

**CDC Coffee Break:
Attribution Versus Contribution**



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Division for Heart Disease and Stroke Prevention



Good afternoon and welcome to today's Coffee Break presented by the Evaluation and Program Effectiveness Team in the Division for Heart Disease and Stroke Prevention at the CDC. We are fortunate today to have Anne Almquist as today's presenter. Anne is from CDC's Division for Heart Disease and Stroke Prevention and is an ORISE Fellow on the Evaluation and Program Effectiveness Team.

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Disclaimer: The information presented here is for training purposes and reflects the views of the presenter. It does not necessarily represent the official position of the Centers for Disease Control and Prevention.

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What We'll Cover Today

- ❑ **Attribution versus contribution**
- ❑ **The challenges of attribution in evaluation**
- ❑ **Evaluation methodological frameworks to demonstrate attribution and contribution**
- ❑ **Discussions with stakeholders**
- ❑ **Resources**

Today we'll cover attribution and contribution, the challenges of attribution in evaluation, the evaluation methodological frameworks to demonstrate attribution and contribution, as well as how to approach discussions with stakeholders. I have also included resources regarding attribution and contribution for your reference.

Attribution Versus Contribution

Attribution

- ***Caused the observed outcomes***
 - *Are the outcomes of interest attributable to the program?*
 - *Are the outcomes of interest changing as a result of the program?*
 - *Did the program cause the outcomes of interest?*

Contribution

- ***Helped to cause the observed outcomes***
 - *Is the program contributing to the outcomes of interest?*
 - *Are the outcomes of interest changing?*
 - *Is there evidence that the program helped achieve (or was part of what caused) the outcomes of interest?*

When assessing attribution, you want to determine if the program caused the observed outcomes. When assessing contribution you want to determine if the program contributed to or helped to cause the observed outcomes.

So, attribution implies causation and involves drawing causal links and explanatory conclusions about the relationship between observed changes, whether anticipated or not, and specific interventions. When assessing attribution, you want to determine to what extent did the program cause the observed outcomes.

Some questions addressing attribution might be: Are the outcomes of interest attributable to the program? Are the outcomes of interest changing as a result of the program? Did the program cause the outcome of interest?

For comparison, some questions related to contribution are: Is the program contributing to the outcomes of interest? Are the outcomes of interest changing? Is there evidence that the program helped to achieve or was part of what caused the outcomes of interest?

The Challenges of Attribution in Evaluation

- ❑ **Broadly-defined target population**
- ❑ **Complex and comprehensive interventions**
 - Multiple programs may contribute to outcomes of interest
- ❑ **Operate in complex social environments**
- ❑ **Change is seldom attributable to a simple factor**
- ❑ **Long-term outcomes**

We can often measure whether or not an intended outcome occurs, but it is difficult to determine what outcomes are attributable to a specific program. A broadly-defined target population may serve as a challenge in showing attribution. Unless the target population is extremely narrow, it may be difficult to show attribution in evaluation.

In addition, the complex and comprehensive nature of some programs makes inferring causation extremely difficult because there may be multiple programs or initiatives designed to support each other with multiple activities which may not have explicit, measurable objectives. In addition, programs may not be carried out in a short time frame, which also makes it difficult to show a causal relationship.

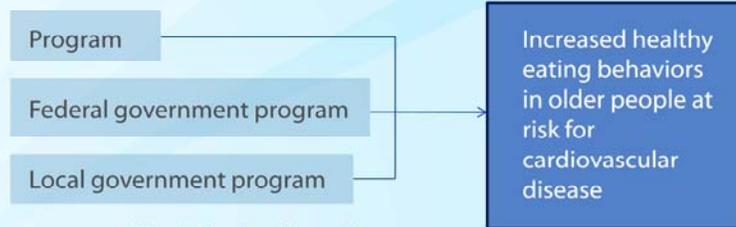
Programs also operate in complex social environments. In most cases, there are many other factors at play in addition to the impact of the program's activities. There are varied and dynamic variables affecting the environment within which the program or multiple programs operate, such as socioeconomic, environmental, political, and cultural factors, which usually cannot be isolated, manipulated, or measured, which makes it difficult to show attribution.

Change is seldom attributable to a simple factor as well. Causal explanation in evaluation may be too optimistic due to too many influencing variables. There may be many players involved working in a coordinated fashion instead. Public health programs may be focused on long-term outcomes, which increases the chance for confounding variables, which also makes it challenging to show attribution.

The Value of Contribution

- ❑ Attribution is nice, but rare.
- ❑ Claiming to make a contribution to a result is more likely.
- ❑ Evidence of contribution could be encouraging and provide credible information on the effects of program investment.

Example:

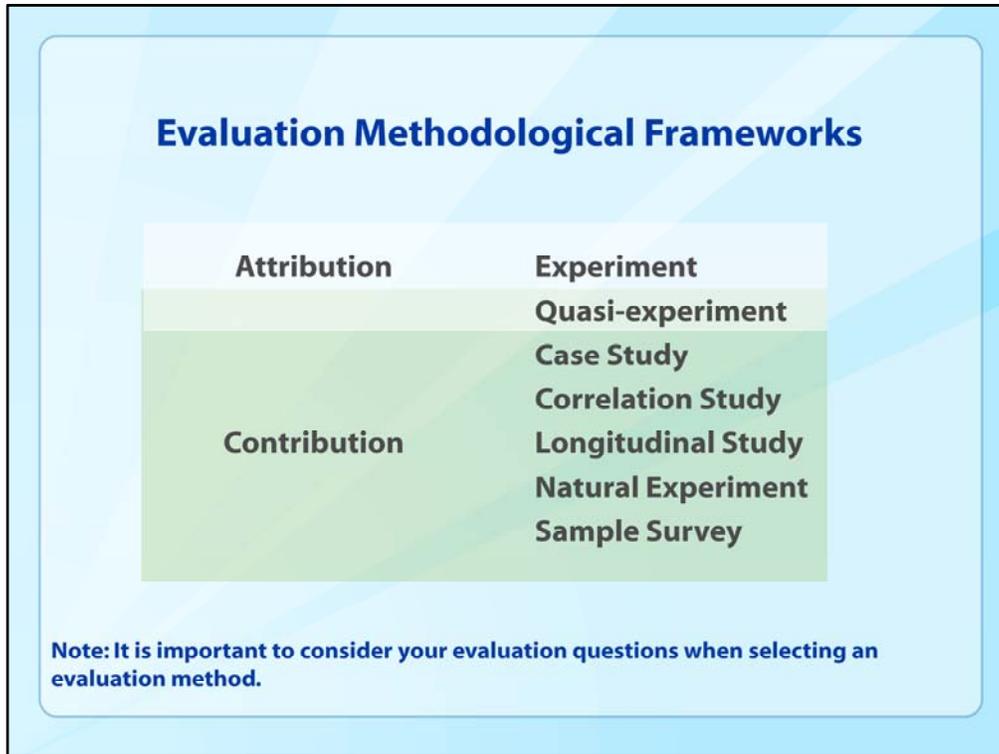


So which program caused the behavior change?

Attribution is nice. We would all like to be able to attribute success fully to our program, but it is also rare. Claiming to make a contribution to a desired result is oftentimes more likely. Evidence of contribution can be encouraging and provide credible information on the effects of program investment.

For example, you have a program to promote healthy eating in older adults at risk of cardiovascular disease. The program offers healthy cooking tips, social support, and health education. At the same time, a federal government program may be promoting health screenings as well as reimbursing physicians for counseling on diet and exercise with the same goal of increasing healthy eating behaviors in older adults at risk for cardiovascular disease, while a local government program is also building infrastructure to encourage walking and providing locations for farmers markets with the intent of increasing healthy eating behaviors in older adults.

So which program caused the behavior change? You cannot determine this, but you may be able to show that the combination of the separate programs caused behavior change and that your program contributed to the observed outcome of interest, that being increasing healthy eating behaviors.



Here, I illustrate which frameworks are appropriate for determining attribution and contribution. Experiments and quasi-experiments are used to show attribution, while quasi-experiments, case studies, correlation studies, longitudinal studies, natural experiments, and sample surveys are used to show contribution.

The evaluation framework and methods, including the data sources, need to match the evaluation questions. You also need to keep in mind who is it that needs to be convinced of attribution or contribution. So the intensity or precision of the evaluation depends on the evaluation purpose and questions. Also, please keep in mind that generally for program awards, CDC funding is not to be used to conduct research.

Experiment: Attribution

- ❑ **Randomization**
- ❑ **Greatest confidence that change is due to program**

Drug trial example: Experimental design—involves randomization



O: Observation
X: Receives drug
Y: Receives placebo

Experimentation involves the deliberate and systematic manipulation of a given phenomenon and the observation and measurement of change in that phenomenon. Experiments try to isolate one factor—the intervention or program—while holding everything else constant. This involves random assignment of people, organizations, or communities to the experiment or control group. Ideally, the experiment and control group will be identical except in receipt of the intervention or program. Experiments give the greatest amount of confidence that change is due to the program. Experiments, therefore, are used to show attribution.

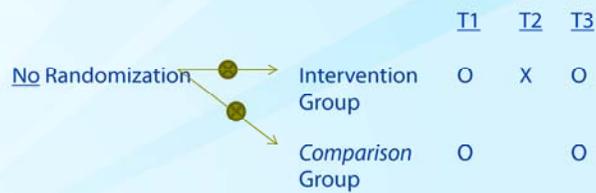
In this example, attribution is assessed in a randomized control trial where you can attribute the health effect of a drug on those who take it versus those who received a placebo. A drug intended to slow heart rate can be objectively measured, tested, and retested with the same result. The evaluation involves random assignment of people to an experiment or control group so ideally, the experiment and control group will be identical except in receipt of the intervention which aids you in showing attribution.

Again, generally for program awards, CDC funding is not to be used to conduct research.

Quasi-Experiment: Attribution and Contribution

- ❑ No randomization
- ❑ Uses similar people, organizations or communities
- ❑ Some confidence that change is due to program

Example: Behavioral intervention



O: Observation
X: Receipt of program

Quasi-experiments can be used to show attribution or contribution. They do not involve randomization. Instead, similar people, organizations, or communities are used to create comparison groups. This requires finding comparable units for the comparison groups, which rules out confounding to the extent that the comparison group is similar, which shows how quasi-experiments are appropriate for assessing contribution.

Case Study: Contribution

- ❑ **Specific way of collecting, organizing, and analyzing data**
 - Data: Comprehensive, systematic and in-depth information about each case
 - Case: Anything that can be defined as a specific, unique bounded system
- ❑ **Flexible**
 - Allows exploration of creativity, innovation, and content
- ❑ **Holistic**

Example: Does the stroke registry contribute to behavioral changes among physicians?

- ❑ Case: One physician or
- ❑ Case: All cardiologists at Hospital X

Another way to assess contribution is through a case study. A case study involves a specific way of collecting, organizing, and analyzing data. It is an in-depth study of a particular case that may be used to narrow down a broad field of research into one topic. A case study is useful when the intended users need to understand a problem, situation, or program in great depth, and they can identify cases rich in needed information.

Case data consist of all the information one has about each case, such as interview data, observations, documentary data, impressions and statements of others about the case, and contextual information. A case is anything that can be defined as a specific, unique, bounded system. A case may be an individual, group, neighborhood, program, organization, culture, or region. A case may also be a critical incident or stage in the life of a person or program.

Case studies are flexible because the design emphasizes exploration rather than prescription and prediction, so a researcher can discover and address issues as they arise.

Case studies are very holistic in their approach. For example, when asking if the stroke registry contributes to behavioral changes among physicians, you can define the case as one physician who can provide information-rich data or define the case as all cardiologists at Hospital X, depending on the evaluation purpose and questions.

Other Evaluation Methodological Frameworks: Contribution

- ❑ **Correlation Study**
- ❑ **Longitudinal Study**
- ❑ **Natural Experiment**
- ❑ **Sample Survey**

Here I have included the remaining evaluation frameworks used to show contribution. Due to time constraints, I am unable to describe the frameworks for assessing contribution. Please see the resources at the end of the presentation for more information on these frameworks, as well as attribution and contribution.

Mixed Methods

- ❑ **Combine quantitative and qualitative data.**
- ❑ **Reduce uncertainty.**
 - Collect data and information that will increase our understanding about a program and its impact.
- ❑ **Generate reasonable confidence as a satisfactory substitute for statistical significance.**
- ❑ **Might conclude with reasonable confidence that the program is indeed making a difference.**

Evaluators should be able to use a variety of tools if they are to be sophisticated and flexible in matching research methods to the particular evaluation questions and the stakeholders' needs. A mixed method design combines quantitative and qualitative data in some way. Some mixed methods are primarily quantitative with qualitative data as supplementary, while others are primarily qualitative with quantitative data as supplementary. Mixed methods allow you to reduce uncertainty by collecting data and information that will increase your understanding about a program and its impact. It also allows you to generate reasonable confidence as a substitute for statistical significance. You may be able to conclude with reasonable confidence that the program is indeed making a difference and show contribution.

Discussions with Stakeholders

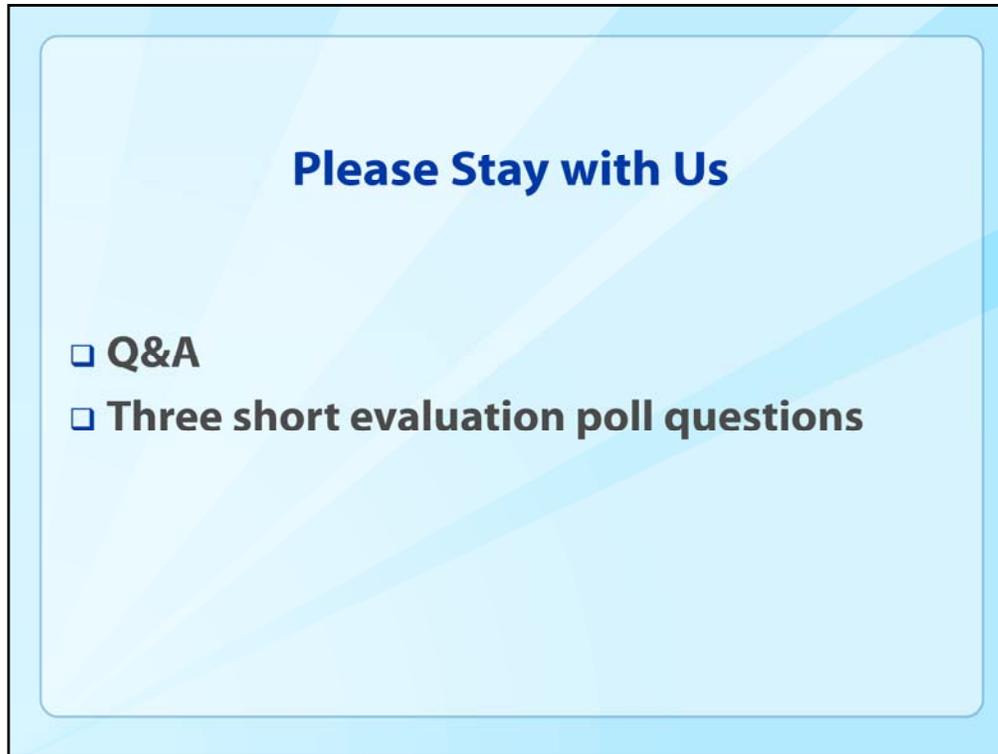
- ❑ **Prior to the evaluation, ask about the nature and characteristics of the intervention.**
- ❑ **Be frank and realistic with stakeholders.**
 - Help to understand the value of assessing contribution and the challenges of attribution.
- ❑ **Stakeholders need to accept some uncertainty.**
- ❑ **Engage stakeholders throughout the process.**

When approaching discussions with the stakeholders, you first need to ask about the nature and characteristics of the intervention. This puts you in a better position to decide on appropriate models and methods, and determine whether or not attribution is the primary concern. It is important to be frank and realistic with stakeholders. You need to help them understand the value of showing contribution, as well as the challenges of attribution. Stakeholders need to accept some uncertainty. Engaging stakeholders throughout the process helps ensure that methods are feasible, realistic, and responsive to their needs.

Resources

- ❑ DeGroff A, Schooley M, Chapel T, & Poister TH. (2010). Challenges and strategies in applying performance measurement to federal health programs. *Evaluation and Program Planning*, 33, 365–372.
- ❑ Patton MQ. (2002). *Qualitative Research & Evaluation Methods* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- ❑ Patton MQ. (2008). *Utilization-Focused Evaluation* (4th ed.). Thousand Oaks, CA: Sage Publications, Inc.
- ❑ W.K. Kellogg Foundation. Knowledge Center. Retrieved from: <http://www.wkkf.org/knowledge-center/resources/2010/W-K-Kellogg-Foundation-Evaluation-Handbook.aspx>
- ❑ For the definition of research, please see the CDC Web site at the following Internet address: <http://www.cdc.gov/od/science/integrity/docs/cdc-policy-distinguishing-public-health-research-nonresearch.pdf>

Here, I have included some resources related to attribution and contribution for your reference.



What is a correlation study and why is it not used to show attribution?

Correlation studies are frequently used to look for relationships between variables. While correlation studies can suggest that there is a relationship between two variables, finding a correlation does not prove that one variable causes a change in another variable or shows attribution. In other words, correlation does not equal causation.

For example, a correlation study might suggest that there is a relationship between two variables, but it cannot prove that a change in the first variable causes a change in the second variable. So, in this way, a correlation study is not appropriate for showing attribution, rather it's appropriate for showing contribution.

Can you expand a bit on the definition of a natural experiment?

A natural experiment is an observational study in which the assignment of treatments, interventions, or the program has been made by nature, but not by evaluators. So, a natural experiment is not a controlled experiment. And they're most useful when there has been a clearly defined and large change in the treatment or exposure to a program or intervention to a clearly defined subpopulation or target population, so that you may be able to show that it contributed to or helped cause the observed outcomes of interest. Without more control of the different factors that influence the outcome of interest, it is difficult to show attribution, so contribution can be shown through this framework.

Thank you

**If you have questions, please contact:
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Thank you for joining us. That concludes our Coffee Break.