics/ahrf.aspx>

The AHRF is a county-specific health resources data file that contains a wide variety of information, including but not limited to: health facilities, health professions, health status, economic activity, and socioeconomic and environmental characteristics. The dataset is useful for program planners and policy makers in describing the health care context at the county, state and national level, and can be downloaded free of charge.

Behavioral Risk Factor Surveillance System. (BRFSS). Retrieved from: http://www.cdc.gov/brfss/data_documentation/

Data includes state and county level information on health risk behaviors, preventive health practices, and health care access primarily related to chronic disease and injury.

The Healthcare Cost and Utilization Project (HCUP). Retrieved from: <https://www.ahrq.gov/research/data/hcup/index.html>

Includes the largest collection of longitudinal hospital care data in the United States, with all-payer, encounter-level information beginning in 1988. These databases enable research on a broad range of health policy issues, including cost and quality of health services, medical practice patterns, access to health care programs, and outcomes of treatments at the national, state, and local levels.

The Medical Expenditure Panel Survey (MEPS). Retrieved from: <https://meps.ahrq.gov/mepsweb/>

Provides data on families and individuals, their medical providers, and employers across the United States. MEPS is a comprehensive source of data on health care cost, utilization and insurance coverage. A limited dataset is available for download; researchers can apply for access to the restricted data at the Agency for Healthcare Research and Quality's Data Center.

(Resources marked with the symbol  are resources that are highly recommended.)

National Health & Nutrition Examination Survey (NHANES). Retrieved from: <https://www.cdc.gov/nchs/nhanes/>

Captures data on a variety of health issues (e.g. dietary behavior, health conditions such as diabetes, high blood pressure, high cholesterol and depression, and environmental exposures); some cities and municipalities also conduct the survey at the local level.

The National Health Interview Series (formerly IHIS). Retrieved from: <https://ihis.ipums.org/ihis/index.shtml>

Collects information on the health, health care access, and health behaviors of the civilian, non-institutionalized U.S. population, with digital data files available from 1963 to present. Users can create custom NHIS data extracts for analysis.

The National Longitudinal Study of Adolescent to Adult Health (Add Health). Retrieved from: <http://www.cpc.unc.edu/projects/addhealth>

Provides access to data on a longitudinal survey that began in 1994, which collects data on respondents' social, economic, psychological, and physical well-being. The site also provides data on family, neighborhood, community, school, friendships, peer groups, and romantic relationships, providing unique opportunities to study how social environments and behaviors in adolescence are linked to health and achievement outcomes in young adulthood.

Nursing Home Compare. Retrieved from: <https://data.medicare.gov/data/nursing-home-compare>

Contains quarterly data on specific quality measures from every Medicaid-certified nursing home in the United States. Available for download free-of-charge.

[Resources marked with the symbol  are resources that are highly recommended.]

Youth Risk Behavior Surveillance System (YRBSS). Retrieved from: <https://www.cdc.gov/healthyyouth/data/yrbs/>

Monitors six types of health-risk behaviors that contribute to the leading causes of death and disability among youth and adults, including—sexual behaviors, behaviors leading to injuries and violence, tobacco use, unhealthy dietary behaviors and inadequate physical activity. Available at state level and for certain large, urban counties.

[Resources marked with the symbol  are resources that are highly recommended.]

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The New York Academy of Medicine advances solutions that promote the health and well-being of people in cities worldwide.

Established in 1847, The New York Academy of Medicine continues to address the health challenges facing New York City and the world's rapidly growing urban populations. We accomplish this through our Institute for Urban Health, home of interdisciplinary research, evaluation, policy and program initiatives; our world class historical medical library and its public programming in history, the humanities and the arts; and our Fellows program, a network of more than 2,000 experts elected by their peers from across the professions affecting health. Our current priorities are healthy aging, disease prevention, and eliminating health disparities.

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