Evaluating Asthma Surveillance

LEARNING AND GROWING THROUGH EVALUATION

MODULE 4

2021 Updates

National Center for Environmental Health
Division of Environmental Health Science and Practice

MODULE 4

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Copies of *Learning and Growing through Evaluation: Asthma Program Evaluation Guide* can be viewed or downloaded from
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Chapter 1 Evaluating Asthma Program Surveillance Activities

After reading this surveillance module, users should be able to:

- Describe how surveillance is conceptualized within the context of asthma programs.
- Develop individual evaluation plans for the surveillance component of an asthma program.
- Implement a surveillance evaluation in a manner that conforms to professional evaluation standards.
- Use evaluation results to strengthen asthma surveillance efforts.

Surveillance is one of the five strategies that enhance infrastructure used by asthma programs. The other strategies include leadership or program management, strategic partnerships, communication, and evaluation. This module, *Learning and Growing through Evaluation*: *Evaluating Asthma Surveillance* (Module 4) will guide you through the process of evaluating asthma surveillance efforts using the six steps of the *CDC Framework for Program Evaluation in Public Health* (CDC, 1999). The module provides general methods for conducting feasible and ethical evaluations and discusses specific challenges that arise when assessing asthma surveillance work. You can adapt these methods to meet the specific needs of your asthma program. The appendices of this module include a section on application of the Centers for Disease Control and Prevention (CDC)'s 2001 *Updated Guidelines for Evaluating Public Health Surveillance Systems* (**Appendix A**), followed by a **GLOSSARY** (**Appendix B**). Glossary terms are highlighted in green.

Previous modules of *Learning and Growing through Evaluation* guide you through evaluation basics and include resources that will also be useful for a surveillance evaluation. Module 1 provides guidance on including surveillance in your strategic evaluation planning process and resources for developing individual evaluation plans. *Implementing Evaluations* (Module 2) walks you through evaluation implementation and includes appendices with details about the various tasks, such as data collection strategies. *Evaluating Partnerships* (Module 3) focuses on planning and carrying out evaluations of strategic partnerships. As a companion to Module 4, it provides insights into evaluating the partnerships necessary to carry out surveillance activities (e.g., collaborations with surveillance data owners or data users).

Evaluating Asthma Program Surveillance Activities

Brief Overview of Asthma Surveillance. According to CDC (2014), **PUBLIC HEALTH SURVEILLANCE** "is the ongoing, systematic collection, analysis, and interpretation of health data, essential to planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those responsible for prevention and control" (p. 8). Asthma surveillance data help program staff members and community partners with designing, refining, and targeting interventions, that is, in using data to guide strategic action. Surveillance data also help clarify asthma trends and identify associated risk factors across populations, places, and time. Results from surveillance analysis are used to raise awareness among key stakeholders about the impact of asthma in a jurisdiction. All asthma programs funded by CDC are required to create surveillance products (e.g., maps, tables) that demonstrate the alignment of program activities with asthma burden as indicated by surveillance data. Additionally, programs are required to publish and disseminate asthma-specific reports, fact sheets, maps, web tables, briefs, newsletters, or other materials to support program activities.

Asthma surveillance requires more complicated methods than traditional infectious disease surveillance systems because there is no definitive laboratory test for asthma and the disease duration is long, often lasting for a lifetime (Boss, Kruetzer, Luttinger, Leighton, Wilcox, & Redd, 2001). To address this complexity, the Council of State and Territorial Epidemiologists (1998) developed a case definition for asthma that uses multiple administrative databases, national self-response surveys, and medical records (see Moorman, Akinbami, Bailey, Zahran, King, Johnson, & Xiang, 2012 for more information on asthma surveillance methods).

Therefore, asthma surveillance requires the collection and analysis of many data sources, from multiple external organizations, in order to obtain information about current and lifetime asthma prevalence, severity, control and management trends, high-risk populations, and disparities. Collaboration with outside data owners can make the asthma surveillance process complex.

At a minimum, asthma programs are required to collect, analyze, and interpret eight **CORE DATA SETS**. Specific burden measures need to be calculated from each required data set (**Table 1.1**). In addition to the required core data sets, asthma programs may collect **ADDITIONAL DATA SETS** and calculate additional measures during the five-year cooperative agreement period, if additional data are useful to guide program activities. Programs should also determine availability of health systems data, such as quality measures and health outcomes data, for use in program planning and evaluation.

Given the importance of asthma surveillance, jurisdictions funded to address *A Comprehensive Public Health Approach to Asthma Control through Evidence-Based Interventions* should ensure an adequate and appropriate staffing plan and project management structure to effectively carry out asthma program surveillance efforts. In addition to analyzing and collecting surveillance data, programs often provide technical assistance to stakeholders, including responding to data requests and offering partner trainings.

Table 1.1 State Asthma Program Core Data Sets and Measures

Core Data Set	Core Measures
BRFSS Core (Adult Prevalence)	• Adult current asthma prevalence • Adult lifetime asthma prevalence
BRFSS Child Asthma Prevalence Module and Random Child Selection Module	• Child current asthma prevalence • Child lifetime asthma prevalence
BRFSS Adult Asthma Call-Back Survey	• Asthma control • Asthma attacks (30 days; past 12 months) • Activity limitations • Number of missed workdays • Asthma self-management education activities and behaviors
BRFSS Child Asthma Call-Back Survey	• Asthma control • Asthma attacks (30 days; past 12 months) • Activity limitations • Number of missed school days • Asthma self-management education activities and behaviors
Vital Statistics - Mortality	• Mortality rates (asthma as underlying cause)
Hospital Discharge	• Hospital discharge rates (asthma is first-listed discharge diagnosis)
Emergency Department	• Emergency department visit rates (asthma is first-listed diagnosis)

Rationale for Surveillance Evaluation. As mentioned in *Public Health Surveillance in the United States: Evolution and Challenges* (CDC, 2012), surveillance evaluations help ascertain whether your surveillance activities are appropriate, cost- or time-efficient, and useful for helping your program in meeting its objectives.

Findings from surveillance evaluations can serve many functions, such as

- Identifying stakeholders to involve in the jurisdiction's asthma surveillance
- Recognizing gaps in data collection or calculated measures
- Improving data collection and analysis processes
- Discovering ways to improve dissemination and use of surveillance materials

Adapting CDC Surveillance Evaluation Guidelines. In 2001, CDC published *Updated Guidelines for Evaluating Public Health Surveillance Systems* (Guidelines), which described a model evaluation of a public health surveillance system. The Guidelines suggested that evaluations of surveillance systems should examine **SURVEILLANCE SYSTEM USEFULNESS** and nine surveillance system attributes. The attributes are **SIMPLICITY**, **FLEXIBILITY**, **DATA QUALITY**, **ACCEPTABILITY**, **SENSITIVITY**, **PREDICTIVE VALUE POSITIVE**, **REPRESENTATIVENESS**, **TIMELINESS**, and **STABILITY**.

The 2001 Guidelines are a useful resource for planning your surveillance evaluation. However, these guidelines focus on the data and the system used to collect and manage it. For asthma programs, surveillance typically refers to a more expansive set of activities, such as appropriately sharing information and using it to guide program decisions. Before using the 2001 Guidelines, assess which of the suggested attributes are applicable to your program's asthma surveillance efforts.

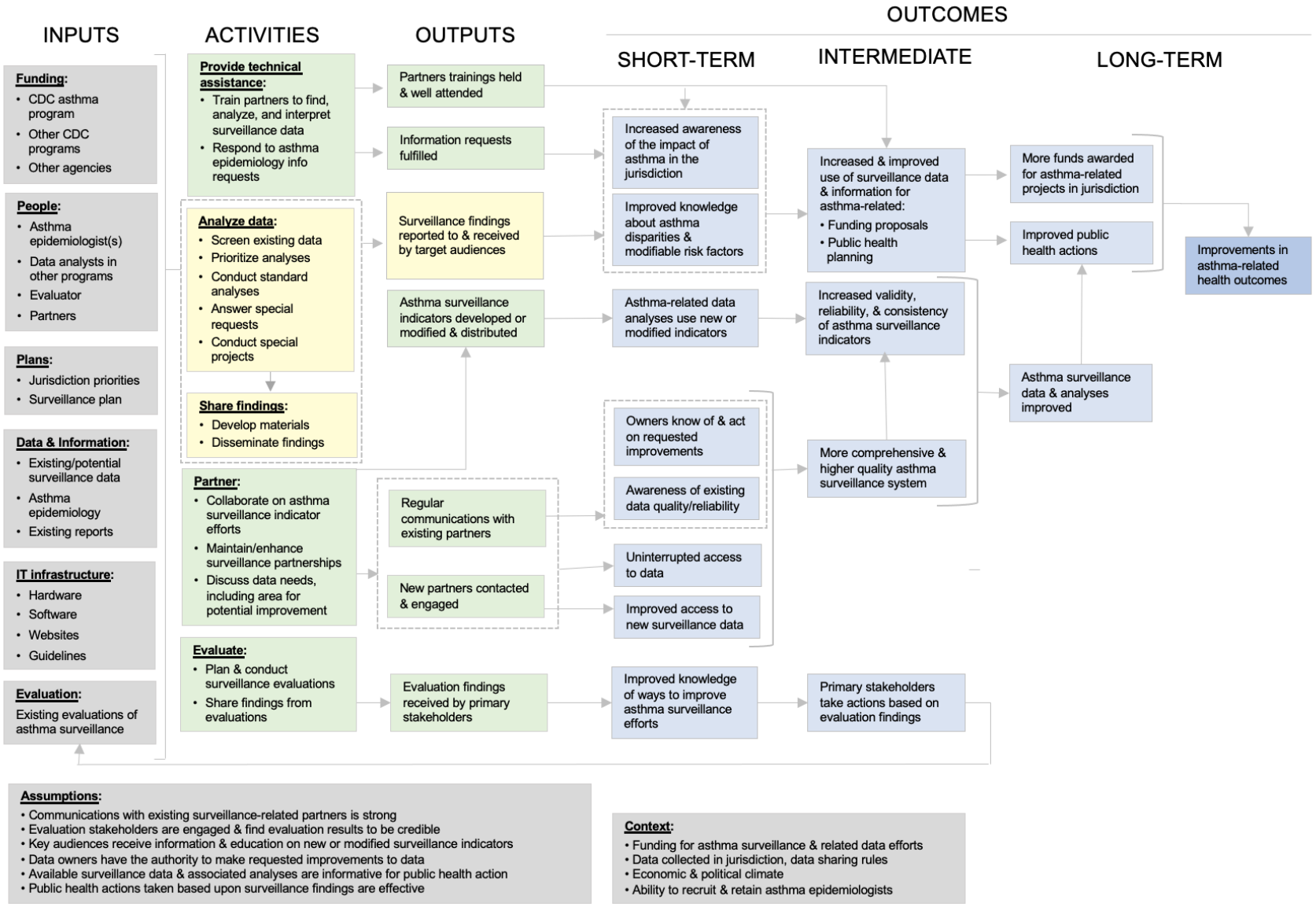
Recognizing that adjustments to the existing Guidelines were needed to properly evaluate asthma program surveillance efforts, the Asthma and Community Health Branch convened the CDC-State Surveillance Evaluation Workgroup (Workgroup) between October 2006 and March 2008.[1] The Workgroup identified asthma surveillance activities not addressed in the Guidelines. For example, they observed that many asthma programs have entities outside of the asthma program or health department conduct common surveillance activities (e.g., data collection, maintenance, and analysis), rather than internal personnel. External partners may apply different methods for ensuring data quality and representativeness, making the simple evaluation suggestions in the Guidelines infeasible.

Another difference the Workgroup noticed was that asthma epidemiologists and data analysts frequently conduct activities beyond those outlined in the Guidelines, such as supporting the surveillance efforts of external partners and answering inquiries about risk factors.
To address these differences, the Workgroup modified the surveillance attributes and processes outlined in the Guidelines to better describe the unique inputs, activities, outputs, and outcomes of asthma surveillance. Using this information, they developed a logic model for asthma program surveillance efforts (**Figure 1.1**). Your asthma program can modify this surveillance logic model so that it fits your program's specific surveillance activities and context. For example, asthma programs may not provide technical assistance to partners through formalized trainings but may have other activities and intended outcomes that should be incorporated into the logic model.

The sections of this module draw on the *CDC Framework for Evaluating Public Health Programs* (CDC, 1999) and the conceptualization of asthma surveillance seen in **Figure 1.1** to provide evaluation strategies for asthma program surveillance activities.

[1] The Surveillance Evaluation Workgroup was in place between October 2006 and March 2008. Workgroup members included CDC staff members (project officers, epidemiologists, and team management) from the Asthma and Community Health Branch (formerly the Air Pollution and Respiratory Health Branch), and representatives from 11 funded state asthma programs. The Battelle Centers for Public Health Research and Evaluation were contracted to provide expert assistance with this workgroup effort.

Figure 1.1 Overarching Logic Model of Asthma Program Surveillance Activities



Applying Step 1 – Engaging Stakeholders in an Asthma Surveillance Evaluation

The first step in evaluating your asthma program's surveillance activities is to engage surveillance stakeholders. Surveillance stakeholders may include people directly involved with your surveillance activities (e.g., epidemiologists), owners of the different data sets, the BRFSS coordinator for the state, users of your surveillance results (e.g., program managers, partners who use surveillance data or findings, public or organizational policymakers), and other individuals potentially interested in the evaluation results (e.g., other asthma program epidemiologists, ACHB).

Your Strategic Evaluation Planning Team may have already suggested relevant stakeholders to involve based on their proposed surveillance evaluation topic. If available, review this list first and note any stakeholders who should be added or removed.

Continue to work with important program decision makers and constituents who you engage during each step of your surveillance evaluation.

Asthma Program Epidemiologists. Although not required, epidemiologists are important stakeholders to engage throughout the surveillance evaluation since they play a central role in asthma program surveillance activities. Given that an asthma epidemiologist's primary responsibility is asthma surveillance, your epidemiologist may feel reluctant or anxious about an evaluation of the asthma program's surveillance efforts. Useful techniques for reducing evaluation anxiety among stakeholders are presented in **Appendix D** of *Implementing Evaluations* (Module 2).

Additional Surveillance Stakeholders. Decisions about other surveillance stakeholders to engage, as well as when and how to engage them, will depend upon the purpose and phase of a surveillance evaluation (e.g., planning, implementation, acting on findings). For example, if you are preparing for an evaluation of data collection methods, you may want to include the data owners during the planning stage. Alternatively, if you are evaluating the effectiveness of surveillance report dissemination, you will probably want to engage the end-users of surveillance products. You may need to adjust and revise the plan for engaging stakeholders as you focus the evaluation in later steps.

Defining Stakeholder Roles and Responsibilities. As you select your stakeholders, determine which individuals or groups are primary, secondary, and tertiary to the evaluation (see Module 1). Classifying stakeholders in this way will help guide the focus for their involvement and define the roles and responsibilities each of the stakeholders play throughout the process. These roles should be clearly defined and agreed upon prior to beginning the evaluation.

Methods for Engaging Stakeholders. When preparing for a surveillance evaluation, consider the most meaningful ways to engage stakeholders. If you have limited resources or time, you may want to focus on engaging primary stakeholders who have a particular expertise or who can provide the most relevant insight. You can solicit the involvement of other stakeholders using methods such as surveys, interviews, or focus groups. Additional information about evaluator roles is provided in Module 1, **Appendix C**; it can help you brainstorm how you will structure your interactions with various stakeholders.

Vignette 1 – Deciding Which Stakeholders to Engage

After completing a comprehensive asthma surveillance report, Jerry, the epidemiologist, asked his colleagues in the state asthma program how the report was being used. His question prompted the Strategic Evaluation Planning Team to propose evaluating whether this report was being used in ways that impacted the state's asthma burden.

In this vignette, we follow the three core members of the Evaluation Planning Team—Joe, the evaluator, Amy, the program coordinator, and Susan, the program manager, as they decide which stakeholders should be engaged in the evaluation of the report.

Amy: As the Strategic Evaluation Planning Team mentioned, we definitely need to include Jerry on this Evaluation Planning Team, since he's the epidemiologist. He knows the surveillance data better than anyone and is the person who initially raised the question about whether and how the report was being used.

Joe: I agree that we should include Jerry. However, since he is invested in the surveillance efforts and this report, we need to make sure he feels that he is a partner in this evaluation. He shouldn't feel as though we are setting out to criticize his work.

Susan: Good point. Can we think of anyone else whom we should engage in this evaluation?

Amy: What about two or three of the five coalition members who have told us they are using the report to help them write grants? I'm sure they will provide good input on specific ways they use our reports.

Susan: I agree that those coalition members could provide ideas for this evaluation. We should also include some members who say they don't use the report to understand if the report is not accessible or doesn't meet their needs.
I wonder how much time and effort they are willing to contribute to this evaluation, especially since they are located across the state. This distance could make an in-person meeting inconvenient and costly.

Joe: Why don't we solicit their input in a few virtual meetings? If we use a virtual meeting, we could also consider inviting a couple other individuals from the state asthma coalition or from local health departments to join, since they probably use the report and are likely to be impacted by the changes we might make to future reports.

Applying Step 2 – Describing the Asthma Program Surveillance Efforts

After engaging stakeholders, your Evaluation Planning Team should describe the purpose of your asthma program surveillance efforts and what they entail.

Providing Context for the Evaluation. Your surveillance evaluation plan should begin with a brief statement about the public health importance of asthma in your jurisdiction (e.g., asthma prevalence, severity, trends, disparities, costs, preventability, and public interest). You may also want to include a brief description of your surveillance data to provide important context. The description could include the data set names, frequency of data collection, sources from which these data are obtained, and the legal authority through which you obtain the data. Funding sources for your surveillance efforts, the economic and political climate, and the ability to recruit and retain epidemiologists may also be helpful information to include.

Overarching Surveillance Logic Model. During the strategic evaluation planning process for your asthma program, the team may have included surveillance-specific components in your program's logic model or conceptual diagram. Using this information as a guide, your Evaluation Planning Team should create or refine a logic model that accurately describes the inputs, activities, outputs, and outcomes solely associated with your surveillance efforts. They should also draw connections between these components. As previously noted, you can adapt the generic asthma surveillance logic model (**Figure 1.1**) to fit your program's unique components and processes.

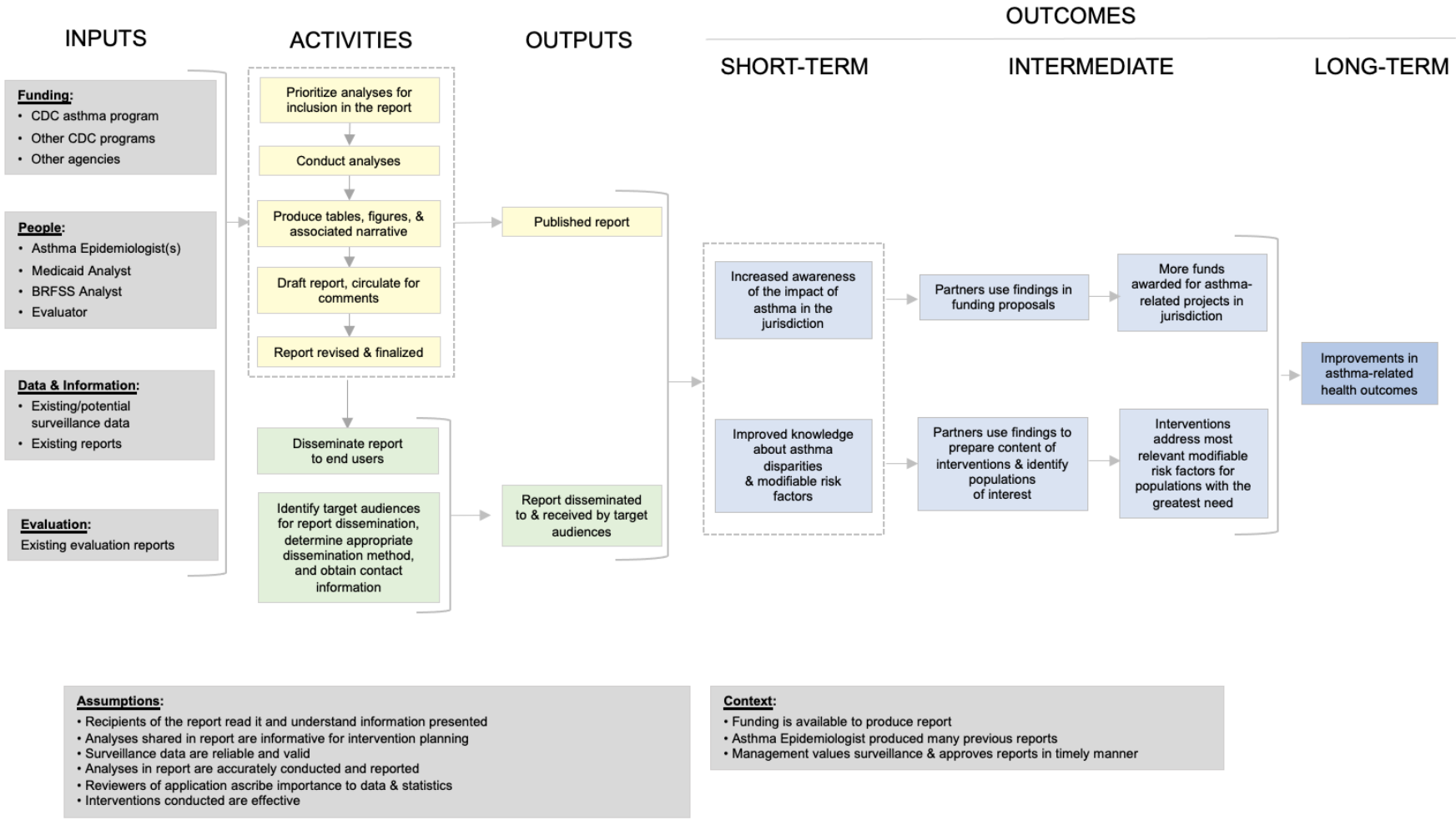
External stakeholders are helpful to include in the creation of the overarching surveillance logic model. They provide important perspectives on the surveillance components and processes outside of the evaluation team's purview.

This overarching surveillance logic model plays many roles throughout the evaluation process. It can help the Evaluation Planning Team identify an evaluation focus as they design the evaluation in Step 3. It also can be used as a communication tool to inform surveillance stakeholders about the scope and processes of your asthma program's surveillance efforts.

Nested Logic Model. After creating an overarching surveillance logic model, the Evaluation Planning Team should review the priority evaluation candidates or focus areas previously suggested by the Strategic Evaluation Planning Team. As described in Step 3, you should determine whether the suggested focus is still relevant given the current program context and evaluation priorities.[2] Your Evaluation Planning Team should identify the most applicable set of boxes in the overarching surveillance logic model that correspond to your final selected evaluation focus. Using these boxes, you may draw a **NESTED LOGIC MODEL** that zooms in and expands on the specific inputs, activities, outputs, outcomes, and processes associated with the evaluation focus. **Figure 1.2** provides an example of a nested surveillance logic model that portrays details about sharing surveillance findings through a report.

[2] The steps in the *CDC Framework for Program Evaluation in Public Health* are not always followed linearly. You may need to return to a previous step after reviewing or refining evaluation candidate topics, questions, or designs.

Figure 1.2. Nested Asthma Surveillance Logic Model for an Evaluation of Report Use and Dissemination



Vignette 2 – A Picture is Worth a Thousand Words

After identifying stakeholders who could contribute to an evaluation of the asthma surveillance report, Amy, Susan, and Joe created an overarching logic model describing all the asthma surveillance efforts they could think of. They conducted their first virtual meeting with the stakeholders who were considered important in this surveillance evaluation. These stakeholders included the program epidemiologist, program manager, program coordinator, and a subset of coalition members. Together, they reviewed and refined the overarching surveillance logic model, making sure it accurately reflected the role of reporting in surveillance efforts. By working with the stakeholders, they were able to identify strengths and weaknesses of the surveillance system and determine whether they needed to focus the evaluation on report dissemination and use. This vignette explains their next steps.

Amy: Well, Jerry and the coalition members have certainly provided us with a great deal of information! We'll need a billboard to put all these details into our surveillance logic model!

Joe: (laughing) I don't think we need to go that far, though that would be amusing! But seriously, after I reviewed all the comments, I can see that the coalition members have identified two major issues in our asthma surveillance efforts: the process for distributing the surveillance findings and the use of the current report.

Amy: That's just what I was thinking. It seems we should evaluate how this report is used, just as the Strategic Evaluation Planning Team suggested. Since the process for distributing surveillance findings is linked to the report's use, we can easily add questions about dissemination methods to our evaluation.

Joe: Let's focus on those two areas and see whether we can describe report distribution and use in more detail. How about we develop a nested logic model, you know, zooming in on distribution and use? It will help us think through these specific aspects of surveillance. Then, we can share the completed version with the stakeholders.

Susan: That is a great idea! Looking at the overarching logic model, I think the key activities for developing the report are the "analyze data" and "share findings" boxes. We can expand these boxes and add more specifics in the nested logic model. It makes sense to specify our current report as an output of data analysis. We should also expand the "surveillance findings reported to and received by intended audiences" box, which includes dissemination.

Amy: Let's see what other information we can pull together from our stakeholder meeting notes to help us complete this nested logic model (Figure 1.2).

Applying Step 3 – Focusing the Surveillance Evaluation Design

Reconsidering the Evaluation Focus and Questions. After creating the overarching surveillance logic model, your Evaluation Planning Team should review the priority evaluation focus area(s) suggested by the Strategic Evaluation Planning Team. Your team should determine whether the focus area(s) are still pertinent. This review is especially important if changes have occurred in your surveillance efforts, such as if an epidemiologist has left the program or a data set is no longer available.

As you select the focus of your evaluation and articulate your evaluation questions, document your decision process so that your stakeholders understand how priorities were selected.

As described in Step 2, a nested surveillance logic model will help you depict your evaluation focus area(s) in detail and determine whether you need to modify or refine the evaluation questions posed by the Strategic Evaluation Planning Team. You may need to develop new evaluation questions if the focus of your evaluation has changed. The answers to the evaluation questions should be useful and actionable. For example, consider an asthma program whose evaluation questions assess four attributes of surveillance systems: data quality, flexibility, stability, and timeliness. If the data used for asthma surveillance are mainly collected and maintained outside of the asthma program, the Evaluation Planning Team should decide up front whether data owners are willing and able to make changes indicated by the evaluation findings. In some cases, changes to data may not be possible, especially if data are used for multiple purposes. If this is the case, refocus the evaluation on an aspect that can be modified or improved.

Your Evaluation Planning Team should also examine the interactions between the evaluation focus area(s) and other aspects of the surveillance efforts. The overarching logic model can help you document interrelationships among the various asthma surveillance components and can help you identify additional evaluation questions.

Examples of evaluation questions that are relevant to the entire spectrum of components laid out in the overarching surveillance logic model are listed in **Table 1.2**. There is great breadth in the types of evaluation questions that can be asked about surveillance; examples in the table are intended to stimulate ideas among your Evaluation Planning Team members.

Table 1.2 Sample Surveillance Evaluation Questions

Logic Model Component	Evaluation Question Examples
Inputs	• To what extent is the existing staffing structure sufficient to carry out the planned activities? Are there opportunities to supplement existing staff members in a manner that is not too costly? • How could the timeliness, completeness, accuracy, and consistency of our existing surveillance data be improved? • In what ways might the existing IT infrastructure be improved for better data collection and management?
Activities	• How could we better educate our stakeholders on interpreting data or findings through our technical assistance efforts? • What data or analyses are missing or lacking? How could the analysis of surveillance data be improved (e.g., faster turnaround, additional indicators)? • How could the surveillance data and analyses be enhanced to support identification of factors that may influence disparities in access to high-quality care? Disparities in health outcomes? • Are the surveillance data presented in a manner that is easily understood? How could we improve the methods or formats used to disseminate data or analytic findings? How could we improve the reach of our dissemination efforts? • How might we more effectively engage our partners and recipients in using our surveillance data? In what ways can we improve upon our existing partner relations or communications?
Outputs	• Were partner trainings held, and if so, which partners attended and why? What additional trainings are needed? In what ways did or didn't the trainings meet the attendees' needs? • Which intended audiences do our surveillance materials reach? Are these materials further disseminated or shared by our partners? If so, with whom are they shared? • What evaluation findings of our surveillance efforts were shared this year? With whom? How? How could we change these communications to better meet our partners' preferences?
Outcomes	• For what purposes are our surveillance data used? How, if at all, are they used in planning and guiding strategic action? • To what extent has the use of surveillance data by our key stakeholders improved because of our partner training? • In what ways has the use of our surveillance data resulted in increased funding for asthma-related projects? • In what ways have our standard asthma surveillance indicators improved since the publication of our last report? How might we continue to increase their validity and reliability?

Refining Your Evaluation Question(s). When you first create your surveillance evaluation question(s), they may be too broad and provide too little guidance for the data collection process. So, the next step is to make your questions as specific as possible so that they

- Guide the evaluation
- Inform the data collection process
- Identify pertinent people, places, or times
- Use measurable terms
- State what you want to learn

For example, imagine that an evaluation aims to answer, "What actions have been taken to identify gaps in our asthma surveillance data over the past two years, and are these activities sufficient?" We might ask what constitutes a gap in asthma surveillance data, and what do we mean by sufficient? Explain broad terms used in our evaluation questions more precisely so that it is clear what is being asked.

Replace the general terms in your surveillance evaluation questions with more specific terms so that your evaluation results provide useful, detailed information on what to improve.

In another example, say one of your surveillance evaluation questions is "To what extent are surveillance data used in planning? How could this usage be improved or increased?" Your Evaluation Planning Team could clarify that planning refers to the development of interventions that will be implemented using existing CDC asthma cooperative agreement funding in upcoming years. You may also want to identify whether the planning should involve either staff members or partners, or both.

Choosing or Modifying an Evaluation Design. Once you have decided upon your specific evaluation question(s), review the evaluation design suggested by the Strategic Evaluation Planning Team. Your Evaluation Planning Team may need to modify the recommended design(s), or if your evaluation questions have changed, you may need to choose a more appropriate evaluation design. Like the steps outlined for evaluating partnerships (Module 3), surveillance evaluations are most likely to be conducted with a **NON-EXPERIMENTAL DESIGN**. In selecting your design, it is useful to consider the four **EVALUATION STANDARDS** that reside at the center of the CDC Framework—**UTILITY**, **FEASIBILITY**, **PROPRIETY**, and **ACCURACY.**[3] Will certain evaluation designs provide more relevant and useful information? Do you have the resources and expertise to implement a particular design? Does the proposed design pose any ethical issues? Will the design lead to accurate answers to your questions?

Some questions you might ask when choosing your evaluation design are

- Is the design **appropriate** for answering the evaluation questions of interest?
- Is the proposed design **feasible** to conduct?
- Is this specific design likely to yield results that are **credible** for the intended purposes of the evaluation?

[3] In 2010, a fifth evaluation standard was added, evaluation accountability. This standard encourages increased transparency in planning and implementation of evaluations as well as how conclusions are drawn through documentation and meta-evaluation.

- Can this design be carried out in an **ethical** manner?
- Is the design **understandable** for all stakeholders interested in the evaluation?

Table 1.3 provides an example of the interrelationship between evaluation questions, stakeholder needs, and the evaluation design selected for a hypothetical surveillance evaluation. For more information about evaluation designs and their strengths and limitations, see **Appendix E** in *Implementing Evaluations* (Module 2).

Table 1.3 Example of Choosing an Evaluation Design

Evaluation Question	*What specific questions do you intend to answer through this evaluation?*	• To what extent is the report disseminated to the intended audiences? Who needs surveillance information and isn't getting it? • What sections, tables, and analyses are accessed, used, or referred to most often? How are they used? What information is not used? Why? • What specific information needs, if any, aren't being met by the current report?
Evaluation Stakeholder Needs	*Who will use the evaluation findings?*	The asthma program epidemiologist and program coordinator.
	What do they need to learn from the evaluation?	The asthma program epidemiologist would like to know: • Can the report be distributed solely through the asthma program website, or are hard copies necessary to reach all intended audiences? • What information is most useful for program stakeholders? • How can the content of the reports be improved? The program coordinator would like to know: • How are specific analytic results used by program stakeholders? • What parts of the reports are most useful? What parts are less useful? • Do gaps exist? Are any priority audiences not getting the information they need? Is information needed that isn't in the current report?
	How will the findings be used?	The asthma program coordinator and epidemiologist will use the evaluation findings to decide how to: • Allocate resources for various distribution methods • Prioritize staff member time for varying data collection efforts, analyses, and time invested in developing reports • Strategize ways to fill any gaps identified
	What do intended users view as credible information?	Those who will use the evaluation results would find the following credible: • In-depth explanations from priority audience members • Detailed information presented in effective formats and information accompanied by examples
Evaluation Design	*What is the design for this evaluation?*	A non-experimental design.
	Why was this design selected?	Because the questions are descriptive in nature, a non-experimental design is appropriate. In addition, this design was thought to be most feasible given available resources and will yield sufficiently accurate findings to effect any necessary changes.

Vignette 3 – What is the Purpose and Design of Our Evaluation?

After developing the nested logic model, Amy, Susan, and Joe share it with the surveillance evaluation stakeholders in a second virtual meeting. During the meeting, the stakeholders provide their feedback on the logic model and decide to make a few changes to the nested logic model so that it more accurately and completely represents all the inputs, activities, outputs, and outcomes associated with surveillance report dissemination and use. Together, they use the nested surveillance logic model to review the evaluation questions originally suggested by the Strategic Evaluation Planning Team and add any questions they believe should be investigated. We rejoin the Evaluation Planning Team after the meeting.

Amy: That was a productive meeting. What do you all think about the evaluation questions we selected? They were, "Who accesses the report?" "Which, if any, target audiences are able to access the report and other surveillance data on our website?" "To what extent, and in what ways, are the report and other surveillance data products easy to understand?" and "How do stakeholders use the report and other data?"

Susan: I think these questions are good. I agree we need to identify who gets the report and how they use it, but from the discussion, I also heard that we need to identify what specific information they need and how to make it easier to understand. Shall we add those questions?

Joe: Yes, those are important questions as well. They are all relevant and interrelated and can be mapped nicely on our logic model. Now let's think about what we will be able to do with the evaluation findings if they should recommend changes, which is always a possibility. Amy, are you and Jerry going to be able to make changes to future reports and current processes? I mean, how much flexibility do you have? I know you work with many partners, so it's inevitable that what pleases one partner may make another unhappy. Are there limitations on what can be changed? And would there be funds to distribute a report in a different manner if the evaluation findings recommended that?

Amy: I think we can find funds to print and send a limited number of hard copies if we knew that was needed, but I think the bigger question is how useful are the different sections of the report, and who are they for? We need to find out who needs what data. Are there needs we're not fulfilling? Are there potential users we are missing? And are we providing data where there are no needs? Once we know the answers to these questions, we can figure out the best ways to get the report to the people who need the information.

Joe: Based on what we've been learning, it seems we have some pretty complex questions to answer. We'll need to select an evaluation design that will be flexible enough to get us information from current users, as well as from those who should use surveillance information but don't for some reason. Let's use the template to help us select an evaluation design (**Table 1.3**).

Applying Step 4 – Gathering Credible Evidence for the Surveillance Evaluation

Identifying Criteria of Merit and Associated Indicators. Once evaluation questions are clarified, your Evaluation Planning Team should spend some time discussing the dimensions of performance (i.e., criteria of merit) that align with the evaluation questions. For instance, if your surveillance evaluation included the following questions, "What is the current quality of our asthma surveillance system? In what ways could this quality be strengthened?" the Evaluation Planning Team might discuss what constitutes a high-quality surveillance system and may well identify one or more of the nine desirable surveillance system attributes described in CDC's *2001 Updated Guidelines for Evaluating Public Health Surveillance Systems* (e.g., flexibility, data quality, representativeness, timeliness; see **Appendix A** for a complete list and additional details). These selected attributes would constitute what evaluators call criteria of merit—"…the aspects of an Evaluand [the entity that is the focus of the evaluation] that define whether it is good or bad and whether it is valuable or not valuable" (Davidson, 2005, p.23).

By clearly articulating the criteria of merit, the team is defining what they mean by the ambiguous words that sometimes appear in evaluation questions. In the example provided in the previous paragraph, the system attributes selected help clarify what the team means by quality. Once this is established, measurement becomes an easier process and the team can move on to establishing one or more **INDICATORS** for each criterion. For instance, perhaps the Evaluation Planning Team selects usefulness of the surveillance system as a criterion of merit. Indicators of the asthma surveillance system's usefulness might include

- The number of legislative policies of public health importance regarding asthma control that cite documents presenting surveillance findings in the past five years
- The percentage of partners who have designed asthma-specific interventions or programs in the past five years that note using surveillance data in their planning process
- The number of new insights obtained regarding disparities in asthma prevalence, morbidity, or mortality from surveillance data in the previous five years

Documenting your rationale for selecting indicators will aid decisions made by those involved in the evaluation implementation process. This information will also benefit individuals who review or use your evaluation results by helping them judge the potential strengths and limitations of the findings. We recommend that you clearly document

- The indicators chosen for your evaluation
- Your reason(s) for choosing those indicators
- How indicators will, or will not, be merged in your findings
- Potential biases or limitations associated with the use of each indicator

To provide additional ideas for surveillance-related indicators, **Table 1.4** includes examples of evaluation questions, criteria of merit, and indicators for asthma surveillance evaluations. The organization and questions included in the table draw inspiration from the National Institute of Environmental Health Sciences (NIEHS), *Partnerships for Environmental Public Health, Evaluation Metrics Manual*, Chapter 4: Products & Dissemination (Drew et al., 2010). In this module, sample indicators are organized by whether your evaluation question is examining activities, outputs, or outcomes listed in your nested logic model. Though not exhaustive, this list can help provide ideas for evaluation questions, criteria of merit, and indicators for various surveillance evaluation topics.

Table 1.4 Example Criteria of Merit and Indicators for Asthma Surveillance Evaluations

Logic Model Component	Example Evaluation Question	Example Criteria of Merit and Associated Indicator(s)
Activities	To what extent is a report disseminated to the intended audiences?	**Comprehensiveness of reach** • Proportion of intended audiences reached by existing dissemination strategies
Outputs	To what extent is the report understood by the intended audiences?	**Clarity** • Percentage of intended audience members who agree or strongly agree that the report was easy to understand • Subgroups that most frequently disagreed or strongly disagreed that the report was easy to understand
		Cultural responsiveness – language • Percentage of intended audience for whom the report is written in primary language
Outcomes	What sections, tables, and analyses are accessed, used, or referred to most often? How are they used? What information is not used? Why?	**Alignment to interest or needs** • Tables most or least frequently viewed by readership • Sections of report most or least frequently viewed by readership
		Use of surveillance information • Types of information readership most or least frequently uses • Description of uses • Types of uses most or least frequently noted by readership • List of reasons provided by readership about why information is not used or used least frequently

Data Collection for Indicators. The next step is to decide what data need to be collected to calculate each of the selected indicators. When selecting data and data collection methods, consider each of the following

Engage stakeholders in discussions about different data collection options to gain the buy-in needed to produce credible evidence and actionable findings.

- Determine whether you have to collect data yourself or if the data already exist.
- Reflect on the strengths and limitations of different data collection strategies. The evaluation standards in the center of the CDC Framework graphic (i.e., utility, feasibility, propriety, and accuracy**)** are helpful when considering the strengths, limitations, and tradeoffs of each proposed data collection strategy.
- When possible, use multiple data collection methods and sources to obtain the information needed to answer your evaluation question(s). Using different methods can improve the evaluation since every data collection method has different strengths and limitations.
- Think through what the intended users of the evaluation findings will view as credible. For example, it is highly likely that epidemiologists are the primary, intended users of the surveillance evaluation findings. Epidemiologists frequently use and are trained in collecting, analyzing, and interpreting quantitative data. Therefore, the evaluation may be viewed as more credible if it contains quantitative data collection strategies. However, this does not mean that you should only collect quantitative data and only conduct quantitative analyses. If answering the evaluation questions at hand requires more perspective, context, and detail than the quantitative data may provide, consider including qualitative data collection methods (in addition to, or perhaps in place of, quantitative). In this case, it would be important to work with epidemiologists to discuss the value-add of qualitative methods in this specific case. Discussions may increase the likelihood of the stakeholders making use of the findings.

Applying Step 5 – Justifying Conclusions from the Surveillance Evaluation

Analyzing and Combining Indicators. Answers to evaluation questions may remain unclear if there is no way to systematically define the "merit, worth, or significance" (Scriven, 1991) of the resulting indicators. Therefore, before collecting data, your Evaluation Planning Team should set **PERFORMANCE STANDARDS**. These standards help define what is an acceptable result or performance level and what findings should trigger action. Once performance standards are established, data can be translated into decisions.

As described in Module 1, a performance *standard* serves as a goal or *target* for performance. These standards are frequently referred to as benchmarks. Standards answer questions such as how do we as a program want to do or 'perform' on this indicator? What will we find acceptable? Indicators, on the other hand, are the specific, observable, and measurable characteristic or change that shows the progress a program is making with respect to specific criteria of merit (DHHS, 2005).
Setting performance standards is sometimes difficult. Indicators may not have set standards for success because they are dependent on context and stakeholders. Therefore, when defining performance standards

- Discuss performance standards with stakeholders who have diverse perspectives or experience with the subject matter. For example, you could include individuals regularly engaged in the policymaking process if the evaluation question is, "To what extent have surveillance data been used to inform policy development?"
- Consider performance of similar programs or evidence from the existing literature. For example, suppose you are answering the evaluation question, "To what extent have surveillance data been used to inform policy development?" This question may require measurement of multiple indicators, including "the percentage of policies proposed to the state legislature in the past five years that have cited asthma surveillance data." Your Evaluation Planning Team may, after consultation with other public health programs who have previously conducted similar evaluations decide to define performance as excellent, when 50% or more of proposed policies cite the data.

Table 1.5 provides an example of how evaluation questions, indicators, and performance standards connect in a hypothetical surveillance evaluation. Notice how indicators and performance standards are not always quantitative.

Table 1.5 Example of Indicators and Associated Performance Standards

Evaluation Question	Example Indicator(s)	Example Performance Standards
To what extent have surveillance data been used to inform policy development?	Percent of asthma-related policies proposed to the state legislature in the past five years that have cited asthma surveillance data	• **Poor**: <25% of proposed policies • **Good**: 25-50% of proposed policies • **Excellen**t: > 50% of proposed policies
	Reported importance of asthma surveillance data in developing public policies by individuals engaged in recent asthma-related policy development efforts	• **Poor**: Individuals make remarks that demonstrate they do not value surveillance data for informing policy development or are unaware of its potential utility. They mention concerns about data quality necessary for policy development or exhibit a lack of awareness about surveillance data. • ***Acceptable or Good***: Individuals generally recognize the value of surveillance data for policy development but consider other factors involved in the policy-making process as more important than surveillance results. • ***Superior or Excellent***: Individuals consistently express that surveillance data are highly relevant to the current task, are accurate and reliable, and used often to inform policy development.

Vignette 4 – What Did We Find Out?

In this vignette, we join the Evaluation Implementation Team after data collection has been completed. Per the data collection plan, Joe obtained the list of people who had downloaded the report. He randomly selected and interviewed six people who had downloaded reports each year for the past three years and six who had downloaded only one report in the past three years. During those interviews, respondents were asked if others in their community should receive the report, and if so, who should receive it. Four names emerged that were not originally on the list of people who downloaded the report, and Joe interviewed them. Following the plan, Joe reviewed the notes and recordings from the interviews and shared a summary with Amy and Susan. We revisit them as they are sitting down to discuss the analysis and their interpretations.

Joe: I know we've only interviewed 16 people, but I can already see a convergence of ideas about what is useful about our reports and what is not.

Amy: Yes, I was surprised that everyone seems to be using the same tables and graphs.

Susan: …and I was also surprised at how strongly everyone felt about wanting the tables and graphs to be in a format that they could copy directly into their own documents.

Joe: What was your take on the perspectives of the non-users?

Amy: It seems the main issue is that they don't know where to find the reports. We can address that issue by increasing how and where we publicize our reports to make them more readily accessible.

Susan: Yes, that shouldn't be difficult; we'll just need to be more creative. I am also concerned about the data they say they want…many of the people who don't regularly use the report say they need data by county—we can't do that.

Amy: Can we combine several years of data by county—at least for the most used tables?

Susan: Maybe. We can ask Jerry. But I'm concerned about the extra work this would create for him.

Amy: Maybe we should consider removing some of the other tables and graphs that no one seems to be using? If he didn't have to create those graphs, it would free up some of his time. Just looking at the responses, it looks like no one used that one table that gave him such a hard time to put together and get through clearance. I think he will be thrilled if we can drop it from the next report and future reports.

Joe: Yes, we should get Jerry's thoughts about the pros and cons of county-level data; they will be important to share with the stakeholders, who will undoubtedly have additional insights and ideas about refining the report. Perhaps Jerry can even be the one to present these evaluation findings to the stakeholder group? His participation would help the group feel more comfortable about and supportive of recommending changes.

Amy: That's a really good point. We should also ask the group about their thoughts on how to share our findings with the state planning group and other partners. Let's draft a communication plan from the template when we meet again to talk about next steps.

Make Recommendations Based on Findings. Once the indicators are calculated and examined against the standards, we can formulate recommendations for actions.

Returning to the example in **Table 1.5**, suppose that the Evaluation Implementation Team found that less than 25% of asthma-related policies cited surveillance data, and the majority of the individuals interviewed believed that surveillance data were unimportant for informing asthma-related policy. Discussions among members of the Evaluation Implementation Team might suggest that the following three activities could lead to improved performance (1) directly disseminating a two-page document that summarizes the state asthma burden to local and state policy makers, (2) including policy recommendations with any surveillance report or product, and (3) having a communication specialist and or state asthma epidemiologist follow up with policy makers to address any questions about the surveillance data and recommendations. The Evaluation Implementation Team and other relevant stakeholders should be involved in discussions regarding these suggested activities, including assessing their potential feasibility.

Applying Step 6 – Ensuring Use of Evaluation Findings and Sharing Lessons Learned

As we have emphasized throughout *Learning & Growing*, the Evaluation Planning Team and the Evaluation Implementation Team should always be thinking about how the findings from the evaluation will be used. In Step 1 of the CDC Framework *Engage Stakeholders*, you were asked to identify evaluation stakeholders who might use the evaluation findings, those who might be affected by changes made as a result of the findings, and those who may have a general interest or stake in the evaluation findings.

It is helpful to revisit this list of stakeholders and consider how you might communicate with them about the evaluation. Think through when and how often the communication should occur and the purpose of these communications. As you look across the various audiences, you will probably notice that information needs and preferred delivery modes differ.

Suppose that the purpose of your evaluation is to examine whether your program's data training efforts have improved your partners' knowledge, access, and interpretation of surveillance findings as well as why these improvements did or did not inform future training efforts. **Table 1.6** provides an example plan for communicating with audiences interested in learning about and taking action based on the findings from this evaluation. Remember to consider engaging the Evaluation Implementation Team to help develop the communication plan. Consult **Appendix J** (Effective Communication and Reporting) of *Implementing Evaluation* (Module 2) for specific ideas about your communication and reporting plan.

Vignette 5 – Planning for Action

In this vignette, we join the Evaluation Implementation Team as they discuss the final stages of their evaluation. They have met with the stakeholder group and interpreted the findings, and they have developed and prioritized recommendations. They now meet to flesh out the action plans based on these recommendations and discuss lessons learned.

Amy: What a great meeting! Jerry did a great job presenting the findings and Joe, you did a great job of facilitating.

Joe: Thank you! The group did come up with some novel ideas.

Amy: Yes, and they volunteered to take on work, too! Andi even agreed to chair the group to revise the plan for the next report.

Sue: Let's hope it gets done…

Amy:…all the more reason to be timely in our follow-up. From my notes, we need to develop action plans regarding redesigning reports and developing a new dissemination strategy.

Sue: Don't forget about the county-level tables they want.

Amy: The group planning the redesign can address that I think—the people who volunteered for that group were the ones wanting the county-level tables. Still, it will be good if one of us participates in the group to be sure none of the ideas are lost.

Joe: I'll get started filling in the action plan templates from *Implementing Evaluations* then we can leave the final decisions for the workgroups.

Amy: And we'll add updates to the agenda for the next meeting. And I'll work on a summary of the evaluation for the newsletter.

Joe: We should also plan a debrief so that we can do better next time.

Sue: Next time? Aren't we done?

Amy: Don't you want to find out how well the action plans get done? If the new report format works better and more people use the reports? Next time, I'd like to know exactly how the tables are used—and if anything happens because they are used.

Table 1.6 Example Surveillance Evaluation Communication Plan

Audience 1: Asthma program epidemiologist, asthma program manager, and surveillance evaluation workgroup			
Purpose	**Formats**	**Timing**	**Notes**
Include in decision-making about evaluation design or activities.	Regular in-person meetings for planning this evaluation	Bi-weekly (minimum)	
Inform about specific upcoming evaluation activities.	Regular staff meetings; email correspondence	Weekly as needed	Set electronic reminder to provide email update
Keep informed about evaluation progress.	Regular staff meetings	Weekly	
Present initial or interim findings.	In-person meetings; email short summaries	After post-test data analysis	
Present complete or final findings and recommendations.	Working session to discuss findings and actions; provide final written report	After all data are complete and analyzed	
Audience 2: Strategic Evaluation Planning Team members (beyond asthma epidemiologist and program manager)			
Purpose	**Formats**	**Timing**	**Notes**
Keep informed about progress of the evaluation.	Email correspondence	Quarterly	
Present complete or final findings and recommendations.	Email final written report; discuss findings at annual in-person meeting	End of evaluation; April 2021 meeting	
Audience 3: Other asthma programs			
Purpose	**Formats**	**Timing**	**Notes**
Present complete or final findings and recommendations.	Distribute summary of methods and findings via asthma program evaluation listserv	End of evaluation	Distribute after results released to all other stakeholders

Once the evaluation is appropriately shared among stakeholders, the results need to be acted upon. These actions may be as simple as deciding to continue course or as dramatic as terminating an initiative. Most actions will be modifications to activities to improve efficiency or effectiveness. To ensure your evaluation findings are used to effect programmatic improvement, we strongly urge you to develop an ACTION PLAN. When developing action plans, it is essential that the planned action flows directly from the finding and is described with sufficient detail. Record who will assure implementation, what resources will be needed, when actions will occur, and how the results of the actions will be measured and tracked. **Appendix K** of Module 2 *Implementing Evaluations* provides some tools to assist in action planning and tracking the results of these actions.

Table 1.7 provides an example of an action plan that has been formulated to address findings discussed in the vignettes. Note that for each programmatic change sought, there is a clearly delineated and specific plan of action that addresses the questions of what, who, how, when, as well as how you will know change has occurred and data sources that will be used.

Table 1.7 Examples of Action Plans

Program Component: Surveillance
Evaluation Purpose: Inform development of report formats
Programmatic Change Sought: Revise the content of asthma surveillance reports to better meet the needs of the users

Evaluation Result	Current report contains unused information and does not contain needed, county-level, data.
Supporting Evidence	Responses to interviews

Plan of Action to Achieve Change							**Monitor Change**	
Change Needed	**Activities to Implement Change**	**Person Responsible**	**Resources Required**	**Due By**	**Indicators that Change is Implemented**	**Data Sources**	**Indicators to Monitor Success of Change**	**Data Sources**
Describe key change(s) you want to achieve based on this finding.	List activities that need to be carried out to make the change happen in the program.	List the person(s) who will assure each activity occurs.	List resources required for the activity.	Assign a due date by which the activity will be completed.	Describe how you will know that the change is implemented as planned.	Describe what data you will need to have to know change has been implemented.	Describe how you will know the change to program is working or not.	Describe the data you will need to measure success.
Revise the report content to better meet the users' needs.	Review current outline and determine what to eliminate; decide which analysis can be feasibly done by county; establish how information will be included in report; share with full workgroup; revise and implement plan; and publish report.	Andi	Time of the review team, Jerry's time to complete the new analysis and reports	Outline of new report within three months; new report within six months	When the new report is released	Outline and then report(s)	Discussion when outline presented, follow-up with stakeholders after getting reports	Follow-up interviews with stakeholders Requests for examples of products that use data from reports

Program Component: Surveillance
Evaluation Purpose: Inform development of future reports
Programmatic Change Sought: Revise the dissemination strategy related to reports

Evaluation Result	Report is not getting to all the people who can use the information.
Supporting Evidence	Several interview respondents named people who should have downloaded the report, but there is no record of that they did. Also, respondents who had not recently downloaded anything noted that they had forgotten the information was there.

Plan of Action to Achieve Change							**Monitor Change**	
Change Needed	**Activities to Implement Change**	**Person Responsible**	**Resources Required**	**Due By**	**Indicators that Change is Implemented**	**Data Sources**	**Indicators to Monitor Success of Change**	**Data Sources**
Describe key change(s) you want to achieve based on this finding.	List activities that need to be carried out to make the change happen in the program.	List the person(s) who will assure each activity occurs.	List resources required for the activity.	Assign a due date by which the activity will be completed.	Describe how you will know that the change is implemented as planned.	Describe what data you will need to have to know change has been implemented.	Describe how you will know the change to program is working or not.	Describe the data you will need to measure success.
Report(s) used by everyone who needs information on asthma.	Review list of potential users; list ideas for how information in reports can be used; work with subgroup to identify a strategy to contact potential users; implement strategy.	Ann	Ann's time, to review evaluation information, find contact info for potential users, and draft messages Money for printing and postage (if hard copies are agreed)	Two months from next report release	Report gets to more identified users	Records of online clicks to report	Increased diversity of who downloads the report	Web tracking Survey of all identified potential users

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NOTES

Appendix A. Applying CDC'S 2001 Updated Guidelines for Evaluating Public Health Surveillance Systems

In 2001, an expert CDC Workgroup released recommendations for evaluations of public health surveillance systems in the Morbidity and Mortality Weekly Report (MMWR). This guidance ensured that important public health issues were monitored efficiently and effectively. The Workgroup adapted the six program evaluation steps in the CDC *Framework for Program Evaluation in Public Health* (CDC, 1999) to specifically apply to the evaluation of surveillance systems. A checklist for these tasks was created by the Workgroup to aid in evaluations (**Figure A.1**) and can be adapted to your jurisdiction's circumstances.

Engage Evaluation Stakeholders. As described elsewhere in this module, this first step in this process is to identify individuals who will be involved in or affected by the results of the surveillance evaluation and ask about their information needs. Since surveillance data may include sensitive, personal information, the evaluation should be designed so that appropriate measures are taken to preserve the confidentiality of data included in the evaluation.

Describe the Surveillance System. CDC's 2001 updated guidelines propose three features that should be present when describing the surveillance system: (1) the public health importance of the health event under surveillance, (2) the purpose and operational aspects of the surveillance system, and (3) articulating what resources are necessary to operate the surveillance system.

With respect to describing the public health importance of the health event under surveillance, the authors recommend discussing the following items.

- Frequency with which the health event occurs as indicated through various measures, such as incidence, prevalence, morbidity, and mortality rates
- Summary measures of population health status, such as quality-adjusted life years or disability-adjusted life years
- Severity of the health-related event under surveillance as indicated through measures such as hospitalization rates, disability rates
- Disparities associated with the health-related event, which existing public health reports may already highlight
- Costs associated with the health-related event, e.g., healthcare-related costs and broader economic impacts associated with the inability of individuals with the health-related event to engage in work or school.
- Preventability of the health-related event, taking into account the current efforts that can be taken to promote primary, secondary, and tertiary prevention
- The possible clinical course that may occur if no intervention was available. For example, what would the natural progression a preventable infectious disease be in the absence of administering a vaccination?
- Public interest in the health-related event. Is this a health condition for which the public expresses concern?

The next items to describe are the purpose and objective of the system and planned uses of the data in the surveillance system. The case definition of the health-related event used for the surveillance system should be clearly stated. Aspects of the surveillance system's operation should be defined, such as where the surveillance system's data sets reside. In addition, it is helpful to include a map or flow chart of data collection procedures.

The attributes of each data set comprising the system should also be described, including

- The population under surveillance
- The time period of collection for each dataset
- The method of data collection
- The sources of data
- How data are managed (where are they stored, who is responsible for storing them, how are they coded, etc.)
- How data are analyzed (how often, appropriate methods to use) and disseminated (who are the audience(s), what mechanism(s) best serves to reach them)
- Security of the data (what infrastructure is in place to safeguard privacy of health data)

Other attributes important in the description include the resources used for data collection and system operation, including the funding source and personnel.

Focus the Surveillance Evaluation Design. After describing and focusing the purpose of the evaluation, generate evaluation questions and select a study design. As previously discussed, it is important to continue engaging stakeholders in the process. Stakeholders may have different ideas about what constitutes a credible evaluation design, and such opinions can affect whether the stakeholder ultimately feels comfortable using the evaluation findings.

The CDC Workgroup also noted that performance standards should be defined, include the surveillance system's usefulness, and describe how well the system performs on the nine desirable attributes outlined and defined in **Figure A.1**. You may find it helpful to consider these standards when designing an evaluation of a surveillance system, depending upon the evaluation questions of interest.

Gather Credible Evidence on the Surveillance System Performance. The authors suggest that two elements should be assessed when examining the performance of a surveillance system, the usefulness of the system and the performance of the system attributes. These performance measures and suggested indicators are outlined in **Table A.1**. As part of this guidance, the authors acknowledge the great variation that exists among public health surveillance systems and note that the guidelines they provide (e.g., tasks to be followed, system attributes to consider) will likely need to be tailored to these contexts.

State and Justify Conclusions and Make Recommendations. The perspectives, procedures, and rationale used to interpret the evaluation results should be stated, and each conclusion should have a strong justification. The authors suggest that evaluators provide recommendations and relate each back to specific findings from the evaluation.

Ensure Use of Evaluation Findings and Share Lessons Learned. The authors note that reports should clearly describe the system and the conclusions of the evaluation. Reports should be disseminated in an appropriate timeframe and in a usable, cost-effective format to the appropriate stakeholders.

Figure A.1 Checklist for Evaluating Public Health Surveillance Systems Developed by the CDC Public Health Surveillance Evaluation Workgroup (CDC, 2001). This checklist can be adapted for your jurisdiction.

✓ **Engage the stakeholders in the evaluation**

✓ **Describe the surveillance system to be evaluated**

- ☐ Describe the public health importance of the health-related event under surveillance
  - ☐ Indices of frequency
  - ☐ Indices of severity
  - ☐ Disparities or inequities associated with the health-related event
  - ☐ Costs associated with the health-related event
  - ☐ Preventability
  - ☐ Potential future clinical course in the absence of an intervention
  - ☐ Public interest
- ☐ Describe the purpose and operation of the surveillance system
  - ☐ Purpose and objectives of the system
  - ☐ Planned uses of the data from the system
  - ☐ Health-related event under surveillance, including case definition
  - ☐ Legal authority for data collection
  - ☐ The system resides where in organization(s)
  - ☐ Level of integration with other systems, if appropriate
  - ☐ Flow chart of system
  - ☐ Components of system
    - Population under surveillance
    - Time period of data collection
    - Data collection
    - Reporting sources of data
    - Data management
    - Data analysis and dissemination
    - Patient privacy, data confidentiality, and system security
    - Records management program
- ☐ Describe the resources used to operate the surveillance system
  - ☐ Funding source(s)
  - ☐ Personnel requirements
  - ☐ Other resources

✓ **Focus the evaluation design**

- ☐ Determine the specific purpose of the evaluation
- ☐ Identify stakeholders who will receive the findings and recommendations of the evaluation
- ☐ Consider what will be done with the information generated from the evaluation
- ☐ Specify the questions that will be answered by the evaluation
- ☐ Determine standards for assessing the performance of the system

✓ **Gather credible evidence regarding the performance of the surveillance system**

- ☐ Indicate the level of usefulness
- ☐ Describe each system attribute
  - ☐ Simplicity
  - ☐ Flexibility
  - ☐ Data quality
  - ☐ Acceptability
  - ☐ Sensitivity
  - ☐ Predictive value positive
  - ☐ Representativeness
  - ☐ Timeliness
  - ☐ Stability

✓ **Justify and state conclusions, and make recommendations**

✓ **Ensure use of evaluation findings and share lessons learned**

Table A.1 Definitions and Potential Measures for Evaluating Surveillance System

Attribute	Definition	Example Indicators
Usefulness	"A public health surveillance system is useful if it contributes to the prevention and control of adverse health-related events, including an improved understanding of the public health implications of such events … it helps to determine that an adverse health-related event previously thought to be unimportant is actually important" (CDC, 2001, p.13).	Number of policies and procedures of public health importance (e.g., legislation, clinical guidelines) regarding asthma control that cite documents presenting surveillance findings
		Amount of time the system takes to detect trends that signal changes in emergency department visits for asthma
		Number of new insights obtained regarding disparities in asthma prevalence, morbidity, or mortality from surveillance detected in the previous five years
Simplicity	"…refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives" (CDC, 2001, p.14).	Amount and type of data necessary to establish occurrence of events
		Amount and type of supporting data available (e.g., demographic data)
		Number of individuals and organizations involved in data collection
		Percentage of data sets in the asthma surveillance system that can be joined with at least one other data set in the system
		Number of data sources
		Time spent obtaining data sources
		Time spent cleaning existing data
		Time spent analyzing data for surveillance products
		Percentage of staff members attending a training on surveillance who report it was very easy or easy to understand the surveillance system components
		Resources spent on system maintenance (i.e., labor hours, monetary costs)
Flexibility	"A flexible public health surveillance system can adapt to changing information needs or operating conditions with little time, personnel, or allocated funds. Flexible systems can accommodate …new health-related events, changes in case definitions or technology, and variations in funding or reporting sources … systems using standardized data formats…can be easily integrated with other systems and thus might be considered flexible" (CDC, 2001, p.15).	Number of hours dedicated to integrating new questions into existing survey (e.g., BRFSS state-added module; Youth Risk Behavior Survey) compared to prior years
		Percentage of asthma-specific questions added (out of total requested) to existing survey (e.g., BRFSS state-added module; Youth Risk Behavior Survey)
		Proportion of asthma epidemiologist's time (during a given calendar or fiscal year) dedicated to updating analyses and surveillance products to account for changes in ICD codes

Attribute	Definition	Example Indicators
Data Quality	"…reflects the completeness and validity of the data recorded in the public health surveillance system" (CDC, 2001, p.16). (inclusive of sensitivity and predictive value positive, each described later in table)	Proportion of records in a data set that are missing data for one or more variables of importance to asthma surveillance
		Proportion of asthma deaths included in mortality data for whom the medical review committee confirms asthma as the underlying cause of death
		Proportion of data owners who have formalized training requirements for people collecting data used in asthma surveillance
Acceptability	"…reflects the willingness of persons and organizations to participate in the surveillance system" (CDC, 2001, p.17).	Response rates for asthma-specific questions on BRFSS Core
		Percentage of hospitals (that meet inclusion criteria) in the state that provide data regarding hospital discharges (by year)
		Percentage of hospitals (that meet inclusion criteria) that provided data regarding emergency department visits by reporting deadline
		Cost of asthma-specific data collection as reported by existing state-based survey coordinators
Sensitivity	"… can be considered on two levels. First, at the level of case reporting, sensitivity refers to the proportion of cases of a disease (or other health-related event) detected by the surveillance system. Second, sensitivity can refer to the ability to detect outbreaks, including the ability to monitor changes in the number of cases over time" (CDC, 2001, p. 18). Sensitivity = A/(A+C)	Proportion of all confirmed asthma hospitalizations through medical record review (A + C) that are included as cases where asthma is the first listed discharge diagnosis in hospital discharge file received (A)
Predictive Value Positive (PVP)	"…is the proportion of reported cases that actually have the health-related event under surveillance" (CDC, 2001, p. 20). PVP = (A/A+B)	Proportion of cases in hospital discharge data file received where asthma is the first listed discharge diagnosis (A+B) that are confirmed by a medical record review as a hospitalization due to asthma (A)
Representativeness	"A public health surveillance system that is representative accurately describes the occurrence of a health-related event over time and its distribution in the population by place and person" (CDC, 2001, p.20).	Percentage of demographics needed to examine the distribution of asthma hospital discharges (where asthma is the first listed discharge diagnosis) included as variables in the data set
		Percentage of jurisdiction's counties included in the data set

Attribute	Definition	Example Indicators
Timeliness	"…reflects the speed between steps in a public health surveillance system" (CDC, 2001, p.22).	Time from receipt of emergency department (ED) data to analysis of ED visits where asthma is the first listed discharge diagnosis by subgroups to identify deviations from normal trends
Stability	"…refers to the reliability (i.e., the ability to collect, manage, and provide data properly without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system" (CDC, 2001, p.23).	Ratio of target and actual time it takes to receive the most recent, complete, and cleaned data file from Medicaid (by year)
		Ratio of the number of years asthma-specific variables have been available in the data source relative to the number of years the data source has been available (for past five years)

The following table is for use with sensitivity and predictive value positive.

	Condition Present		
Detected by Surveillance	Yes	No	
Yes	*True Positive (A)*	*False Positive (B)*	*A + B*
No	*False Negative (C)*	*True Negative (D)*	*C + D*
	A + C	*B + D*	*Total*

For an example of the use of all 10 attributes in evaluating an asthma surveillance system, see

- Reeves, M.J., Lyon-Callo, S., Brown, M.D., Rosenman, K., Wasilevich, E., & Williams, S.G. (2006). Using billing data to describe patterns in asthma-related emergency department visits in children. *Pediatrics, 117*(4), S106–S117. Retrieved from: https://pediatrics.aappublications.org/content/pediatrics/117/Supplement_2/S106.full.pdf

For a detailed example of a surveillance evaluation examining the attribute of data quality, see

- Brunner, W.M., Ross, S.K., & Johnson, J.E.S. (2009). Review of the asthma mortality rate for Minnesota residents aged 55 years or older, 2004–2005: When death certificates deserve a second look. *Preventing Chronic Disease, 6*(3), A92. Retrieved from: https://www.cdc.gov/pcd/issues/2009/jul/08_0154.htm

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Appendix B. Glossary

Definitions included in the glossary can be found in the sources referenced at the end of the appendix. Note that glossary terms are often close paraphrases or excerpts from sources. Words highlighted in **GREEN, BOLD, SMALL CAPS** indicate cross-references to other terms included in the Glossary.

Acceptability	An attribute of public health surveillance systems reflecting the willingness of those involved in the surveillance system to provide accurate, consistent, complete, and timely data (Lee, Teutsch, Thacker, & St. Louis, 2010).
Accuracy	One of the program **EVALUATION STANDARDS** developed by the Joint Committee on Standards for Educational Evaluation. The extent to which an evaluation is truthful or valid in what it says about a program, project, or material (Yarbrough, Shulha, Hopson & Caruthers, 2011). See also **FEASIBILITY**, **PROPRIETY**, **UTILITY**, and **EVALUATION ACCOUNTABILITY**.
Action Plan	The steps to be taken to complete an objective or implement a recommendation. An action plan outlines specific tasks, resource requirements, responsible parties, and a timeline for completion (Center for Community Health and Development, n.d).
Additional Data Sets	Data sets that are not required under the current Notice of Funding Opportunity (NOFO). They may include but are not limited to the Youth Tobacco Survey, Youth Risk Behavior Survey, payers (e.g., Medicaid or Children's Health Insurance Program), worker's compensation claims, medical or pharmacy insurance claims, school district health data or student attendance records, use of healthcare services, and costs of care.
Behavioral Risk Factor Surveillance System (BRFSS)	The Behavioral Risk Factor Surveillance System (BRFSS) is the world's largest, on-going telephone health survey system. Surveys were developed and conducted to monitor state-level prevalence of the major behavioral risks among adults associated with premature morbidity and mortality. In 1999, an optional two-question adult asthma module was added to the BRFSS, and beginning in 2000, the two questions were included in the core of the BRFSS questionnaire and were asked in all participating jurisdictions (NCCDPHP, 2019).
Benchmarks	Measures of progress toward a g**OAL**, taken at intervals prior to the program's completion or the anticipated attainment of the final goal (EPA, 2007).
Core Data Sets	Data sets required under the current NOFO: Hospitalization, Emergency Department Visits, **BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM** (BRFSS) Core, BRFSS Random Child Selection Module, BRFSS Child Prevalence Module, BRFSS

	Asthma Call-Back Survey (adult), BRFSS Asthma Call-Back Survey (child), and Vital Statistics.
Data Quality	An attribute of **PUBLIC HEALTH SURVEILLANCE** systems that reflects the completeness and validity of the recorded data (Lee et al., 2010).
Evaluation Accountability	One of the program **EVALUATION STANDARDS** developed by the Joint Committee on Standards for Educational Evaluation. This standard encourages increased transparency in planning and implementation of evaluation as well as how conclusions are drawn through documentation and meta-evaluation (Yarbrough et al., 2011). See also **FEASIBILITY**, **PROPRIETY**, **ACCURACY**, and **UTILITY**.
Evaluation Standards	Developed by the Joint Committee on Standards for Educational Evaluation, evaluation standards are the criteria upon which the quality of program evaluations can be judged (Yarbrough et al., 2011). See also **ACCURACY**, **EVALUATION ACCOUNTABILITY**, **FEASIBILITY**, **PROPRIETY**, and **UTILITY**.
Feasibility	One of the program **EVALUATION STANDARDS** developed by the Joint Committee on Standards for Educational Evaluation. The feasibility standards are intended to ensure that an evaluation will be realistic, prudent, diplomatic, and frugal (Yarbrough et al., 2011). See also **ACCURACY**, **PROPRIETY**, **UTILITY**, and **EVALUATION ACCOUNTABILITY**.
Flexibility	An attribute of **PUBLIC HEALTH SURVEILLANCE** systems indicating how well the system can adapt to changing data needs and operating conditions if there is little to no additional time, personnel, or funds. Flexible systems can accommodate changes in definitions of health-related events, in technology, and in funding. It is best evaluated by retrospectively examining how a system responded to change (Lee et al., 2010).
Indicator	A specific, observable, and measurable characteristic or change that shows the progress a program is making toward achieving a specified outcome (DHHS, 2005).
Nested Logic Model	A logic model that depicts in greater detail a specific component of an overarching program model (Silverman, Mai, Boulet, & O'Leary, 2009).
Non-experimental Design	An evaluation design in which participant information is gathered during or after an intervention. There is no comparison group, control group, or repeated measurements of the treatment group (DHHS, 2005; Salabarría-Peña et al., 2007).
Performance Standards	A generally accepted, objective form of measurement that serves as a rule or guideline against which an organization's level of performance can be compared. Frequently referred to as **BENCHMARKS** (Davidson, 2005).

Predictive Value Positive (PVP)	The proportion of all reported health-related events that actually have a health-related event. A low value indicates that multiple events are incorrectly identified by the case-definition used for the system. Also known as the positive predictive value. Predictive value positive can be calculated by dividing the number identified as having the disease divided by all individuals who actually have the disease (true negative) (Lee et al., 2010).
Propriety	One of the program **EVALUATION STANDARDS** developed by the Joint Committee on Standards for Educational Evaluation. The extent to which the evaluation has been conducted in a manner that evidences uncompromising adherence to the highest principles and ideals (including professional ethics, civil law, moral code, and contractual agreements). See also **ACCURACY**, **FEASIBILITY**, **UTILITY**, and **EVALUATION ACCOUNTABILITY** (Yarbrough et al., 2011).
Public Health Surveillance	Public health surveillance is the continuous, methodical collection, analysis, interpretation, and dissemination of data regarding health-related events. Data collected from public health surveillance are used to inform decisions about public health action to reduce morbidity and mortality and improve health. Data from a public health surveillance system can be used to (1) determine whether events are of public health importance to guide action and signal areas where epidemiological evaluation is necessary, (2) measure disease burden or incidence or prevalence of health-related events, (3) identify high-risk populations and areas to prioritize allocation of health resources, (4) identify new or emerging health concerns, (5) monitor health-related events and practices to identify whether trends exceed expected levels, (6) guide the planning, implementation, and evaluation of programs to prevent and control disease, injury, or adverse exposure, (7) evaluate the effect of public policy, interventions, or social norms changes on health-related outcomes, (8) define the clinical course and natural history of disease, and (9) provide data for epidemiologic evaluation (CDC, 2001; Thacker, 2010).
Representativeness	An attribute of **PUBLIC HEALTH SURVEILLANCE** where the distribution of a health-related event is accurately described by place, population, and over time (Lee et al., 2010).
Simplicity	An attribute of a **PUBLIC HEALTH SURVEILLANCE** system describing whether the system's structure and operability is simple enough to promote easy use but still meet all system objectives (Lee et al., 2010).
Sensitivity	An attribute of a **PUBLIC HEALTH SURVEILLANCE** system that is an **INDICATOR** of performance. There are two types of

	sensitivity to be considered when measuring the performance of surveillance systems. Sensitivity may also be the ability to detect more health-related events than expected or to identify changes in health-related events over time (Lee et al., 2010).
Stability	An attribute of a **PUBLIC HEALTH SURVEILLANCE** system that refers to the reliability (i.e., the ability to manage and provide data properly without failure) and availability (the ability to be operational when it is needed) of the public health surveillance system (Lee et al., 2010).
Surveillance System Usefulness	A useful public health surveillance system supports action (such as prevention and control) in response to health-related events and supports the improved understanding of the public health implications of such events. For example, a useful system will have an effect on policy decisions and control programs. A system is also considered useful if it identifies trends or emergence of a health-related event. Data collected by a system will be useful if it identifies needs in certain populations. Usefulness might be affected by all the attributes of the datasets or data collection or analysis efforts (CDC, 2001; Thacker, 2010).
Timeliness	An attribute of a surveillance system that reflects the speed of surveillance activities (i.e., how quickly data can be collected, cleaned, analyzed, and disseminated). It is required to identify and react to trends or control measures. Timeliness may also reflect how quickly information needs to be obtained to implement appropriate control efforts for the public (Lee et al., 2010).
Utility	One of the program **EVALUATION STANDARDS** developed by the Joint Committee on Standards for Educational Evaluation. The extent to which an evaluation produces and disseminates reports that inform relevant audiences and have beneficial impact on their work (Yarbrough et al., 2011). See also **ACCURACY**, **FEASIBILITY**, **PROPRIETY**, and **EVALUATION ACCOUNTABILITY**.

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