



# EVALUATING ASTHMA SURVEILLANCE

## LEARNING AND GROWING THROUGH EVALUATION

**MODULE 4**

*April 2015*

Copies of *Learning and Growing through Evaluation: Evaluating Asthma Surveillance* can be viewed or downloaded from the following website: [http://www.cdc.gov/asthma/program\\_eval/guide.htm](http://www.cdc.gov/asthma/program_eval/guide.htm)

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## Module 4 Table of Contents

	<b>Page</b>
Evaluating State Asthma Program Surveillance Activities .....	1-2
Applying Step 1 - Engaging Stakeholders in an Asthma Surveillance Evaluation .....	1-6
Applying Step 2 - Describing the State Asthma Surveillance Efforts .....	1-8
Applying Step 3 - Focus the Surveillance Evaluation Design .....	1-11
Applying Step 4 - Gather Credible Evidence for the Surveillance Evaluation.....	1-17
Applying Step 5 - Justify Conclusions from the Surveillance Evaluation.....	1-19
Applying Step 6 - Ensure Use of Evaluation Findings and Share Lessons Learned.....	1-22

### List of Tables

Table 1 State asthma program core datasets and measures .....	1-3
Table 2 Sample surveillance evaluation questions .....	1-12
Table 3 Example of choosing an evaluation design .....	1-16
Table 4. Sample indicators for asthma surveillance evaluations .....	1-18
Table 5 Example of data collection strategies .....	1-20
Table 6 Example of indicators and associated performance standards .....	1-24
Table 7 Example of action plans .....	1-26
Table 8 Example of surveillance evaluation communication plan .....	1-27

### List of Figures

Figure 1 Overarching logic model of state asthma surveillance activities .....	1-5
Figure 2 Nested asthma surveillance logic mode .....	1-9

### List of Appendices

Appendix A. Applying CDC's 2001 Updated Guidelines for Evaluating Public Health Surveillance Systems
Appendix B. Glossary



## Evaluating Asthma Surveillance

**After reading the surveillance module, users should be able to:**

- ② Describe how surveillance is conceptualized within the context of state asthma programs.
- ② Develop individual evaluation plans for the surveillance component of a state asthma program.
- ② Implement a surveillance evaluation in a manner that conforms to professional evaluation standards.
- ② Use evaluation results to strengthen asthma surveillance efforts.

Surveillance is considered one of five infrastructure strategies used by state asthma programs, in addition to leadership, strategic partnerships, strategic communications, and evaluation. This module, *Learning and Growing through Evaluation: Evaluating Asthma Surveillance* (Module 4), guides 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 guidance provides general methods for conducting feasible and ethical evaluations and discusses particular challenges that arise when assessing asthma surveillance work conducted in states. You can adapt these methods to meet the specific needs of your state 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 the 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 as well as 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 asthma coalitions. As a companion to Module 4, it provides insights into evaluating the partnerships necessary to carry out your surveillance activities, for example, collaborations with surveillance data owners or data users.

## Evaluating State Asthma Program Surveillance Activities

**Brief Overview of Asthma Surveillance.** According to the CDC (2012), “**PUBLIC HEALTH SURVEILLANCE**” is the ongoing, systematic collection, analysis, and interpretation of health data, essential to the planning, implementation and evaluation of public health practice, closely integrated with the dissemination of these data to those who need to know and linked to prevention and control.”

Asthma surveillance data assist program staff and community partners with designing, refining, and targeting interventions – or, put more simply, in monitoring and using data to guide strategic action. These 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 state. All state asthma programs are required to create surveillance products, such as maps, tables, or other tools that demonstrate the alignment of program activities with asthma burden as indicated by surveillance data. Additionally, programs are required to publish and disseminate fact sheets, reports, briefs, newsletters, or other materials as needed 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 et al., 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 et al., 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. The collaboration with outside data owners can make the asthma surveillance process complex.

At a minimum, state asthma programs are required to collect, analyze, and interpret seven core datasets for each year of the cooperative agreement with CDC’s Air Pollution and Respiratory Health Branch (APRHB). Specific burden measures need to be calculated from each required dataset (**Table 1**). In addition to the required minimum core datasets, asthma programs may collect additional datasets and calculate additional measures during the five-year cooperative agreement period, if additional data are useful to guide program activities and promote comprehensive asthma control services. 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, states funded to address comprehensive asthma control through evidence-based strategies and public health-healthcare collaboration should ensure an adequate and appropriate staffing plan and project management structure to effectively carry out state asthma surveillance efforts. In addition to analyzing and collecting surveillance

data, programs often provide technical assistance to stakeholders, including responding to data requests and data partner trainings.

**Table 1. State asthma program core datasets and measures**

Core Datasets	Core Measures
<b>BRFSS Core (Adult Prevalence) Dataset Collection and Years Available</b>	<ul style="list-style-type: none"> <li>• Adult current asthma prevalence</li> <li>• Adult lifetime asthma prevalence</li> </ul>
<b>BRFSS Child Asthma Prevalence Module and Random Child Selection Module Collection and Years Available</b>	<ul style="list-style-type: none"> <li>• Adult current asthma prevalence</li> <li>• Adult lifetime asthma prevalence</li> </ul>
<b>BRFSS Adult Asthma Call-Back Survey Collection and Years Available</b>	<ul style="list-style-type: none"> <li>• Adult asthma management course measure</li> <li>• Adult early symptoms knowledge measure</li> <li>• Adult peak-flow meter knowledge measure</li> <li>• Adult asthma emergency response knowledge measure</li> <li>• Adult asthma action plan measure</li> </ul>
<b>BRFSS Child Asthma Call-Back Survey Collection and Years Available</b>	<ul style="list-style-type: none"> <li>• Child asthma management course measure</li> <li>• Child early symptoms knowledge measure</li> <li>• Child peak-flow meter knowledge measure</li> <li>• Child asthma emergency response knowledge measure</li> <li>• Child asthma action plan measure</li> </ul>
<b>Vital Statistics - Mortality dataset collection and Years Available</b>	<ul style="list-style-type: none"> <li>• Number of asthma deaths</li> <li>• Crude asthma mortality rate</li> <li>• Age-adjusted mortality rate</li> </ul>
<b>Hospital Discharge (State) Collection and Years Available</b>	<ul style="list-style-type: none"> <li>• Number of hospital discharges</li> <li>• Crude hospital discharge rate</li> <li>• Age-adjusted hospital discharge rate</li> </ul>

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

Findings from surveillance evaluations can serve many functions, including but not limited to:

- Identifying stakeholders to involve in the state’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 reports

**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, which 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 whether the suggested attributes or measures of usefulness are important or applicable to your program’s asthma surveillance efforts.

Recognizing that more applicable surveillance guidelines were needed to evaluate state asthma surveillance efforts, the APRHB convened the CDC-State Surveillance Evaluation Workgroup<sup>1</sup> (“Workgroup”) between October 2006 and March 2008. The Workgroup identified asthma surveillance activities not addressed in the Guidelines. For example, they observed that many asthma programs have common surveillance activities (e.g. data collection, maintenance, and analysis) conducted by entities outside of the state asthma program or health department rather than by internal personnel. External partners may apply different methods for ensuring data quality and representativeness, making the simple evaluation suggestions in the Guidelines unfeasible.

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.

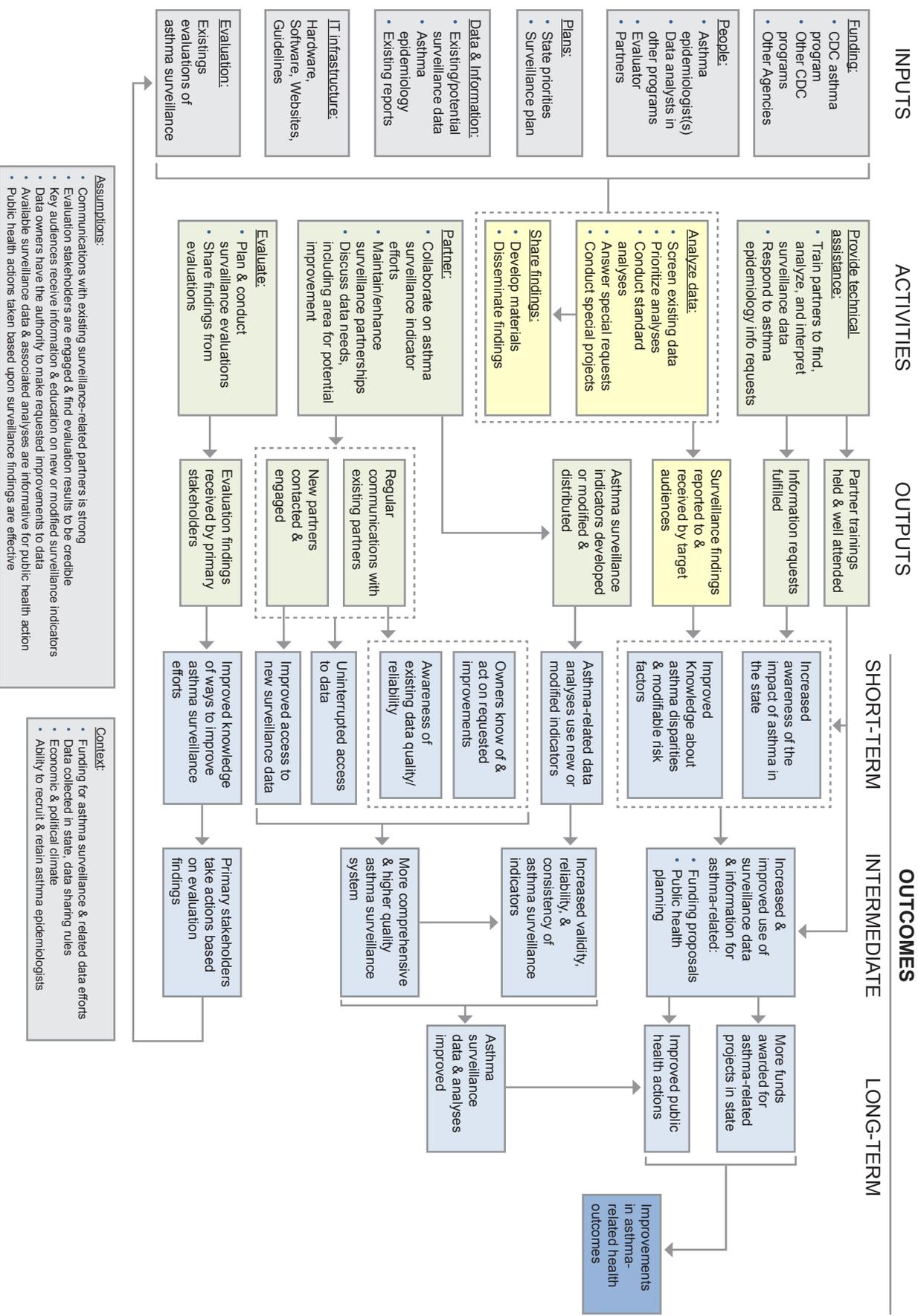
To address these differences, the Workgroup modified the surveillance attributes and processes outlined in the Guidelines to better describe the unique inputs, activities, outputs, and outcomes of asthma surveillance. Using this information, they developed a logic model for state asthma program surveillance efforts (**Figure 1**). Asthma programs 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 following 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** to provide evaluation strategies for state asthma surveillance activities.

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<sup>1</sup> The Surveillance Evaluation Workgroup was in place between October 2006 and March 2008. Workgroup members included CDC staff (project officers, epidemiologists, and team management) from 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. Overarching logic model of state asthma surveillance activities**



## Applying Step 1– Engaging Stakeholders in an Asthma Surveillance Evaluation

The first step in evaluating your state asthma program’s surveillance activities is to engage surveillance stakeholders. Surveillance stakeholders may include persons 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 policy makers), and other individuals potentially interested in the evaluation results (e.g., other state asthma epidemiologists, APRHB).

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 that should be added or removed.

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

**State Asthma Epidemiologists.** Although not required, more often than not, epidemiologists are important stakeholders to engage throughout the surveillance evaluation since they play a central role in state asthma surveillance activities. Given that an asthma epidemiologist’s primary responsibility is state 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, taking action on findings). For example, if you are preparing for an evaluation of dataset collection methods, you may want to include the data owners during the planning stage. Alternatively, if you are evaluating effectiveness of surveillance report dissemination, you will probably want to engage end-users of the surveillance data. 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. Classifying the importance of stakeholders in the various stages of your evaluation will help guide the focus and define the roles and responsibilities 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 Table D.2 in Appendix D of *Evaluation and Your State Asthma Program* (Module 1). This table 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 State Asthma Program 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 individual evaluation planning team --Joe, the State Asthma Program Evaluator, Amy, the State Asthma Program Coordinator, and Susan, the State Asthma 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 utilized.

**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 who might be important to engage in this evaluation?

**Amy:** What about the five coalition members who have told us they are using the report in writing 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 used a virtual meeting, we could also invite others 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 changes we might make to future reports.

## Applying Step 2 - Describing the State Asthma Surveillance Efforts

After engaging stakeholders, your evaluation planning team should describe the purpose of your state asthma 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 state (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, such as the dataset 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**) 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.

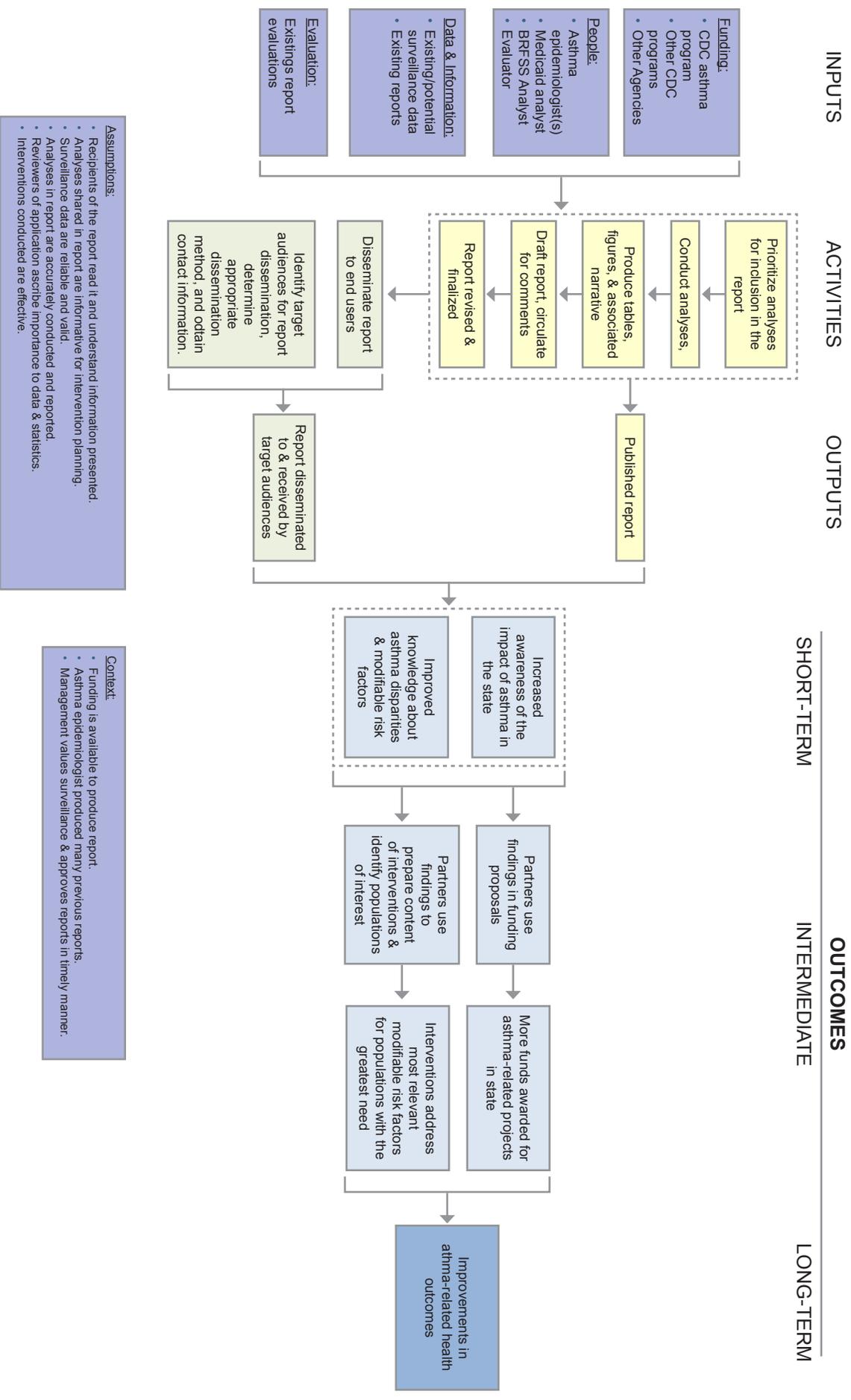
This overarching surveillance logic model plays many roles throughout the evaluation process. It can help you identify your evaluation focus as you design your evaluation in Step 3. It also can be used as a communication tool to inform surveillance stakeholders about the scope and processes of your asthma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

**Nested Logic Model.** After creating an overarching surveillance logic model, your evaluation planning team should review the priority evaluation candidates or focus areas previously suggested by your 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<sup>2</sup>. Your surveillance 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 2** provides an example of a nested surveillance logic model that specifically portrays details on reporting of asthma surveillance.

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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 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 considered important to engage in this surveillance evaluation – the Program Evaluator, Program Manager, Program Coordinator, and 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 to determine whether they needed to be focusing the evaluation on report dissemination and utilization. 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 practically 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 data and utilization of the current report.

**Amy:** That's just what I was thinking. So it seems we should evaluate how this report is used, just as the strategic evaluation planning team suggested. Since the process for distributing surveillance data is linked to the report's use, we can easily add questions about report dissemination methods to our evaluation.

**Joe:** Let's hone in 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 so 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 target 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 2**).

## Applying Step 3 - Focus the Surveillance Evaluation Design

**Reconsidering the Evaluation Focus Area and Questions.** After creating the overarching surveillance logic model, your surveillance 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 given your program's current surveillance evaluation framework. This review is especially important if changes have occurred in your surveillance efforts, such as if an epidemiologist has left the program or a dataset 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 a state asthma program whose evaluation questions assess four characteristics of surveillance: data quality, flexibility, stability, and timeliness. If the data utilized by the program for asthma surveillance are mainly collected and maintained outside of the program, the planning team should ascertain 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 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 2. Sample surveillance evaluation questions**

Logic Model Component	Evaluation Question Examples
<b>Inputs</b>	<ul style="list-style-type: none"> <li>• To what extent is the existing staffing structure sufficient to carry out the planned activities? How could partners ease the burden? Are there opportunities to supplement existing staff in a manner that is not too costly?</li> <li>• How could the timeliness, completeness, accuracy, and consistency of our existing surveillance data be improved?</li> <li>• In what ways might the existing IT infrastructure be improved for better data collection and management?</li> </ul>
<b>Activities</b>	<ul style="list-style-type: none"> <li>• How could we better educate our stakeholders on interpreting data or findings through our technical assistance efforts?</li> <li>• What data or analysis is missing or lacking? How could the analysis of surveillance data be improved (e.g., faster turnaround, additional indicators)?</li> <li>• 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?</li> <li>• 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/communications?</li> </ul>
<b>Outputs</b>	<ul style="list-style-type: none"> <li>• Were partner trainings held, and if so, which partners attended and why? What additional trainings are needed? Did the trainings meet the attendees' needs?</li> <li>• Which target audiences do our surveillance materials reach? Are these materials further disseminated or shared by our partners? If so, with whom are they shared?</li> <li>• What evaluation findings were shared this year? With whom? How? How could we change these communications to better meet our partners' preferences?</li> </ul>
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• For what purposes are our surveillance data used? Are they used in planning and guiding strategic action?</li> <li>• To what extent has the use of surveillance data by our key stakeholders improved as a result of our partner training?</li> <li>• In what ways has the use of our surveillance data resulted in increased funding for asthma-related projects related to the state asthma program? 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?</li> </ul>
<b>Processes</b>	<ul style="list-style-type: none"> <li>• For what purposes are our surveillance data used? Are they used in planning and guiding strategic action?</li> <li>• To what extent has the use of surveillance data by our key stakeholders improved as a result of our partner training?</li> <li>• In what ways has the use of our surveillance data resulted in increased funding for asthma-related projects related to the state asthma program? 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?</li> </ul>

**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 persons, places, or times
- Use measureable terms
- State what you want to learn

For example, imagine that an evaluation wants to answer: “What actions have been taken to identify gaps in our asthma surveillance data over the past 2 years, and are these activities sufficient?” We might ask what constitutes a “gap” in asthma surveillance data, and what do we mean by “sufficient”? It is important to 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 your state asthma program staff or your partners should carry out this planning or whether the planning should involve both staff and partners.

**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(s). Similar to the steps outlined for evaluating partnerships (Module 3), surveillance evaluations are most likely to be conducted with a **NON-EXPERIMENTAL DESIGN**. However, other evaluation designs may be used depending upon the question (especially in the **QUASI-EXPERIMENTAL DESIGN** category). In selecting your design, it is useful to consider the four **EVALUATION STANDARDS** that reside at the center of the CDC Evaluation Framework—**UTILITY, FEASIBILITY, PROPRIETY, and ACCURACY**<sup>3</sup>. 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? For example, if you are interested in causation have you included strategies to help rule out **THREATS TO INTERNAL VALIDITY**?

3 In 2011, a fifth evaluation standard was added, **EVALUATION ACCOUNTABILITY**. This standard encourages increased transparency in planning and implementation of evaluation as well as how conclusions are drawn through documentation and metaevaluation.

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

**Table 3**, on page 19, 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 weaknesses, see Appendix E in *Implementing Evaluations* (Module 2).

### 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, outcomes, and processes 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 planning team after the meeting.*

**Amy:** That was a productive meeting. What do you all think about the evaluation questions we selected?: “Who accesses the report?” “Are the target audiences able to access the report and other surveillance data on our website?” “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 for whom? 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 aren’t for some reason. Let’s use the template to help us select an evaluation design ([Table 3](#)).

**Table 3. Example of choosing an evaluation design**

<b>Evaluation Question</b>	<i>What specific questions do you intend to answer through this evaluation?</i>	<ul style="list-style-type: none"> <li>• To what extent is the report disseminated to the intended target audiences? Who needs surveillance information that isn't getting it?</li> <li>• What sections, tables, and analyses are accessed, used, or referred to most often? How are they used? What information is not used? Why?</li> <li>• Are there specific data needs that aren't being met by the current report?</li> </ul>
<b>Stakeholder Needs</b>	<i>Who will use the evaluation findings?</i>	The state asthma epidemiologist and program coordinator
	<i>What do they need to learn from the evaluation?</i>	<p>The state asthma epidemiologist would like to know:</p> <ul style="list-style-type: none"> <li>• Can the report be distributed solely through the state asthma program website, or are hard copies necessary to reach all target audiences?</li> <li>• What information is most useful for stakeholders?</li> <li>• How can the content of the reports be improved?</li> </ul> <p>The program coordinator would like to know:</p> <ul style="list-style-type: none"> <li>• How are specific data used?</li> <li>• What parts of the reports are most useful? What parts are less useful?</li> <li>• Do gaps exist? i.e. Are any target audiences not getting data they need? Are any data needed that aren't in the current report?</li> </ul>
	<i>How will the findings be used?</i>	<p>The state asthma program coordinator and epidemiologist will use the evaluation findings to decide how to:</p> <ul style="list-style-type: none"> <li>• Allocate resources for various distribution methods</li> <li>• Prioritize staff time for varying data collection efforts, analyses, and time invested in developing reports</li> <li>• Strategize ways to fill any gaps identified</li> </ul>
	<i>What do intended users view as credible information?</i>	<p>Those who will use the evaluation results would find the following credible:</p> <ul style="list-style-type: none"> <li>• In-depth explanations from target audience members</li> <li>• Detailed information about more effective format and information accompanied by examples</li> </ul>
<b>Evaluation Design</b>	<i>What is the design for this evaluation?</i>	A non-experimental design
	<i>Why was this design selected?</i>	Because the questions of interest 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 affect any necessary changes.

## Applying Step 4 -Gather Credible Evidence for the Surveillance Evaluation

**Identifying indicators.** Once evaluation questions are clarified, your individual evaluation planning team should select one or more indicators to measure the answer(s) to your evaluation question(s).

There are a variety of ways to define indicators. Some evaluators use systematic methods to synthesize information across the various indicators, whereas others let stakeholders interpret the findings. Regardless of your decision, we recommend that you clearly document:

- The indicators chosen for your evaluation
- Your reason for choosing those indicators
- How all indicators will be merged in your findings
- Potential biases or limitations associated with the use of each indicator

(These indicators are similar to performance measures, but indicators are more specifically tied to your evaluation questions. In some cases, you may choose to use the performance measure as your indicator, if it specifically answers your evaluation question.)

For example, say your surveillance evaluation planning team asks, “How can we measure whether individuals used surveillance data to inform asthma intervention development?” There are many ways your team could gauge use of surveillance data for intervention planning. Your team might decide the following measureable factors indicate whether or not surveillance information was used for planning.

- The percent of overlap between planned activities and areas with poor asthma outcomes..
- The inclusion of specific and relevant surveillance data in documents that explain upcoming asthma intervention efforts.
- Staff and partner explanations for the reasons behind the selection and design of specific asthma interventions.

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 weaknesses associated with the findings.

To help you with selecting your indicators, **Table 4** provides examples of indicators specifically for evaluating surveillance that were adapted 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 document, 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 your team begin identifying relevant indicator information you want to collect.

**Table 4. Sample indicators for asthma surveillance evaluations**

Logic Model Component	Evaluation Question Example	Indicator Example
<b>Activities</b>	To what extent is a report disseminated to the intended target audiences?	<ul style="list-style-type: none"> <li>List of those receiving the report who are defined as target audiences</li> </ul>
	Who needs surveillance information that isn't getting it?	<ul style="list-style-type: none"> <li>List of target audience members who are not receiving reports</li> </ul>
<b>Outputs</b>	Does the current report provide the specific data needs that aren't being met?	<ul style="list-style-type: none"> <li>List of data gaps in the report</li> </ul>
<b>Outcomes</b>	What sections, tables, and analyses are accessed, used, or referred to most often? How are they used? What information is not used? Why?	<ul style="list-style-type: none"> <li>Frequencies of use of specific information</li> <li>Description of uses</li> <li>List of reasons information is not used</li> </ul>

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

- Determine whether you have to collect data yourself or if the data already exist.
- Reflect on the strengths and weaknesses of different data collection strategies. The evaluation standards in the center of the CDC Evaluation Framework graphic (i.e., utility, feasibility, propriety, and accuracy) are helpful when considering the strengths, weaknesses, 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 weaknesses.
- Think through what the intended users of the evaluation findings will view as credible. For example, it is highly likely that one or more epidemiologist is the primary intended user(s) of the surveillance evaluation findings. Epidemiologists frequently use and interpret quantitative data and work on studies designed to demonstrate cause-effect relationships with high **INTERNAL VALIDITY**. Therefore, evaluation is often viewed as credible if it contains accurate and unbiased quantitative data collection strategies and results. However, this does not mean that you should only collect quantitative data and only conduct quantitative analyses. Often, the use of qualitative methods adds an important depth of information and provides a different or additional perspective, context, and detail that quantitative methods cannot. Combining or mixing both qualitative and quantitative methods can ensure appropriate and accurate interpretation, which will better lend itself to relevant use of the findings.

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

## Applying Step 5 - Justify 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 collected data. Therefore, before collecting data, your individual 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.

(To clarify terminology, a performance *standard* serves as a goal—how do we as a program want to do or ‘perform’ on this indicator? What will we find acceptable? Performance *measures*, on the other hand, are the measures a program collects on a regular basis to monitor its performance.)

Setting performance standards is sometimes difficult. Indicators may not have set standards for “success” as these concepts 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 literature evidence. 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 team may define performance as “excellent” when 50% or more of proposed policies are cited.

**Table 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 5. Example of indicators and associated performance standards**

Evaluation Question	Indicator(s) Examples	Performance Standards Examples
<b>To what extent have surveillance data been used to inform policy development?</b>	Percent of asthma-related policies proposed to the state legislature in the past five years that have cited asthma surveillance data	<ul style="list-style-type: none"> <li>• <b>Poor:</b> &lt;25% of proposed policies</li> <li>• <b>Good:</b> 25-50% of proposed policies</li> <li>• <b>Excellent:</b> &gt; 50% of proposed policies</li> </ul>
	Reported importance of asthma surveillance data in developing public policies by individuals engaged in recent asthma-related policy development efforts	<ul style="list-style-type: none"> <li>• <b>Poor:</b> 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.</li> <li>• <b>Acceptable/Good:</b> 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.</li> <li>• <b>Superior/Excellent:</b> Individuals consistently express that surveillance data are highly relevant to the current task, are accurate and reliable, and used often to inform policy development.</li> </ul>

**Vignette 4 – What Did We Find Out?**

*In this vignette, we rejoin the evaluation team after data collection has been completed. Per the data collection plan, Joe obtained the list of persons 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. 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 tapes from the interviews with those 16 persons from the target audience 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 though 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 all indicators are defined, merged, and analyzed, the evaluator and evaluation stakeholders should recommend the next steps based on the evaluation findings.

Returning to the example in **Table 5**, suppose that the evaluator 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. The evaluator might suggest three activities: (1) directly disseminate to local and state policy makers a two-page document that summarizes the state asthma burden; (2) include policy recommendations with any surveillance report or product; and (3) have 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 planning team and other relevant stakeholders should be involved in discussions regarding these suggested activities.

### Applying Step 6 - Ensure Use of Evaluation Findings and Share Lessons Learned

As we have emphasized throughout *Learning & Growing*, the evaluation planning 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 the list of stakeholders who may use or be affected by the evaluation findings 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 modes of delivery 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 to determine why these improvements did or did not inform future training efforts. **Table 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 rejoin the evaluation 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 Evaluation* 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 6. Example surveillance evaluation communication plan

Audience	Applicable?	Communication Purpose	Communication Formats	Timing	Notes
<b>State asthma program epidemiologist, state asthma program manager, &amp; Surveillance Evaluation Workgroup</b>	√	Include in decision making about evaluation design/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/interim findings	In-person meeting Email short summaries	Following post-test data analysis	
	√	Present complete/final findings and recommendations	Working session to discuss findings and actions; Provide final written report	After all data is complete and analyzed	
<b>Strategic evaluation planning team members (beyond asthma epidemiologist &amp; program manager)</b>		Include in decision making about evaluation design/activities			
		Inform about specific upcoming evaluation activities			
	√	Keep informed about progress of the evaluation	Email correspondence	Quarterly	
		Present initial/interim findings			
	√	Present complete/final findings and recommendations	Email final written report; Discuss findings at annual in-person meeting	End of evaluation; April 2014 meeting	

Audience	App-licable?	Communication PurposeΩ	Communication Formats	Timing	Notes
Other state asthma programs		Include in decision making about evaluation design/activities			
		Inform about specific upcoming evaluation activities			
		Keep informed about progress of the evaluation			
	√	Present initial/interim findings	Distribute summary of methods and findings via state evaluation list-serv	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 on course or as dramatic as terminating an initiative. Most actions will be modifications to activities to improve efficiency or effectiveness. In order to ensure your evaluation findings are used to affect 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 as to 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.

In Table 7 below is 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 7. Action Plan Examples**

Program Component: Surveillance

Evaluation Purpose: Inform development of report formats

Programmatic Change Sought: Revise the content of asthma 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							
Plan of Action to Achieve Change								
Change needed	Activities to implement change	Person responsible	Re-sources 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 re-sources 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 is 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 user's 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 3 months; new report within 6 months.	When the new report is released	Outline and then report(s)	Discussion when outline presented, follow-up with stake-holders after getting reports	Follow-up interviews  Requests for ex-amples 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

<b>Evaluation Result</b>	Report is not getting to all of the people who can use the information							
<b>Supporting Evidence</b>	Several interview respondents named people who should have downloaded the report but there is no record of this. Also respondents who had not downloaded anything recently noted that they had forgotten the information was there.							
<b>Plan of Action to Achieve Change</b>							<b>Monitor Change</b>	
<b>Change needed</b>	<b>Activities to implement change</b>	<b>Person responsible</b>	<b>Resources required</b>	<b>Due by</b>	<b>Indicators that change is implemented</b>	<b>Data sources</b>	<b>Indicators to monitor success of change</b>	<b>Data sources</b>
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.	Describe what data you will need to have to know change is 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.  Jerry to verify use of data is appropriate.  Money for printing and postage (if hard copies are agreed)	2 months from next report release	Report gets to more users identified	Records of on-line clicks to report	Increased diversity of who down-loads the report; more reported use of data	Possible pop-up survey on website  Follow-up interviews  Documentation of evaluation use

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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 issues of “public health importance 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 1.1**) and can be adapted to your state’s circumstances.

**Engage Evaluation Stakeholders.** When engaging stakeholders, you should identify and ask the needs of individuals who will be involved in or affected by the results of the surveillance evaluation. All stakeholders involved in or affected by the evaluation should place their obligations in writing and adhere to their defined roles. In particular, the evaluator should have well-defined roles and responsibilities and be qualified so that the evaluation is considered credible. Since surveillance data may include sensitive, personal information, the evaluation should be designed so that individuals and data involved in the evaluation are ethically treated. The evaluator should also interact respectfully with others so no one feels threatened.

**Describe the Surveillance System.** The first aspect to consider when describing surveillance systems is to consider the importance of the health event under surveillance. This description should include the applicable measures for explaining the public health importance of the health-related event under surveillance:

- Frequency of dataset collection for each dataset in the surveillance system (total number of events, morbidity/mortality rates, etc.)
- Severity of the health-related event under surveillance in each dataset (hospitalization rates, emergency department visit rates, days of school missed, etc.)
- Disparities associated with the health-related event
- Costs associated with the health-related event
- How preventable the health-related event is
- Clinical course or natural history of health-related event if there was no intervention (no inhaler, no home visits, no physician training, etc.)
- Public interest in the health-related event

The next issue that should be described is the purpose and objective of the system and planned uses of the data system. The case definition of the health-related event used in the surveillance system should be clearly stated. Aspects of the surveillance systems’ operation should be defined by where the datasets composing surveillance system reside and a map or flow chart of data collection.

The attributes of each dataset composing the system and data collection context should also be described, including:

- Population under surveillance
- Time period of collection for each dataset
- Method of data collection
- 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 are used) 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 descriptions of the resources used for data collection and system operation, including the funding source and the personnel.

**Focus the Surveillance Evaluation Design.** After describing and focusing the purpose of the evaluation, evaluation questions should be generated. Stakeholders should be identified who will be interested in the evaluation findings. It is important to plan, conduct, and report evaluations in ways that will engage the stakeholders and increase the likelihood that evaluation results are used. Evaluation designs determine the validity, reliability, and usability of the results, and therefore, can impact the usefulness of the evaluation results in being utilized to address and serve the necessary populations. The description should also include recommendations and the uses of evaluation findings. The CDC Workgroup also noted that performance standards should be defined and include the surveillance system's usefulness as well as how well the system performs on nine desirable attributes outlined and defined in **Figure 1.1**. These standards should be considered when designing the surveillance evaluation.

**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 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. Recommendations should be made that address issues illuminated by the evaluation.

**Ensure use of Evaluation Findings and Share Lessons Learned.** Reports should clearly describe the system and the conclusions of the surveillance evaluation. Reports should be disseminated in an appropriate time-period and in a usable, cost-effective format to the appropriate stakeholders.

**Figure 1.1.** 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 state.

- Engage the stakeholders in the evaluation
- Describe the surveillance system to be evaluated
  - 1. Describe the public health importance of the health-related event under surveillance
    - a. Indices of frequency
    - b. Indices of severity
    - c. Disparities or inequities associated with the health-related event
    - d. Costs associated with the health-related event
    - e. Preventability
    - f. Potential future clinical course in the absence of an intervention
    - g. Public interest
  - 2. Describe the purpose and operation of the surveillance system
    - a. Purpose and objectives of the system
    - b. Planned uses of the data from the system
    - c. Health-related event under surveillance, including case definition
    - d. Legal authority for data collection
    - e. The system resides where in organization(s)
    - f. Level of integration with other systems, if appropriate
    - g. Flow chart of system
    - h. Components of system
      - 1) Population under surveillance
      - 2) Period of time of data collection
      - 3) Data collection
      - 4) Reporting sources of data
      - 5) Data management
      - 6) Data analysis and dissemination
      - 7) Patient privacy, data confidentiality, and system security
      - 8) Records management program
  - 3. Describe the resources used to operate the surveillance system
    - a. Funding source(s)
    - b. Personnel requirements
    - c. Other resources
- Focus the evaluation design
  - 1. Determine the specific purpose of the evaluation
  - 2. Identify stakeholders who will receive the findings and recommendations of the evaluation
  - 3. Consider what will be done with the information generated from the evaluation
  - 4. Specify the questions that will be answered by the evaluation
  - 5. Determine standards for assessing the performance of the system
- Gather credible evidence regarding the performance of the surveillance system
  - 1. Indicate the level of usefulness
  - 2. Describe each system attribute
    - a. Simplicity
    - b. Flexibility
    - c. Data quality
    - d. Acceptability
    - e. Sensitivity
    - f. Predictive value positive
    - g. Representativeness
    - h. Timeliness
    - i. Stability
- Justify and state conclusions, and make recommendations
- Ensure use of evaluation findings and share lessons learned

**Table 1. Definitions and Potential Measures for Evaluating Surveillance System (CDC, 2001).**

Attribute	Definition	Measure Examples
<b>Usefulness</b>	“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.... If it helps to determine that an adverse health-related event previously thought to be unimportant is actually important.” (p.13)	<ul style="list-style-type: none"> <li>• The number of asthma-related policies or procedures related to prevention or control that have been developed or changed based on the surveillance system findings</li> <li>• Amount of time the system takes to detect trends that signal changes in the occurrence of the health-related event</li> <li>• The number of clinical practices that were changed based on information in the surveillance system and the number of adverse health effects averted due to these changes</li> </ul>
<b>Simplicity</b>	“...refers to both its structure and ease of operation. Surveillance systems should be as simple as possible while still meeting their objectives.” (p. 14)	<ul style="list-style-type: none"> <li>• Amount and type of data necessary to establish occurrence of events</li> <li>• Amount and type of supporting data available (e.g., demographic data)</li> <li>• Number of individuals and organizations involved in data collection</li> <li>• Level of integration of datasets in the system and of the system with other systems</li> <li>• Data collection method, including number and types of data sources and time spent on collecting data</li> <li>• Data management method, including “time spent on transferring, entering, editing, storing, and backing up data”</li> <li>• Data analysis and dissemination methods, “including time spent on preparing the data for dissemination”</li> <li>• Staff training</li> <li>• Resources spent on system maintenance</li> </ul>
<b>Flexibility</b>	“A flexible public health surveillance system can adapt to changing information needs or operating conditions with little additional 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.” (p.15)	Retrospective assessment of system’s response to new demands, such changes in data validity and completion after the addition or revision of questions, case definitions, information technology, or funding.

Attribute	Definition	Measure Examples
<b>Data quality</b>	“...reflects the completeness and validity of the data recorded in the public health surveillance system.” (p.16)	<ul style="list-style-type: none"> <li>• Level of data completion, including the amount of missing data</li> <li>• Validity of the system’s data, measured by comparing surveillance values to “true” values through a review of sampled data, a special record linkage, or patient interview</li> <li>• Sensitivity, specificity and predictive value positive calculations</li> <li>• Performance of the screening or diagnostic tests and surveillance forms used to collect data on the health-related event</li> <li>• Quality of training and supervision of persons completing surveillance forms and managing data management</li> </ul>
<b>Acceptability</b>	“...reflects the willingness of persons and organizations to participate in the surveillance system.” (p.17)	<ul style="list-style-type: none"> <li>• Subject or organization participation rate</li> <li>• Data completion rates and question refusal rates, completeness of report forms;</li> <li>• Physician, laboratory, or hospital/facility reporting rate; and</li> <li>• Data reporting timeliness</li> <li>• Rating of the public health importance of the health-related event</li> <li>• Time burden of interviews, transcriptions, data entry, etc.</li> <li>• Ease and cost of data reporting</li> <li>• System’s ability “to protect privacy and confidentiality”</li> </ul>

Attribute	Definition	Measure Examples				
<p><b>Sensitivity</b></p>	<p>“... 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.” (p. 18)</p>	<ul style="list-style-type: none"> <li>• Sensitivity measurements require a) access to data and b) internal validation of data collected.</li> <li>• <math>Sensitivity = A / (A + C)</math></li> </ul> <p style="text-align: center;">Condition present</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Detected by surveillance (+)</td> <td style="width: 50%; text-align: right;">Yes</td> </tr> <tr> <td style="width: 50%;">No (-)</td> <td style="width: 50%;"></td> </tr> </table> <p style="text-align: center;">Yes (+) A (true positive) B (false positive) A+B</p> <p style="text-align: center;">No (-) C (false negative) D(true negative) C+D</p> <p style="text-align: center;">A+C    B+D</p> <ul style="list-style-type: none"> <li>• “A” and “A+C” can have many different values, for example:             <ol style="list-style-type: none"> <li>1. Proportion of health-related events in a population detected by surveillance (A) out of the total true number of health-related events in a population (A+C).</li> <li>2. Proportion of health-related events diagnosed by a provider (A) out of all individuals who went to see that provider who had that event (A+C).</li> <li>3. Proportion of persons with landline telephones at home who participated when they were called (A) out of all individuals in a population who were called (A+C).</li> </ol> </li> </ul>	Detected by surveillance (+)	Yes	No (-)	
Detected by surveillance (+)	Yes					
No (-)						

Attribute	Definition	Measure Examples																					
<p><b>Predictive value positive</b></p>	<p>“...is the proportion of reported cases that actually have the health-related event under surveillance.”(p. 20)</p>	<ul style="list-style-type: none"> <li>A high PVP indicates fewer resources are being wasted on false-positives. The PVP reflects the sensitivity and specificity of the case definition (i.e., the screening and diagnostic tests for the health-related event) and the prevalence of the health related event in the population under surveillance. Predictive value positive is also referred to as positive predictive value (PPV) in other epidemiological texts.</li> <li>Predictive value positive=<math>A/(A+B)</math></li> </ul> <p style="text-align: center;">Condition Present</p> <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: left;">Detected by surveillance (+)</td> <td style="width: 5%;"></td> <td style="width: 40%; text-align: right;">Yes</td> </tr> <tr> <td style="text-align: left;">No (-)</td> <td></td> <td></td> </tr> <tr> <td style="text-align: left;">Yes (+)</td> <td style="text-align: center;">A (true positive)</td> <td style="text-align: right;">B (false positive)</td> </tr> <tr> <td></td> <td style="text-align: center;"><math>A+B</math></td> <td></td> </tr> <tr> <td style="text-align: left;">No (-)</td> <td style="text-align: center;">C (false negative)</td> <td></td> </tr> <tr> <td style="text-align: left;"><math>D</math>(true negative)</td> <td style="text-align: center;"><math>C+D</math></td> <td></td> </tr> <tr> <td></td> <td style="text-align: center;"><math>A+C</math></td> <td style="text-align: right;"><math>B+D</math> Total</td> </tr> </table>	Detected by surveillance (+)		Yes	No (-)			Yes (+)	A (true positive)	B (false positive)		$A+B$		No (-)	C (false negative)		$D$ (true negative)	$C+D$			$A+C$	$B+D$ Total
Detected by surveillance (+)		Yes																					
No (-)																							
Yes (+)	A (true positive)	B (false positive)																					
	$A+B$																						
No (-)	C (false negative)																						
$D$ (true negative)	$C+D$																						
	$A+C$	$B+D$ Total																					
<p><b>Representative</b></p>	<p>“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.” (p. 20)</p>	<p>Representativeness of surveillance data can be estimated based on knowledge of the following, often through the calculation of rates:</p> <ul style="list-style-type: none"> <li>Characteristics of the population, including, age, socioeconomic status, access to health care, and geographic location</li> <li>Characteristics of the outcome (e.g., death, hospitalization, or disability)</li> <li>Prevailing medical practices (e.g., sites performing diagnostic tests and physician-referral patterns)</li> <li>Multiple sources of data (e.g., mortality rates for comparison with incidence data and laboratory reports for comparison with physician reports).</li> </ul>																					

Attribute	Definition	Measure Examples
<b>Stability</b>	“...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.” (p. 23)	<ul style="list-style-type: none"> <li>• Number of unscheduled outages and down times for a system’s technology</li> <li>• Costs required to fix technology maintaining system or storing data</li> <li>• Ratio of target versus actual time the system takes to collect or receive data</li> <li>• Ratio of desired and actual amount of time required for the system to manage the data including transfer, entry, editing, storage, and back-up of data</li> </ul>
<b>Timeliness</b>	“...reflects the speed between steps in a public health surveillance system.” (p.22)	<ul style="list-style-type: none"> <li>• The amount of time linking two steps in the surveillance system</li> </ul>

## References

Centers for Disease Control and Prevention [CDC] (2001). Updated guidelines for evaluating public health surveillance systems. MMWR, 50 (RR13).

Centers for Disease Control and Prevention [CDC] (1999). Framework for program evaluation in public health. MMWR, 48(RR-11).

## Appendix B

### Glossary

Definitions included in the glossary can be found in the sources referenced at the end of the appendix. Words highlighted in **GREEN, BOLD, SMALL CAPS** indicate cross-references to other terms included in the Glossary.

<b>Acceptability</b>	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.
<b>Accountability</b>	One of the program evaluation standards developed by the Joint Committee on Standards for Educational Evaluation that encourages adequate documentation of evaluations and a metaevaluative perspective focused on improvement and accountability. See also <b>FEASIBILITY, ACCURACY, PROPRIETY, and UTILITY.</b>
<b>Accuracy</b>	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. See also <b>FEASIBILITY, PROPRIETY UTILITY, and EVALUATION ACCOUNTABILITY.</b>
<b>Action Plan</b>	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.
<b>Behavioral Risk Factor Surveillance System (BRFSS)</b>	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 states and territories.
<b>Data Quality</b>	An attribute of public health surveillance systems that reflects the completeness and internal validity of the recorded data.

<b>Evaluation Accountability</b>	One of the program evaluation standards developed by the Joint Committee on Standards for Educational Evaluation. The evaluation accountability standards encourage adequate documentation of evaluations and a metaevaluative perspective focused on improvement and accountability for evaluation processes and products. See also <b>FEASIBILITY</b> , <b>PROPRIETY UTILITY</b> , and <b>EVALUATION ACCOUNTABILITY</b> .
<b>Evaluation Standards</b>	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. See also <b>ACCURACY</b> , <b>FEASIBILITY</b> , <b>PROPRIETY</b> , <b>UTILITY</b> and <b>EVALUATION ACCOUNTABILITY</b> .
<b>Feasibility</b>	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. See also <b>ACCURACY</b> , <b>PROPRIETY</b> , <b>UTILITY</b> and <b>EVALUATION ACCOUNTABILITY</b> .
<b>Flexibility</b>	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.
<b>Indicator</b>	A specific, observable, and measurable characteristic or change that shows the progress a program is making toward achieving a specified outcome.
<b>Internal Validity</b>	The ability to assert that a program has caused measured results (to a certain degree), in the face of plausible potential alternative explanations. The most common threats to internal validity are history, maturation, mortality, selection bias, regression artifacts, diffusion, and imitation of treatment and testing.

**Performance Standards**

Criteria for assessing how a public health surveillance system performs that establish “what the system must accomplish to be considered successful in meeting its objective.”

**Predictive Value Positive**

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. In the diagram below, predictive value positive can be calculated by dividing the number identified as having the disease (“A” box) divided by all individuals who actually have the disease (sum of “A” and “B” box)  $(A/(A+B))$ .

Actual Occurrence of Health-Related Event		
System identification as health-related event		
Yes (+)	No (-)	
Yes (+)	A (true positive)	B (false positive)
No (-)	C (false negative)	D(true negative)

**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.

**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:

Determine whether events are of public health importance to guide action and signal areas where epidemiological research is necessary

Measure disease burden or incidence/prevalence of health-related events

Identify high risk populations and areas to prioritize allocation of health resources

Identify new or emerging health concerns

Monitor health-related events and practices to identify whether trends exceed expected levels

Guide the planning, implementation, and evaluation of programs to prevent and control disease, injury, or adverse exposure

Evaluate the effect of public policy, interventions, or social norms changes on health-related outcomes

Define the clinical course and natural history of disease

Provide data for epidemiologic research

**Nested Logic Model**

A logic model that zooms in or focuses on a specific activity or set of activities in a larger, more general logic model. This is not a different model than the overarching logic model, but rather, a model capturing a different level of detail about the specific inputs, activities, outputs, outcomes, and processes. These models may focus on multiple levels based on the complexity of the larger logic model.

<b>Non-experimental Design</b>	An evaluation design in which participant information is gathered before and after the program intervention or only afterwards. Neither a control group nor a comparison group is used. Therefore, this design does not allow you to determine whether the program or other factors are responsible for producing a given change.
<b>Quasi-experimental Design</b>	An evaluation design in which participant information is gathered before and after the program intervention or only afterwards. Neither a control group nor a comparison group is used. Therefore, this design does not allow you to determine whether the program or other factors are responsible for producing a given change.
<b>Representativeness</b>	An attribute of public health surveillance where the distribution of a health-related event is accurately described by place, population, and over time.
<b>Simplicity</b>	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.
<b>Sensitivity</b>	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 refer to the proportion of the health-related events detected where the event actually occurred. In the diagram below, sensitivity can be calculated by the number identified as having the disease ("A" box) divided by all individuals who actually have the disease (sum of "A" and "C" box) ( $A/(A+C)$ ).

	Actual Occurrence of Health-Related Event		
	System identification as health-related event		
	Yes (+)	No (-)	
Yes (+)	A (true positive)	B (false positive)	
No (-)	C (false negative)	D (true negative)	

Sensitivity may also be the ability to detect more health-related events than expected or to identify changes in health-related events over time.

<b>Stability</b>	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.
<b>Surveillance System Usefulness</b>	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/analysis efforts.
<b>Timeliness</b>	An attribute of a surveillance system that reflects the speed of surveillance activities. Reflects how quickly data can be collected, cleaned, analyzed, and disseminated. 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 public health–related events.
<b>Threats to Internal Validity</b>	<p>The factors that can threaten <b>INTERNAL VALIDITY</b> include:</p> <p>Confounding: The true effect between an input and an output is influenced by one or more extraneous factors (called confounders), so that the observed effect indicates an incorrect relationship.</p> <p>Selection bias: Units included or excluded in an evaluation which are systematically more likely to have characteristics that lead to the outcome being measured, resulting in a biased estimate of a program’s effect.</p> <p>Information bias: Bias in an estimate that arises from consistent measurement error. Includes misclassification bias and recall bias.</p>

**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. See also **ACCURACY, FEASIBILITY, PROPRIETY, UTILITY** and **EVALUATION ACCOUNTABILITY**.

## References

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