

# PLANNING AN EVALUATION OF AN EHDI INFORMATION SYSTEM

## Purpose of this Document

The information in this document can help you conduct an evaluation of an EHDI-IS. It is based on the Centers for Disease Control and Prevention's Framework for Program Evaluation in Public Health ([www.cdc.gov/eval/framework](http://www.cdc.gov/eval/framework)), and the Updated Guidelines for Evaluating Public Health Surveillance Systems ([www.cdc.gov/mmwr/preview/mmwrhtml/rr5013a1.htm](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5013a1.htm)). While this resource is not intended to be a complete technical guide, it does describe the important steps of an evaluation. To help explain this information, the document uses examples from a fictional EHDI program to illustrate the major steps in planning and performing an evaluation.

## Background

To help identify and provide recommended follow-up services to deaf and hard of hearing infants as early as possible, states and territories have set-up Early Hearing Detection and Intervention (EHDI) programs. These programs have developed data systems, often called EHDI Information Systems (EHDI-IS), to ensure all newborns

1. Are screened for hearing loss,
2. Receive follow-up diagnostic testing if they do not pass the screening, and
3. Are enrolled in early intervention services if diagnosed as being deaf or hard of hearing.

Completing an evaluation of the EHDI-IS can help states and territories to identify what is working well and how the system can be further improved.

## How To Plan Your Evaluation

The following six connected steps can together be used as a starting point to tailor an evaluation for the EHDI-IS:

1. Engage Stakeholders;
2. Describe the program;
3. Focus the evaluation design;
4. Gather credible evidence;
5. Justify conclusion and
6. Ensure use and share lesson learned.

## STEP 1 ► ENGAGING STAKEHOLDERS

**Example:** Gloria is the Program Coordinator for a state EHDI program and she is responsible for organizing the evaluation of the program's EHDI-IS. Because she knows the first step in the process is forming an evaluation team, she convenes an initial meeting with James, the principal investigator (P.I.) for this state's EHDI program, and Steve, the data analyst. Both of them agree to be part of the evaluation team.

However they also recognize the need for someone with evaluation expertise to address questions they may have, to help the team make decisions, and to perform some of the evaluation.

- If an evaluator is not available to support the team, consider engaging a mentor from outside the organization. Check with resources such as CDC or universities, or consider one of your stakeholders who may have evaluation or research experience.

In addition, Gloria, James, and Steve know they may need to engage additional stakeholders in the near future. They also plan to report on the current status of the evaluation during meetings of the program's advisory committee.



CDC EVALUATION FRAMEWORK

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## STEP 2 ► DESCRIBING THE EHDI-IS

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The Program Coordinator helps the evaluator learn about the EHDI program, the team’s experiences, and barriers and external factors that affect the program. Although the EHDI program has a work plan in place, some objectives are not clear, and some goals will take a long time to achieve. The evaluator should ask questions about how the current strategies are aligned with the intended objectives. In these discussions it becomes clear that each member of the team has a different and valuable perspective about the current work plan.

If not already in place, the evaluator suggests they develop a **logic model** (a graphic representation of the EHDI-IS) to

- Describe the existing process,
- Align each of the activities with the intended outcomes, and
- Get consensus among the group.

Once the logic model is in place, it will clearly show whether current activities are on the right path. This exercise helps the staff reach consensus about strategies to be implemented during the next three years. Through the logic model, they now clearly understand the *ultimate* purpose of EHDI while also recognizing the importance of establishing short-term and intermediate outcomes for the EHDI-IS. As a result, the team breaks the project into discrete and feasible “chunks,” each with specific milestones. This process will also help them identify activities to be evaluated (see **Appendix A** for an example of *EHDI-IS Logic Model*).

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## STEP 3 ► FOCUSING THE EVALUATION DESIGN

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### Identifying What To Evaluate

Now the evaluation team needs to choose one or more activities to evaluate. The new web-based EHDI-IS will be implemented during the next two years. Gloria, the Program Coordinator, says it is imperative to evaluate its functionality, the quality of the data collected, and the barriers users may face. However, Steve, the Data Analyst, mentions that after examining the hospital data reports over the past 6 months, Hospital A’s performance appears to be consistently worse than the rest (i.e., it has a high rate of infants that are not screened—around 10%—when compared with the average of 3 to 5%). How is Hospital A’s process different from other hospitals? He wonders if the high miss rate is attributable to its intensive care unit or the well-baby unit. He suggests evaluating the hospital process.

Although James, the P.I., agrees with Steve and Gloria, he is primarily concerned with the loss to follow up/loss to documentation (LTF/LTD) rate for the EHDI program, which has remained at 40% for the past three years.

### Prioritization

All the information contained in the logic model looks important, but at this point the program needs to establish priorities. The evaluator helps the team prioritize activities to be evaluated, using a criteria-driven decision matrix. (Consult Appendix C for more information about prioritizations techniques). During the process the evaluator highlights the **utility and feasibility standards for evaluation**, and encourages the team to think about the following items, which they should be aware of before undertaking an evaluation:

- How feasible is this evaluation?
- Can the evaluation question be answered with available resources and within the available timeframe?
- What resources will be needed to conduct the evaluation and where will they come from?
- Who will use the evaluation findings?
- How will the findings be used?

#### STANDARDS

Utility  
Feasibility  
Propriety  
Accuracy

During the meeting, the team uses a table to help with the prioritization process.

Criteria		Web-based Data Reporting System	Hospital Miss Rate	Loss to Follow-up Rate
<b>Utility</b>	Is it likely that results or recommendations from this evaluation will be used by intended audience?	5	3	4
<b>Feasibility</b>	Can the evaluation question be answered with available resources and within the available timeframe?	3	2	2
<b>Information Need</b>	How critical is the evaluation information for making near-term decisions?	5	2	3
<b>Cost</b>	What financial resources have we invested in this activity?	4	2	3
<b>Prior Evaluation</b>	Have we evaluated this activity before?	Yes/No	Yes/No	Yes/No
<b>Total</b>		<b>17</b>	<b>9</b>	<b>12</b>

*Example of prioritization process. This list is not intended to be comprehensive. In this example the evaluation planning team decided to apply quantitative ranking from 1 to 5 where 5 represents the highest score. Team members can decide what is important to them in deciding what to evaluate, and can use different prioritization techniques.*

After completing the prioritization process, the team decides to conduct two evaluations. The team realizes that they are investing a significant part of the budget in the new web-based data reporting system, and that recommendations from the evaluation will be used to make near-term decisions about any updates to the EHDI-IS; therefore, resources should be directed towards evaluating the system. However, they also understand that evaluating LFU/LTD is a priority.

## EVALUATION OF THE NEW WEB-BASED DATA REPORTING SYSTEM

### Establishing and Clarifying Constructs to be Evaluated

Next, the team needs to come up with a clear description of the following to help reduce misunderstandings among those involved in the evaluation:

- The purpose of the evaluation.
- The evaluation questions to be answered.
- What will be evaluated.
- The indicators used to assess success.

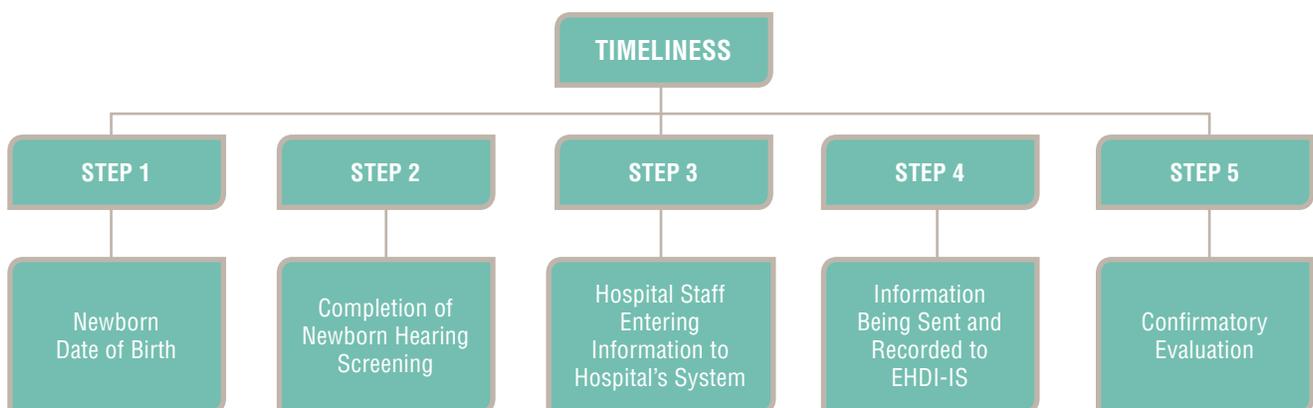
Their discussion might go something like this:

**James:** “How will we decide if the implementation of the new EHDI-IS has been successful? What are our expectations?”

**Steve:** “One important outcome is to improve the timeliness of the screening data. Of course this new system should improve the quality of the data, since it should eliminate data entry errors by our staff.”

**Evaluator:** “Do you have a clear definition of what **timeliness and data quality**, means in this context?”

**Steve:** “Timeliness is the time between the hearing screening date and the information being recorded in the EHDI-IS. (Steps 2 to 4)”



**Evaluator:** “Does everyone agree with Steve’s statement? Before we start the evaluation we need to have a clear definition of the ‘*construct to evaluate.*’ I mean the concept, or the idea to evaluate. We don’t want any misunderstandings.”

**James:** “I believe the average time number of days to get documentation of the results after the hearing screening is 20 days.”

**Evaluator:** “We can use this information as baseline data, and take additional measurements over time. How much do you want to improve? Before the evaluation starts it’s important to establish a clear indicator of success.”

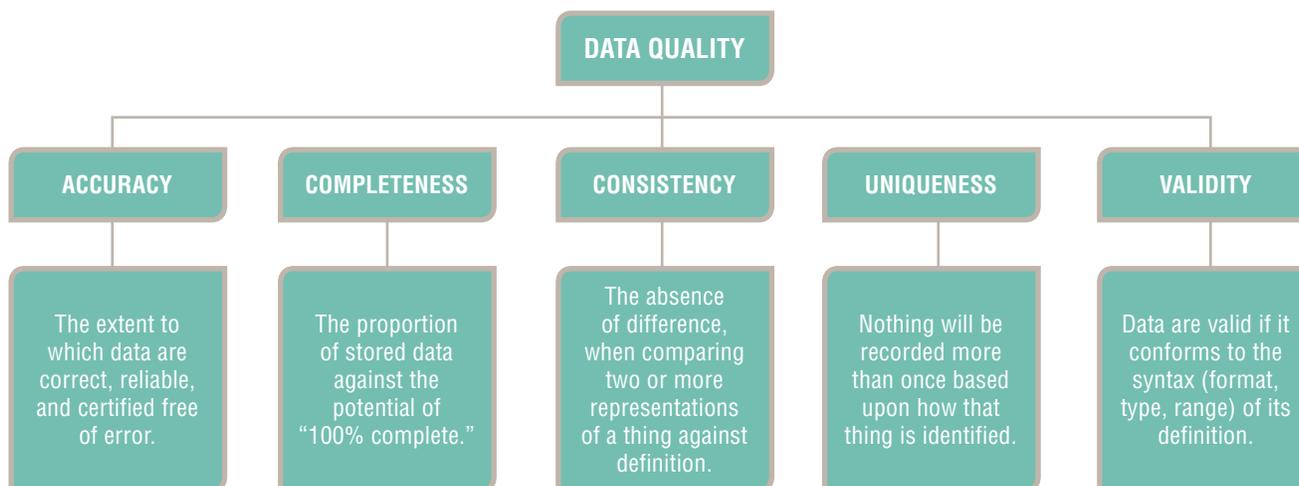
**James:** “What about ‘*data quality?*’ Do we have a clear definition of what data quality means in his context?”

**Steve:** “We can identify the number of errors we may find in the report as an indicator to assess the quality of the data.”

**Evaluator:** “When you examine the ‘errors,’ it looks like you are assessing the ‘*accuracy*’ of the data. What about when you have missing information? I mean (null) values? In this case, staff are looking for the ‘*completeness.*’ Is the completeness of the data important for your program? Is the team interested in assessing this dimension?”

**James:** “Absolutely. I understand we need to assess both accuracy and completeness.”

**Evaluator:** “My point here is that there are different dimensions of the quality of the data, as well as attributes of the surveillance system. Before we start the evaluation we need to have a clear definition of the ‘*construct to evaluate.*’ The more specific we are, the easier the measurement process is going to be.”



A complete description of dimensions of EHDI Data Quality Assessment can be found here: <http://www.cdc.gov/ncbddd/hearingloss/documents/dataqualityworksheet.pdf>

**James:** “How should we evaluate the users, in other words people reporting the data, and capture the results?”

**Gloria:** “In addition to logging the number of calls for assistance from the users, we can administer a survey. But I worry that it might not give us specific enough information.”

**Steve:** “That’s a good point. Besides we need to receive inputs from users quickly. What about a focus group during a hospital site visit? It might be an efficient way to get this information.”

**Evaluator:** “**Yes**, some user issues may not be captured well with a survey. A checklist should be developed to guide questions during the visit. It will make it easier to gather responses from the reporters, and will simplify the analysis later. We can also include our observations during the focus group visit.”

**Gloria:** “Besides, site visits would be fairly inexpensive, since this will be implemented in just three hospitals.”

**James:** “Do we need to inform someone at the hospital about this process?”

**Evaluator:** “Yes, we need to consider additional stakeholders who should be aware of this evaluation.”

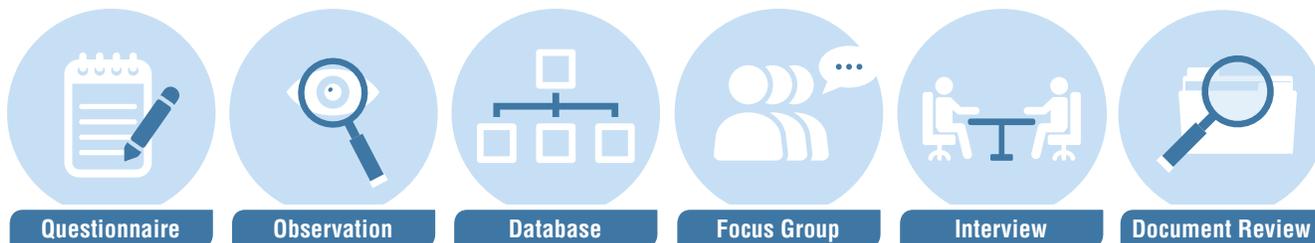
**Gloria:** “I will call each hospital’s contact to inform them and find out if we need to follow any additional procedures during the site visit.”

**Evaluator:** “To summarize, the team will be running a system report each month to assess the accuracy and completeness of the data, as well as the data timeliness, from three hospitals for six months, starting in June. We can graphically represent some of the results with a time series graph to spot patterns or trends. In addition the team will implement a descriptive evaluation to assess barriers, or issues users may face with the new EHDI-IS. During focus groups with the hospitals, information will be collected using a checklist, in addition to logging the number and type of technical assistance calls provided to the data reporters.”

**James:** “How do we manage these implementations with all our current responsibilities?”

**Evaluator:** “In this case, a timeline will keep us on track. We will also need to assign responsibilities to be clear who is going to be in charge of each aspect of the evaluation.”

### COMMON WAYS TO COLLECT DATA FOR EVALUATION PURPOSES



## STEP 4 ► GATHERING CREDIBLE EVIDENCE

Now that the team has clarified the purpose of the evaluation, identified the evaluation questions, and discussed potential ways to collect the data, it is important to decide on the evaluation design, timelines, and resources. **Table 1** will assist the evaluation team organize the discussion and develop an overall strategy.

Keep in mind, the information gathered from the evaluation must be reliable and credible for those who will be using the evaluation findings. Part of the discussion should include

- What amount of information is sufficient?
- What information is considered valid and reliable by your stakeholders? For example, some audiences may view quantitative data as more accurate and valid than qualitative data. For others, information that comes from case studies, focus groups, or interviews will have greater weight.
- What quality control procedures will you follow? For example, do you need to develop data collection instruments? Or are there existing instruments you can use? Will you pilot those instruments before collecting data?

Whether a body of evidence is credible to stakeholders might depend on such factors as how the questions were posed, sources of information, conditions of data collection, reliability of measurement, validity of interpretations, and quality control procedures. <http://www.cdc.gov/eval/steps/gatheringcredibleevidence.pdf>

In addition the team needs to consider when data collection must occur. **Table 2** will assist the evaluation team in estimating the overall evaluation project timelines and the optimal time to collect data.

**Table 1.****Summary of the Evaluation Plan**

The purpose of this evaluation is to determine the quality of the data captured in the new web-based data reporting system represented by the completeness, accuracy, and timeliness of the data reported by three Hospitals from June to November. In addition, the evaluation will reveal barriers that users may have.

Evaluation Question	Evaluation Design	Indicator	Data Collection	Person in Charge
Does the new web-based data reporting system contain complete and accurate data?	Descriptive design	<p><b>Completeness:</b> % of patients' records that have all minimum data elements. (from Jun-Nov)</p> <p><b>Accuracy:</b> % of records with incorrect values in data fields (from Jun-Nov)</p> <p><b>Uniqueness:</b> % of duplicated records (from Jun-Nov)</p>	Run system report	
Are the users reporting hearing screening results within 10 days of the screening event?	Time series designs	Average number of days between hearing screening date and information being recorded in EHDI-IS	Run system report	
After users have been trained, how many users report through the web-based reporting system vs. faxing the screening results?	Descriptive design	# of active users	Query of total active users	
To what extent are active and non-active users satisfied with the new-web-based reporting system? <ul style="list-style-type: none"> <li>What kind of barriers do active and non-active users face?</li> </ul>	Descriptive design		Focus groups and technical assistance phone log	

**Table 2.**

Timeline for the evaluation of the new web-based data reporting system

Activities	Months														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Logic Model in place															
Develop evaluation plan															
Develop checklist to guide site visit to hospitals															
Data collection process (Run system report)															
Focus Group to assess barriers															
Data analysis															
Discussion of preliminary results															
Interpretation and discussion of final results															
Reporting															

## STEP 5 ► JUSTIFYING CONCLUSION

After collecting and analyzing the data, the team examines the results and links the findings to the questions in order to discover the story behind the findings.

To check if improvement has been made, the team also compares

- The actual with the intended outcomes, and
- Current with the previous years of outcomes.

### Report Structure

Gloria identified the following “must-haves” for her report, which included a background, methods, findings, lessons learned, and next steps.

Also, when developing the report, Gloria considers the limitations of the evaluation and asks herself

- Is there a bias?
- Is the result valid?
- Is the result reliable?
- Can I generalize the result to other hospitals?

## STEP 6 ► DEVELOPING RECOMMENDATIONS, ENSURES USE OF EVALUATION FINDINGS AND LESSONS LEARNED

Based on the findings, the team further develops recommendations for program improvement. In order to get buy-in it is important to engage stakeholders, who can help the team

- Clearly distinguish between findings and recommendations,
- Write recommendations using clear and specific language,
- Explain the cost, benefits and challenges associated with implementing recommendations,
- Review the recommendations prior to finalizing the report, and
- Identify action items to ensure use of evaluation findings.

**EVALUATION REPORT:** The following example describes key findings from the evaluation of the timeliness of the new EHDI-IS.

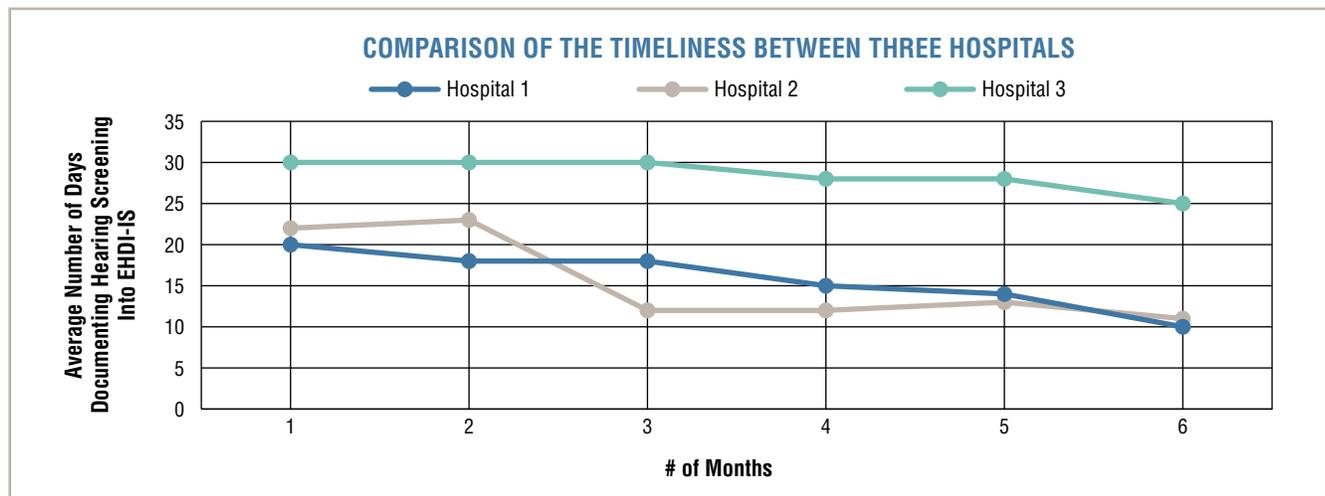
### Are the users reporting hearing screening results within 10 days of the screening event?

Key Findings:

- After the evaluation we found that the timeliness of the hearing screening has improved with the new web-based data reporting system. The hospitals reporting inpatient screening in 2014 averaged **20.3 days** for completion of newborn hearing screening to date of recording information into EHDI-IS. By January 2016 data show that the average number of days at three hospitals using the new web-based data reporting system was **12.5**. Although a significant improvement, this did not meet the original expectation to reduce the timeliness of reporting hearing screening results to **10 days**.

Site visits to hospitals found important issues that are affecting the timeliness of the data collected, not only related to the new web-based data reporting system, but also the screening protocol in hospital #3.

In addition, when analyzing data related to hearing screening, several errors with regard to the dates of screening were identified and corrected.



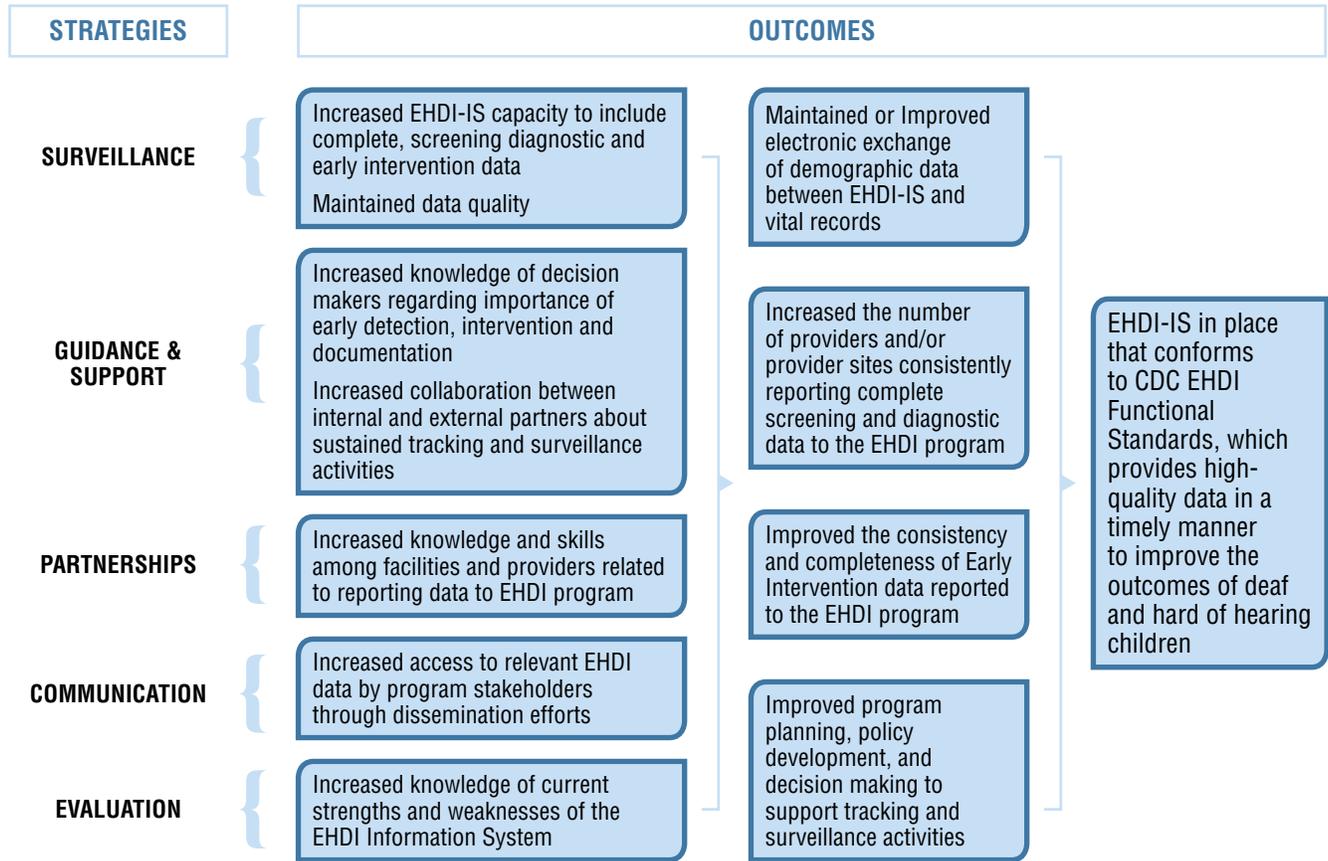
### FINAL ACTIONS: Recommendations and Next Steps

- Share evaluation findings with hospitals, and during the next six months the EHDI program will provide additional support in the data reporting process to help address the identified issues with hospital #3 (detailed information provided under evaluation of barriers faced by data reporters).
- Added data validation rules to Hearing Screening Date entry field to prohibit entering the screening date before date of birth or date in the future.
- Perform data cleaning monthly to reduce errors.
- Present findings from this evaluation at the quarterly advisory committee meeting.
- During the next six months, implement the new EHDI-IS in 15 more hospitals.

# APPENDIX A

## Enhancing the EHDl-IS Performance with Logic Models

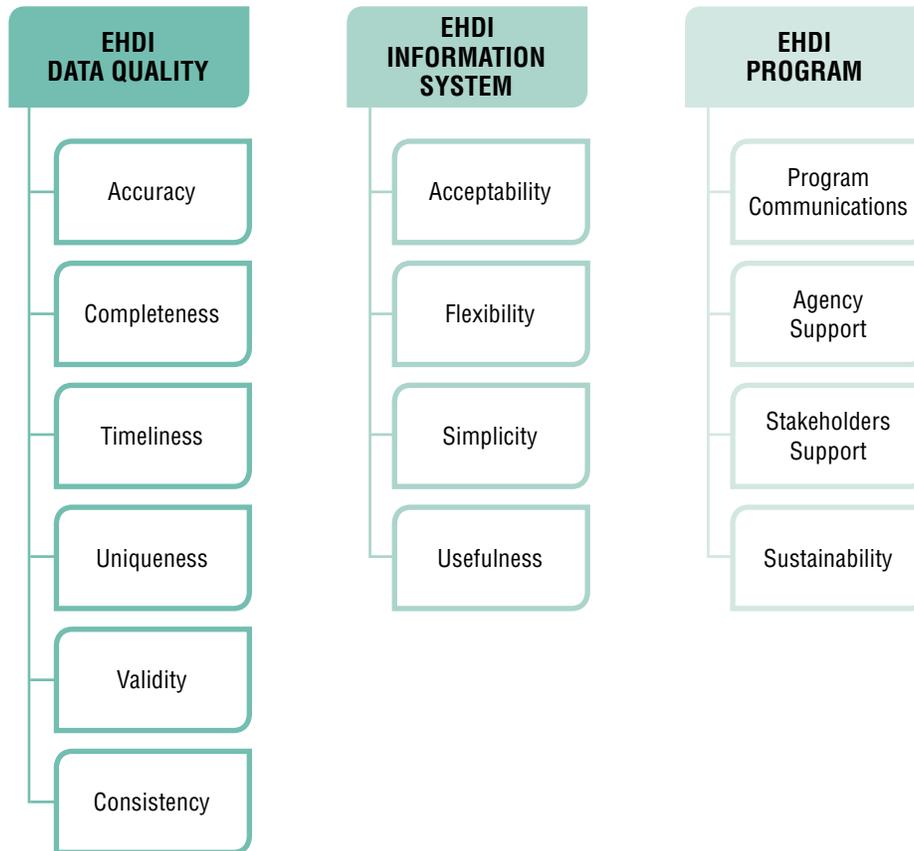
INPUTS: Infrastructure, Funding, Staff, Guidance and Support, Stakeholders, Information System



## APPENDIX B

Please see **Appendix B** for a complete list potential attributes and components to evaluate.

### Potential Attributes and Components To Evaluate



## APPENDIX C

### PRIORITIZATION PROCEDURES

A criteria-driven decision matrix evaluates and prioritizes a list of options. The team first establishes a list of weighted criteria and then evaluates each option against those criteria. A variety of techniques are available for working with stakeholders to prioritize evaluation candidates or evaluation questions, as well as for setting priorities in other areas of program planning. These techniques include, but are not limited to, the Nominal Group Planning Method and the Criteria Weighting Method.

Please visit the following online resources for more information:

- Brief #7 – Gaining Consensus among Stakeholders through the Nominal Group Technique. Available from the BRIEFS link on the right-hand side of the page at [www.cdc.gov/healthyyouth/evaluation/pdf/brief7.pdf](http://www.cdc.gov/healthyyouth/evaluation/pdf/brief7.pdf)
- <http://asq.org/learn-about-quality/decision-making-tools/overview/decision-matrix.html>