



CDC STEADI:

Evaluation Guide for Older Adult Clinical Fall Prevention Programs



Centers for Disease
Control and Prevention
National Center for Injury
Prevention and Control

STEADI Stopping Elderly Accidents,
Deaths & Injuries

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CDC STEADI:
**Evaluation Guide for
Older Adult Clinical
Fall Prevention
Programs**

**By
Gwen Bergen, PhD, MPH,¹ and Iju Shakya, MPH²**

¹Division of Unintentional Injury Prevention
National Center for Injury Prevention and Control
Centers for Disease Control and Prevention
Atlanta, Georgia

²Oak Ridge Institute for Science and
Education (ORISE) fellow to the Centers for
Disease Control and Prevention

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Centers for Disease Control and Prevention

Robert R. Redfield, MD, Director

National Center for Injury Prevention and Control

Debra Houry, MD, MPH, Director

Division of Unintentional Injury Prevention

Grant Baldwin, PhD, MPH, Director

Home, Recreation, and Transportation Branch

Ann Dellinger, PhD, MPH, Branch Chief

Home and Recreation Injury Prevention Team

Robin Lee, PhD, MPH, Team Lead

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INTRODUCTION

Importance of Clinical Fall Prevention Programs



Falls among adults aged 65 and over (“older adults”) are common and costly. In 2016, falls led to about 3 million emergency department visits, 962,000 hospitalizations, and 30,000 deaths.¹ Falls are often accompanied by loss of independence, reduced mobility, and fear of falling.² Additionally, the annual medical cost associated with falls and fall deaths is an estimated \$50 billion.³

To address the burden of falls among older adults, the CDC developed an initiative called STEADI (Stopping Elderly Accidents, Deaths, and Injuries) based on the American and British Geriatrics Societies’ clinical fall prevention guideline.^{4,5} [The STEADI initiative](#) helps healthcare providers develop a standardized process for screening patients for fall risk, assessing the at-risk patient’s modifiable risk factors, and intervening to reduce the identified risk using effective risk factor-specific interventions.^{6,7} CDC’s *Coordinated Care Plan to Prevent Older Adult Falls* offers insight into implementation of a STEADI-based clinical fall prevention program, and provides primary care practices with tips and strategies needed for successful implementation.⁸ The *Evaluation Guide for Older Adult Clinical Fall Prevention Programs* is a companion to the Coordinated Care Plan. While the Evaluation Guide focuses on evaluating programs implemented in primary care settings, STEADI-based programs can be implemented in different healthcare settings and this guide can also be used to evaluate those programs. CDC recommends using the Coordinated Care Plan and the Evaluation Guide simultaneously for implementation and evaluation purposes, respectively.

FALLS ARE PREVENTABLE:

CDC’s STEADI initiative encourages clinical fall prevention by providing resources for healthcare providers, older adults, and caregivers on how to reduce fall risk.



Use the Coordinated Care Plan and the Evaluation Guide simultaneously to implement and evaluate a STEADI-based clinical fall prevention program.

Why evaluate your program?

Evaluating STEADI-based programs can help providers and organizations increase the quality of care provided to their older patients, streamline implementation, demonstrate program-related successes, identify areas for improvement, and prioritize future needs (e.g., budget).

The purpose of this Evaluation Guide is to describe key steps to measure and report on the success of implementing a STEADI-based clinical fall prevention program. The guide, based on the CDC Framework for [Program Evaluation in Public Health](#)^{9,10} and other program evaluation guides,¹¹⁻¹⁹ uses the following framework steps to help you develop an evaluation plan ([Figure 1](#)):



Each step is an important component of the evaluation, and they are not always completed in order. Evaluators often go back and forth between steps and may find themselves revisiting earlier steps based on new information or decisions made in later steps. For example, a group might describe their program before engaging stakeholders, then revise the program description based on stakeholder feedback. In addition, the Framework includes the following standards to guide evaluators at each step in the evaluation. These standards should be revisited and reviewed throughout the evaluation process to ensure that evaluation is focused, ethical, and unbiased.

- **Utility:** the evaluation is useful and serves the needs of the intended users
- **Feasibility:** the evaluation is realistic, prudent, diplomatic, and frugal
- **Propriety:** the evaluation is conducted legally, ethically, and with regard for the welfare of those involved in the evaluation as well as those affected by the evaluation results
- **Accuracy:** the evaluation uses and reports accurate data and information



EVALUATION HELPS:

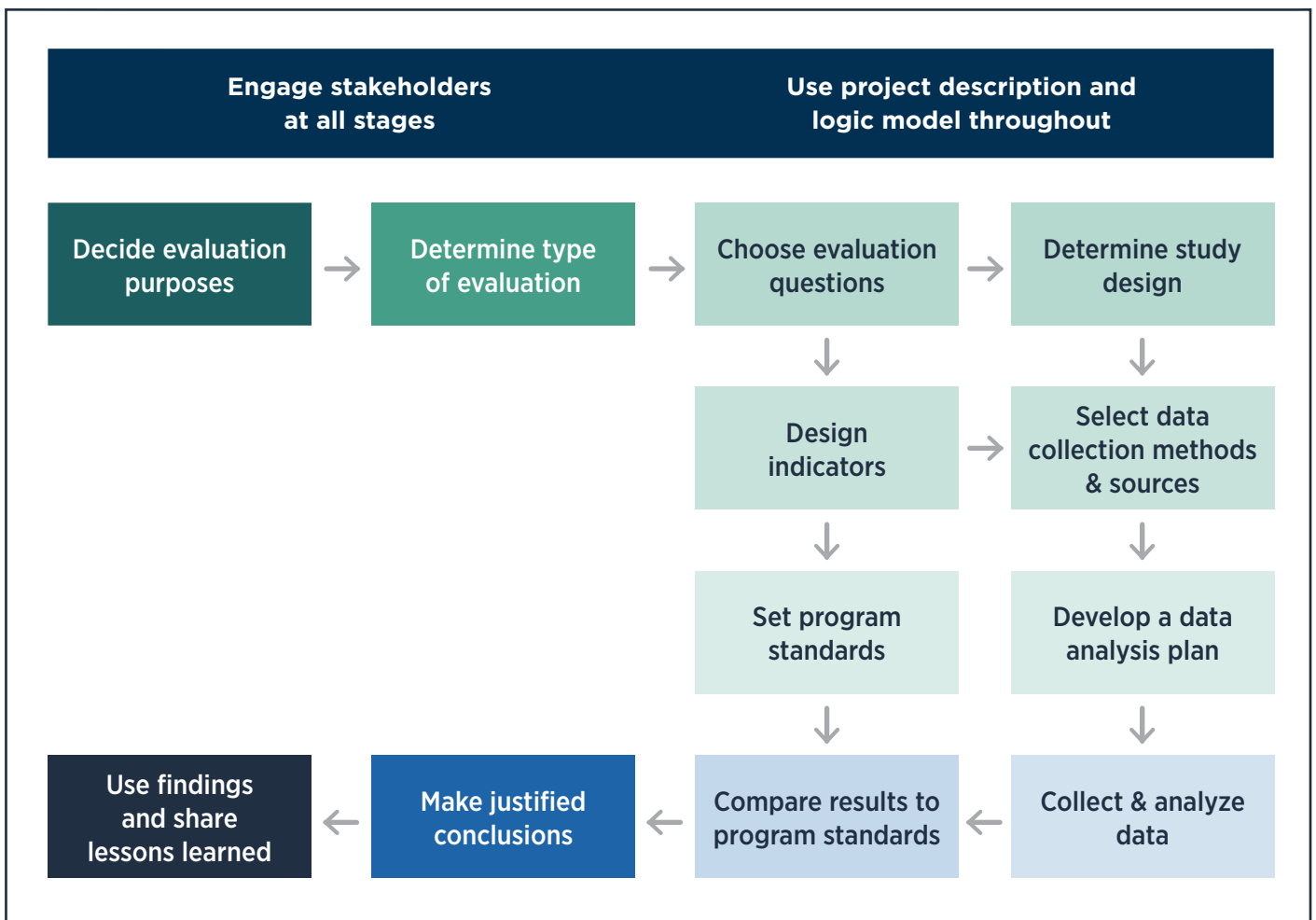
- Improve your program
- Showcase program successes
- Prioritize future needs

FIGURE 1. CDC Evaluation Framework¹⁰



Figure 2 shows the six evaluation framework steps in greater detail, and this guide will describe how each step can be used to evaluate a STEADI-based clinical fall prevention program (referred to as “fall prevention program” from here on). Additionally, an appendix with worksheets has been included to help you develop your evaluation plan.

FIGURE 2. Steps involved in the evaluation process





FRAMEWORK STEP 1

Engage Stakeholders



Why is fall prevention stakeholder engagement important?

Involving stakeholders is important to:

- **Make your evaluation relevant:** Successful fall prevention programs involve a variety of stakeholders who may have different perceptions and expectations of the program. To ensure evaluation results match stakeholder needs, spend time understanding different stakeholder perspectives, and engage a diverse evaluation team that brings a wide variety of ideas to the process ([Figure 3](#)).
- **Prioritize your evaluation:** Stakeholders can help focus your evaluation by identifying important and feasible evaluation questions.
- **Conduct your evaluation activities:** It is useful to engage stakeholders with varied skills and positions for evaluation tasks such as developing data collection instruments, collecting data, disseminating results, and reviewing evaluation reports. Involving stakeholders can lessen the burden of evaluation tasks, especially if resources are limited.
- **Use your evaluation results:** When evaluation focus and questions reflect stakeholder interest, results will be more readily accepted and used to improve the program.
- **Maintain your fall prevention program:** Involving stakeholders and incorporating their views will encourage them to improve and continue the program.

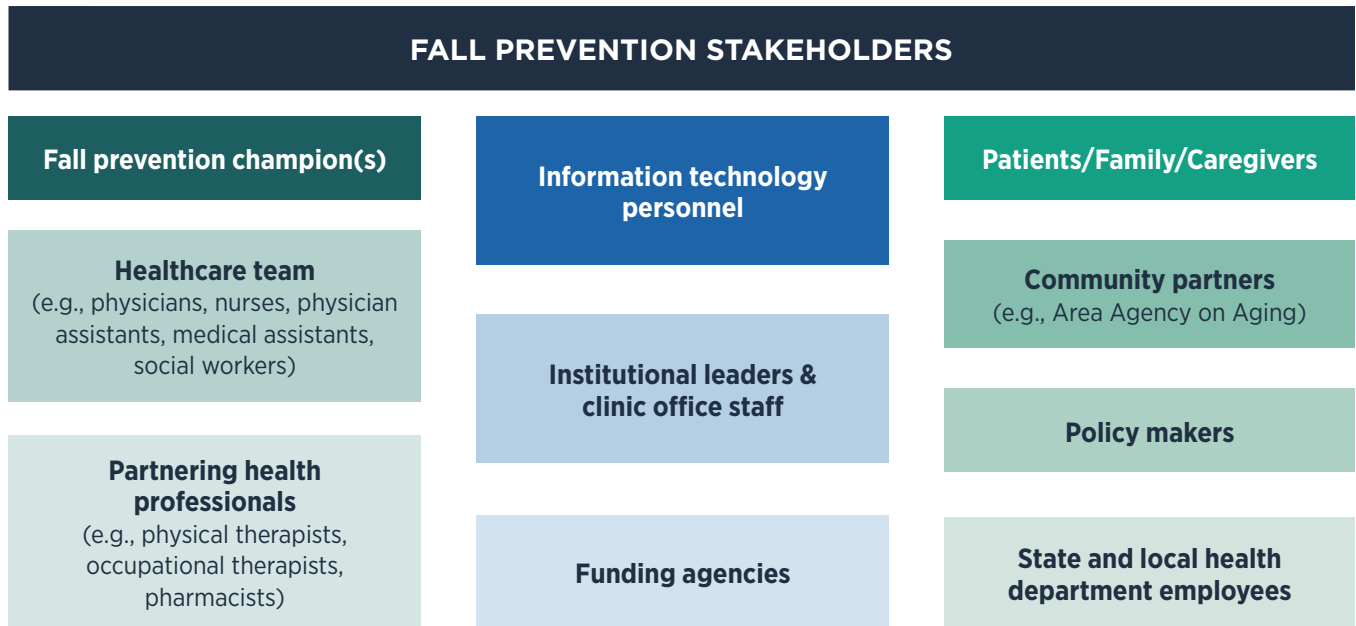
Who are fall prevention stakeholders?

Stakeholders are people or organizations that:

- develop or maintain fall prevention programs (e.g., champions and physicians)
- are involved in fall prevention activities (e.g., nurses and physical/occupational therapists)
- are affected by results of the fall prevention program (e.g., older patients)
- will use evaluation results (e.g., funding agencies and health information technology personnel)
- decide on program operations (e.g., institutional leaders)

Fall prevention stakeholders may include: fall prevention champions, healthcare team members, partnering health professionals, health information technology (IT) personnel, institutional leaders, clinic office staff, funding agencies, patients, family members, caregivers, community partners, policy makers, and state and local health department employees ([Figure 3](#)).

FIGURE 3. Potential stakeholders for a fall prevention program



Once you have a list of stakeholders, you may want to assess the feasibility of including all stakeholders or beginning with just a subset. Key considerations might be available resources, time, stakeholder roles, and perspectives. Resource concerns such as limited funds will affect the level of stakeholder engagement (e.g., number of meetings held). Limited time might require working with a small group that can reach consensus quickly and be managed easily.

It is important to maintain clear communication with all your stakeholders as it helps garner support for evaluation and with disseminating evaluation results. Some stakeholders, depending on their roles, may be involved at different stages of evaluation (e.g., planning, implementation, dissemination, ensuring use of the findings). Some stakeholders might be more directly involved in improving the program than others.

Regardless of a stakeholder group’s size, the group must be organized and managed to function efficiently. One way to structure stakeholder involvement is to develop a stakeholder engagement plan ([Table 1](#); worksheet available in appendix). You can record stakeholder name, title, role in fall prevention, information they need from the evaluation, role in evaluation, mode of communication, and level of engagement in the evaluation. Having a record of each stakeholder can help define the expectations of each person, set expectations of workload, identify and use skills needed in evaluation, and document the range of interest in the evaluation. It is crucial to ensure that at the end of your evaluation, stakeholders get the information needed to improve, continue, and advocate for the program. Therefore, being aware of the required information at this early stage is important.

Identify key stakeholders to develop your evaluation plan, but keep all stakeholders informed of the progress.

TABLE 1. Example of a stakeholder engagement plan for a fall prevention program

STAKEHOLDER NAME, TITLE	ROLE IN FALL PREVENTION	INFORMATION NEEDED FROM EVALUATION	ROLE IN EVALUATION	MODE OF COMMUNICATION	WHEN TO INVOLVE IN EVALUATION
Full name, Nurse	Screen for fall risk Assess gait, strength, and balance	Progress made with screening efforts to identify fall risk among older patients Impact of assessing fall risk factors such as gait	Assist in understanding facilitators and barriers to screen and assess older patients Help collect data Use results for clinical care	Biweekly conference calls	Throughout the entire evaluation
Full name, Physician	Assess and manage fall risk factors such as medications that increase fall risk Refer to specialists and/or community activities	Impact of assessing fall risk factors Patient completion of referrals	Insight into success and failures of operating the program Define evaluation questions Use results	Biweekly conference calls	Throughout the entire evaluation
Full name, Physical therapist	Work with older patients to improve gait, strength, and balance	Impact of exercise sessions on reducing falls	Data source to understand session components and patient involvement	Meet in-person when required	Implementation stage of evaluation
Full name, Institutional leader	Support fall prevention program	Quality measures addressed Resources used Overall impact	Advocate for evaluation Disseminate evaluation findings	Email or meet in-person to inform about evaluation Email updates	Planning and dissemination stages of evaluation
Full name, health IT personnel	Integrate fall prevention tools in electronic health record system	Functionality of health record system	Help gather data from health record system Use results to improve clinical decision support tools	Meet in-person when required	Implementation and dissemination stages of evaluation



FRAMEWORK STEP 2

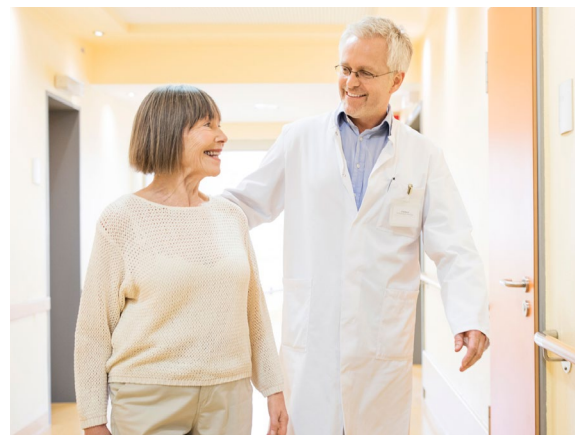
Describe the Program

A shared understanding of the program and clear expectations about what the fall prevention program does and does not do is important. This stage is especially important if you are working with a diverse group of stakeholders because their positions and roles may affect their expectations and understanding of the program. Describing the program with stakeholders also provides an opportunity to clear up any confusion or identify gaps about program activities, outputs, and impacts before beginning the evaluation process. This helps ensure the evaluation will be relevant and useful to the program. Program descriptions are usually already written as part of program implementation, but make sure to revisit the description with stakeholders and update as needed.

Program description components include the statement of need, target population, stage of development, and the logic model. A **statement of need** describes the public health problem that the program is intended to address (e.g., falls). The statement may include information on the number of people affected, significance of the health concerns, and/or consequences of the problem.

EXAMPLE “STATEMENT OF NEED”:

Each year, one in four adults age 65 and over (“older adults”) falls. This results in 29 million falls, 7 million of which lead to a healthcare encounter and/or voluntary restriction of daily activity. Older adult falls result in nearly \$50 billion in direct medical costs each year. To address the health issues pertaining to falls, CDC developed a fall prevention initiative called STEADI (Stopping Elderly Accidents, Deaths and Injuries). The STEADI initiative includes a suite of materials intended to help healthcare providers implement the clinical practice guideline developed by the American and British Geriatric Societies for prevention of falls among older adults.



ENSURE ALL STAKEHOLDERS AGREE ON:

- ▶ Nature of the problem
- ▶ Target population
- ▶ Program input
- ▶ Program activities
- ▶ Program output
- ▶ Program outcomes
- ▶ Context of the program

The **target population** describes the people or groups of people the program can help. For fall prevention programs, older adult patients aged 65 and older are the target population. You may want to further describe your target population by describing characteristics such as their geographic location or where they receive outpatient care.

Another important program description component is **stage of development**. This describes program maturity. Programs can usually be categorized into planning, implementation, and maintenance of outcomes. For example, if the program is in the implementation stage, focus will be on evaluating activities such as training. If the program is in the maintenance stage, the focus will be on evaluating outcomes such as screening, assessment, and intervention. The stage of development will determine how evaluations are focused.

To further define your program, we recommend using a **logic model**. A logic model is a visual representation of the relationship between program activities and the intended outcomes. It should help show the rationale behind why a program will work (Figure 4). You can modify the model's level of detail as needed for your team, and the model itself can change based on new research, evaluation findings, or more experience.

Five components of a comprehensive program are typically included in a logic model: inputs, activities, outputs, outcomes, and context.

- 1 **Inputs.** Inputs are essential resources such as staffing, funding, and leadership support needed for the program to begin and for the activities to take place. When looking at evaluation results, if the program is not working as intended, it can be useful to look at the inputs to see if there is a missing or an insufficient input. For fall prevention programs, as shown in Figure 4, inputs such as staff willingness to conduct clinical fall prevention, health record system, personnel, and the STEADI tools and resources are important inputs.
- 2 **Program activities.** Program activities are actions that program staff perform to achieve the intended outcomes. They can occur at different times during program implementation. Fall prevention program activities, as shown in Figure 4, include collaborating with specialists, adapting communication materials, forming a fall prevention team, designing a fall prevention plan, training the identified team, integrating and streamlining fall prevention tools into clinical workflow, and modifying the clinical decision support. Evaluation may focus on a few activities depending on the question, but it is important to understand all activities.
- 3 **Program outputs.** Program outputs are direct and tangible products (or capacities) that result because of the program activities. For example, fall prevention trainings will result in an output of a specific number of trained healthcare providers and staff. In addition, collaboration may result in an output of a comprehensive referral list that includes community pharmacists who are willing to conduct thorough medication reviews for patients taking multiple medications linked to increased fall risk.
- 4 **Program outcomes.** Program outcomes are focused on who or what will change outside of the people or organization implementing the program activities. Categorizing outcomes into short, intermediate, and long term gives clarification of the intended sequence of events. In most instances, one of the fall prevention program's intended impacts is to have fewer older adults fall, but this outcome is only possible if providers screen and assess their patients routinely and intervene as needed (short-term outcome), and if older adults are receptive to their provider's prescribed interventions (intermediate outcome). It is also important to realize that long-term outcomes such as reducing falls take time to achieve. For example, older patients may readily participate in recommended exercise programs, but it takes a while for people to build strength and balance.
- 5 **Context:** Describe social, political, economic, environmental, or any other factors that may facilitate or hinder getting to the outcomes. These factors influence how the program is run and will also affect the evaluation. It helps to report the context in which evaluation findings may be applicable. Some external factors that may affect fall prevention programs include additional work for clinic staff to screen and assess for fall risk, limited time to screen and assess in clinics, and limited financial incentives for fall prevention.

Figure 4 shows an overall generic logic model for the STEADI initiative, which you can modify to meet your specific fall prevention implementation plans. You might also consider drawing arrows to show relations between components, such as from one activity to another activity, from activity to outcome, and from one outcome to another outcome.

Use a logic model to visualize your program inputs, activities, outputs, outcomes, and context

FIGURE 4: STEADI Logic Model

INPUTS	ACTIVITIES	OUTPUTS	OUTCOMES		
			SHORT TERM <i>(Staff-directed)</i>	INTERMEDIATE <i>(Patient-directed)</i>	LONG TERM <i>(Impact)</i>
<p>Assess readiness</p> <ul style="list-style-type: none"> - Staff & administration ready to commit to a fall prevention initiative <p>Health record</p> <ul style="list-style-type: none"> - Electronic - Paper <p>Personnel</p> <ul style="list-style-type: none"> - Providers - Clinic staff - Administrative staff - Health Information Technology (IT) specialists - Physical therapists - Occupational therapists - Emergency responders - Pharmacists <p>STEADI components</p> <ul style="list-style-type: none"> - Toolkit of provider and patient fall prevention resources 	<p>Collaboration</p> <ul style="list-style-type: none"> - Meet with institutional leaders - Consult IT specialists - Identify clinical fall prevention resources - Identify community fall prevention resources <p>Communication</p> <ul style="list-style-type: none"> - Adapt or develop fall communication strategy and materials for older adults <p>Fall prevention plan</p> <ul style="list-style-type: none"> - Design a specific fall prevention strategy - Develop implementation and monitoring plans - Identify appropriate billing codes for reimbursement - Use CMS quality improvement plan - Identify internal quality improvement opportunities <p>Fall prevention team</p> <ul style="list-style-type: none"> - Identify champion(s) - Form a team with defined roles <p>Health record system</p> <ul style="list-style-type: none"> - Modify clinical decision support to record fall screening, assessment, intervention and follow-up for fall risk <p>Training</p> <ul style="list-style-type: none"> - Train providers and staff on falls, fall prevention workflow, and clinical decision support tools <p>Workflow</p> <ul style="list-style-type: none"> - Integrate and streamline fall prevention tools into clinic workflow 	<p>Collaboration</p> <ul style="list-style-type: none"> - Clinical resources identified - Community resources identified - Referral list developed <p>Communication</p> <ul style="list-style-type: none"> - Communication strategy and materials for older adults developed <p>Fall prevention plan</p> <ul style="list-style-type: none"> - Implementation plan documented - Billing codes identified - Quality improvement plans documented <p>Fall prevention team</p> <ul style="list-style-type: none"> - Team formed <p>Health record system</p> <ul style="list-style-type: none"> - Clinical decision support updated to incorporate fall prevention tools <p>Training</p> <ul style="list-style-type: none"> - Providers and staff members trained <p>Workflow</p> <ul style="list-style-type: none"> - Fall prevention tools integrated as part of the clinic workflow 	<p>1. Screen</p> <ul style="list-style-type: none"> - Clinic staff screen older adults for fall risk <p>2. Assess</p> <p>Providers and clinic staff</p> <ul style="list-style-type: none"> - Perform medical assessment to identify fall risk factors - Update medical record with assessment results <p>3. Intervene</p> <p>Providers and clinic staff</p> <ul style="list-style-type: none"> - Develop a plan of care - Perform effective interventions (e.g., adjust medication) - Refer to specialists and other health professionals (e.g., physical therapist) - Recommend evidence-based community fall prevention interventions (e.g., Tai Chi) <p>4. Follow Up</p> <ul style="list-style-type: none"> - Clinic staff follow up with older adults at increased risk of falls 	<p>Older adults aware of their fall risk status</p> <p>Older adults participate in recommended strength, balance, or exercise program</p> <p>Older adults take Vitamin D as needed</p> <p>Older adults make recommended changes to their medications</p> <p>Older adult visits appropriate specialist or other healthcare professional</p>	<p>Gait, strength, and balance improves</p> <p>Fewer older adult falls</p> <p>Fewer older adult falls with injury</p> <p>Fewer fall-related ED visits</p> <p>Fewer fall-related hospitalizations</p> <p>Decrease in direct medical costs associated with falls</p>

CONTEXT: Identification and management of fall risk is time intensive and physicians have limited time; there are limited financial incentives for fall prevention; patient has the ability to adhere to the prescribed intervention/recommendation; patient adherence to the prescribed intervention/recommendation



FRAMEWORK STEP 3

Focus the Evaluation Design

An evaluation that is too broad is unlikely to be successful. This section describes how to focus your evaluation starting with the purpose.

Evaluation Purpose

The evaluation purpose is driven by stakeholder interest, available resources, and the program’s stage of development. The purpose describes why the evaluation is being conducted and often falls into one or more of these categories to:

- Demonstrate that the program is working as designed (e.g., matches the logic model, high percentage of older adults are screened, assessed, and offered interventions for falls)
- Improve conduct of program activities (e.g., streamline implementation)
- Demonstrate program effectiveness (e.g., the program results in reduced older adult falls)

EXAMPLE “PURPOSE STATEMENT”:

The purpose of this project is to evaluate the implementation of a fall prevention program in XYZ system. The specific project evaluation goals are to: (a) understand the project workflow in order to suggest improvements, and (b) understand how patient outcomes vary based on quality of implementation.



Ensure that your evaluation meets stakeholder interests, and provides useful information.

Type of Evaluation

There are different types of evaluations, such as process or implementation, outcome or effectiveness, formative, efficiency, attribution, and cost-effectiveness.⁹ This guide focuses on process or implementation and outcome or effectiveness evaluations.

FIGURE 5: Type of evaluation and corresponding logic model components

PROCESS OR IMPLEMENTATION EVALUATION			OUTCOME OR EFFECTIVENESS EVALUATION
Inputs (e.g., Does the program have the capacity to run the planned activities?)	Activities (e.g., Were activities implemented as planned? Why are/aren't we getting our intended outcomes?)	Outputs (e.g., Were activities implemented? Did activities produce the intended outputs?)	Outcomes (Short, Medium & Long) (e.g., Did activities lead to the intended outcomes?)

Process or implementation: This type of evaluation examines whether a program has been implemented as intended, and focuses on program inputs, activities, and outputs (Figure 5). Results can be used to improve program operations, to understand program outcomes, to measure efficiency, and to identify challenges.

EXAMPLE OF A PROCESS EVALUATION:

- ▶ A fall prevention program trains staff (activity) to screen for fall risk. Through a process evaluation, one might find that training sessions were poorly attended because staff cannot find time to attend in-person trainings. This finding provides an opportunity to change the training format to an asynchronous webinar or recorded conference call.

Outcome or effectiveness: This type of evaluation examines whether program activities led to the intended changes, and focuses on short-term, intermediate, and long-term health outcomes (Figure 5). Fall prevention program activities are expected to increase i) screening for fall risk, ii) assessment of risk factors among at-risk patients, iii) interventions to reduce the identified risk factors, and iv) follow-up (short-term outcomes). These short-term goals lead to changes in people's attitudes, beliefs, and behavior (intermediate outcomes), which in turn leads to changes in mortality and morbidity (long-term outcomes). Although an outcome evaluation is conducted relatively late in a program's timeline, early planning is critical to obtain baseline data and access to data sources.

EXAMPLES OF OUTCOME EVALUATION:

- ▶ With trained staff (output), the number of patients being screened, assessed, and provided interventions is expected to increase. An outcome evaluation can be used to determine the percentages of screened and assessed cases, and cases that were offered intervention(s) before and after program implementation.
- ▶ With increased screening, assessment and intervention, older adults become aware of their fall risk and start participating in exercise classes. Here, an outcome evaluation can be used to understand changes in older adults' attitudes, and to determine the extent of participation or uptake of recommended interventions.
- ▶ Outcome evaluation can then be used to measure changes in fall rate before and after program implementation.

Ideally, process and outcome evaluations are conducted together in a type of evaluation called comprehensive evaluation. This can be beneficial because understanding the process can help explain results of an outcome evaluation. For example, if an outcome evaluation shows that the screening rate is low, activities associated with this outcome (e.g., training staff, updating the health record system) can be investigated through a process evaluation for an in-depth understanding of the issue.

OTHER TYPES OF EVALUATION:⁹

- ▶ **Formative evaluations** study the feasibility and relevance of launching a new program using methods such as needs assessments and pilots. Findings help inform program development.
Example: How much will the fall prevention program cost?
- ▶ **Efficiency evaluations** study the relationship between inputs and activities/outputs, and determine whether there is efficient use of resources to implement program activities and produce outputs.
Example: Has the clinical decision support been updated to incorporate fall prevention tools?
- ▶ **Attribution evaluations** study the relationship between activities/outputs and outcomes, and helps understand whether the observed results are because of the program and not because of any other external factors.
Example: Is the decreasing number of fall-related ED visits a result of the fall prevention program?
- ▶ **Cost effectiveness evaluations** study whether the benefit of the program's outcomes exceed the cost of implementing the program.
Example: Does the economic benefit of preventing falls exceed the cost of implementing and maintaining the fall prevention program for older adults?

Evaluation Questions

Questions can cover a mix of process and outcome evaluation. Process questions are focused on what and how activities happened. Outcome questions are focused on the results or outcomes of the activities. Using the logic model may help develop evaluation questions. The number of questions selected will depend on the program's stage of development and should be manageable with the amount of time, resources, funding, and staff available. Ask stakeholders what evaluation questions they would like asked. This helps to ensure their concerns are addressed and encourages stakeholder buy-in. Keep a record of what questions were considered and the process used to select questions. The following examples of evaluation questions may help you determine yours.

Process evaluation questions:

- 1 How many providers and staff were trained on the fall prevention program workflow?
- 2 Was the fall prevention plan incorporated in the clinic workflow?
- 3 What are the facilitators and barriers to implementing a fall prevention program?

Outcomes evaluation questions:

- 1 How much has the fall prevention program increased fall risk screening among older patients?
- 2 What were the fall-related health outcomes before and after implementing the fall prevention program?
- 3 Has referral to physical therapy sessions led to fewer falls among older patients?

COMMON IMPLEMENTATION ISSUES TO CONSIDER FOR EVALUATION:⁹

- ▶ **Access:** In a fall prevention program, provider referrals to community fall prevention programs (e.g., Tai Chi) assume that older adults have access to these opportunities. If patients do not have access and are not able to follow provider advice, then the expected intermediate and long-term outcomes may not happen.
- ▶ **Transfer of accountability:** Successfully reducing falls assumes that older adults will follow their provider's recommendations, but this is a case of transferring accountability to patients, which requires evaluation to measure whether it happened.
- ▶ **Dosage:** Dosage refers to the amount and (sometimes) frequency in which an intervention activity is delivered. Measuring dosage can help in understanding problems with outcomes. For example, staff who received a one-hour training for a complex fall assessment are still not performing the assessment correctly. It could be that the number of training hours (the dosage) was not sufficient.
- ▶ **Staff competency:** Technical and cultural competence of staff is important. For instance, a nurse or pharmacist can review a patient's medications for fall risk but only a licensed prescriber can make changes to the medications. Therefore, it is important to make sure appropriate members of the healthcare team are assigned to each activity.

Study Design

A good study design for an outcome evaluation will produce valid and defensible results. Not all study designs are equal in their suitability for determining the effectiveness of an intervention.²⁰ Here are descriptions of characteristics of study designs ordered by strength of design from strongest to weakest.

- ▶ **Strong:** The strongest designs:
 - are prospective (e.g., design and measurements of evaluation start before the intervention is put in place),
 - include random assignment of patients to comparison (e.g., control) and intervention groups, and
 - measure the outcome of interest (e.g., falls, fall injuries) and the amount of intervention received or dosage of both groups prior to, during, and after the intervention.

While this is the strongest design, it can be time-consuming and expensive to put into place. Additionally, even with random assignment, care must be taken to assure that the intervention and control groups are similar for all characteristics that are related to falls.

- ▶ **Medium:** Medium-strength designs lack one or more of the criteria listed for strong designs. Examples of medium strength designs include:
 - Retrospective studies where design and measurements start after the intervention is in place. These designs include comparison and intervention groups but these groups are created by chance rather than purposively (e.g., an older adult is identified as at risk for a fall but does not receive an intervention so is in the comparison group).
 - Studies with pre- and post-treatment measures on the patients being screened, assessed, and intervened but no comparison group.

Demonstrating effectiveness can be harder with these designs compared with the stronger designs. When a comparison group is created without random assignment the patients in each group may not be similar for all characteristics related to falls. If a comparison group is not included in the design, assigning improvements to the intervention requires additional justification.

► **Weak:** The weakest study designs include:

- Cross sectional studies where the intervention and outcome are measured at the same point in time.
- Case studies where a smaller number of patients are examined and described.

These study designs do not include a comparison group, or pre-intervention measures so it is difficult to determine if the outcome is an improvement from what would normally happen. Comparisons of the outcome can be made against national, state, regional, or local indicators to show improvement but the study population should be similar to the indicator populations. These designs are generally less expensive and time-consuming to implement.

Choose a design that most easily and accurately helps answer the evaluation question, and takes resource and time constraints into consideration. Keep in mind that findings must help improve programs, and be useful to stakeholders.

USEFUL TERMS TO KNOW:⁹

► **Internal validity:** Ability to report confidently that a program was responsible for the measured results.

Example: A community initiative to get older adults to do Tai Chi started at the same time as your fall prevention intervention; since Tai Chi has been shown to reduce falls, it may not be valid to attribute reduced falls to your intervention.

► **External validity:** Ability to generalize program conclusions to subjects receiving the program in the future or under different conditions.

Example: You conducted your study in outpatient clinics in a large city with many resources for specialist referral, exercise, and senior transportation; as a result, your findings may not apply to outpatient practice in a more rural area.





FRAMEWORK STEP 4

Gather Credible Evidence

Indicators

Both process and outcome evaluations use indicators to answer the selected evaluation questions. Indicators:⁹

- ▶ can be either pre-existing or new indicators
- ▶ are measurable, often expressed as numbers, percentages, or proportions
- ▶ must be clear, specific, focused, observable, and feasible
- ▶ show how a program is progressing towards its desired goal

USING INDICATORS:

Evaluation Question: What percent of older patients is being screened for fall risk?

Indicator: Proportion of older patients screened for fall risk in the past 30 days

The indicator clearly defines **the measure:** proportion, **the population:** older patients, **the task:** screened for fall risk, and **the time frame:** past 30 days. It is also feasible since many practices will have this information in their health record system.

Each evaluation question should have at least one indicator but you may need multiple indicators to fully address the question (Table 2).

TABLE 2: Examples of indicators for fall prevention programs

LOGIC MODEL COMPONENT	EVALUATION QUESTION	INDICATORS
Input: Staff & administration ready to commit to a fall prevention initiative	To what extent are the primary care team members committed to carry out a fall prevention program?	<ul style="list-style-type: none"> - Attendance at informational sessions* - Feedback that staff is ready to commit*
Activity: Train providers and staff on fall, fall prevention workflow, and clinical decision support tools	How many providers and staff were trained on the fall prevention program workflow?	<ul style="list-style-type: none"> - Number of training sessions provided in a month - Number of providers/staff trained by month - Number of providers/staff trained by facility - Number of providers/staff trained by specialty
Output: Community resources developed	Have community fall prevention resources been identified?	<ul style="list-style-type: none"> - Number of community resources listed - Types of community resources listed
Short-term outcome: Clinic staff screen older patients for fall risk	What percent of older patients are being screened for fall risk?	<ul style="list-style-type: none"> - Number of older patients seen at practice in the past 30 days - Proportion of older patients who were screened for fall risk in the past 30 days - Proportion of screened older patients at low risk of fall in the past 30 days - Proportion of screened older patients at increased risk of fall in the past 30 days
Intermediate outcome: Older patients visit appropriate specialist or other healthcare professional	What percent of older patients complied with prescribed physical therapy visit for fall-risk-reduction interventions?	<ul style="list-style-type: none"> - Proportion of older patients who received physical therapy after referral
Long-term outcome: Fewer older patients fall	What were the fall-related health outcomes before and after implementing the fall prevention program?	<ul style="list-style-type: none"> - Rate of older patients who fell in the year prior to implementation - Rate of older patients who fell in the year post-implementation

*Some evaluation questions may not have a direct measure, in which case, you can develop indicators that most closely answer the question. Such indicators are called proxy indicators.

Data sources and methods: After finalizing indicators for each evaluation question, choose data source(s) and collection method(s) for each. While choosing sources, think about who or what can best answer your evaluation question, and consider resources (e.g., budget and time) required for obtaining data from each source. Some examples of data sources are:

- Personnel (e.g., providers, staff, patients, champions)
- Meetings, minutes, attendance sheet, agendas
- Organizational charts, policies, and work plans
- Materials developed for the program
- Progress reports
- Survey tools
- Electronic or paper medical record / charts
- Screening, assessment, and referral forms

Data might already be available through sources such as project documents and health records. Early action on determining how to obtain access and getting any required authorizations will expedite the process when data are needed. If data are not available, common methods to collect data include focus groups, observation, key informant interviews, surveys, chart review, and case studies ([Table 3](#)). When collecting your own data, be mindful of how much time it will take. It may be helpful to have a timeline to ensure that data collection plans align with project goals and deadlines. As with all parts of your evaluation, stakeholders also need to be engaged in data collection. An example of a data collection plan is shown in [Table 4](#). Each data source and method has strengths and limitations. Therefore, if resources allow, it is best to use multiple sources and methods to answer the same question. If different methods produce similar results, there will be more confidence in your results.

USEFUL TERMS TO KNOW:⁹

Validity refers to performing accurate measurements.

Reliability refers to getting consistent results when repeatedly measured.



TABLE 3: Summary of common data collection methods with strengths and limitations^{11,21}

METHODS OF DATA COLLECTION	STRENGTHS	LIMITATIONS
Document review (e.g., EHR)	<ul style="list-style-type: none"> • Information readily available • Few biases • No additional burden on the patient or the healthcare staff or the program • Data for multiple years available • Patient characteristics, comorbidities, and drug use can be collected from these records along with data about the specifics of their fall screening, assessment, and referral to treatment 	<ul style="list-style-type: none"> • Incomplete information • Might take time to find what you need especially from paper records • Data available in different formats over time • Limited to the data available • Freeform data such as that in physician’s notes are not readily extractable and may need to be abstracted • May not have access • May require approvals prior to data collection*
Focus groups	<ul style="list-style-type: none"> • Can gather common perspectives from a number of people at the same time • Allows in-depth discussion as participants have to clarify their views to each other 	<ul style="list-style-type: none"> • Need to develop focus group guide • Requires trained moderator • Difficulty with scheduling participants • Researchers cannot assure confidentiality • Group dynamics may influence responses • Can be time consuming and expensive to process data (e.g., transcription) • Researchers’ personal bias may affect data interpretation • May require approvals prior to data collection*
Key informant interviews	<ul style="list-style-type: none"> • More time and scope to understand a perspective fully • Flexible logistics 	<ul style="list-style-type: none"> • Need to develop interview guide • Requires skilled interviewer who can build rapport and probe as needed • Time consuming to conduct interviews and to process data (e.g., transcription) • Expensive depending on number of interviews • Researchers’ personal biases may affect data interpretation and responses • Participants may have recall bias or present responses that the interviewer want to hear • May require approvals prior to data collection*

TABLE 3: Summary of common data collection methods with strengths and limitations^{11,21}

METHODS OF DATA COLLECTION	STRENGTHS	LIMITATIONS
Observations	<ul style="list-style-type: none"> • Able to observe program components such as screening in a natural setting • Can understand circumstances and context better • Flexible timing 	<ul style="list-style-type: none"> • Requires skilled observer who can remain objective throughout the observation process • Awareness that they are being observed may cause participants to act differently than they normally would
Surveys	<ul style="list-style-type: none"> • Appropriate when there are many people • Various format options: paper, telephone, online • Anonymous participation possible • Validated survey tools may be available • Comparable data • Can cover multiple topics 	<ul style="list-style-type: none"> • Developing survey tools can be time intensive • Skilled staff required for development • Limited context • Achieving desired response rate • Responses may be biased due to participant’s concerns of social desirability • May require approvals prior to data collection*
Case studies	<ul style="list-style-type: none"> • Few perspectives explored in depth • Good for examples 	<ul style="list-style-type: none"> • Time consuming • Cannot apply results to the general population under study

**For some evaluation purposes, certain approvals and/or clearances such as data use agreements and institutional review board (IRB) approvals might be required. IRBs are organizational entities that review and approve studies involving human participants. If your evaluation is collecting data from patients and healthcare providers, consult with your IRB since protocols for IRB submission and timeline may vary among health systems.*

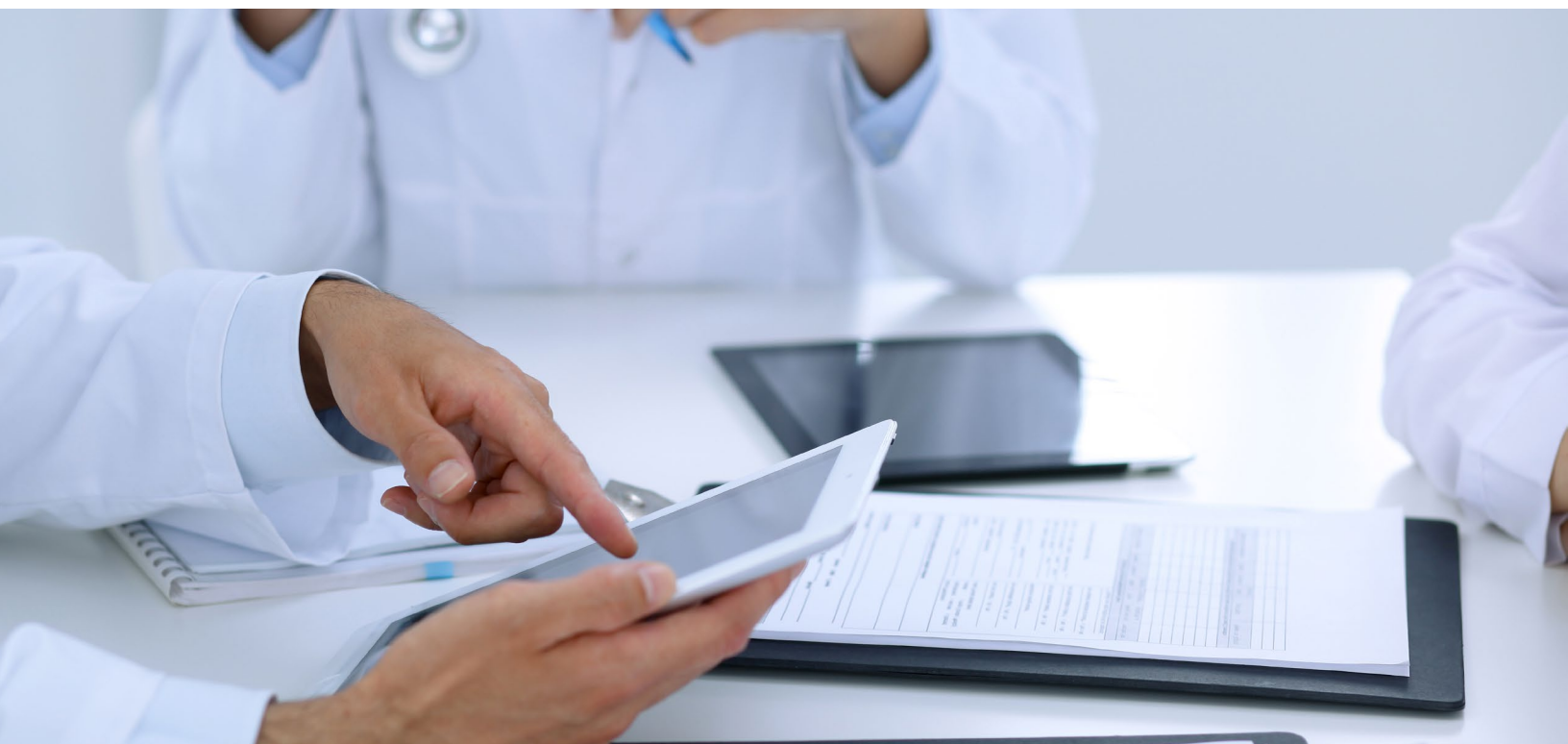


TABLE 4: Example of a data collection plan

EVALUATION TYPE & QUESTION	LOGIC MODEL COMPONENT	INDICATORS	DATA SOURCE	DATA COLLECTION METHOD	LOGISTICS OF DATA COLLECTION <i>(timing, duration, frequency)</i>
<p>Process evaluation: How many healthcare team members were trained on the fall prevention program workflow?</p>	<p>Activity: Train providers and staff on fall, fall prevention workflow, and clinical decision support tools</p>	<ul style="list-style-type: none"> - Number of training sessions provided in a month - Number of staff trained by month - Number of staff trained by facility - Number of staff trained by specialty 	<p>Training logs</p>	<p>Document review</p>	<p>Review training logs at the end of every month for Year 1</p>
<p>Outcome evaluation: What percent of older patients is being screened for fall risk?</p>	<p>Short-term outcome: Clinic staff screen older patients for fall risk</p>	<ul style="list-style-type: none"> - Number of older patients seen at practice in the past 30 days - Proportion of older patients screened for fall risk in the past 30 days - Proportion of screened older patients at low risk of fall in the past 30 days - Proportion of screened older patients at increased risk of fall in the past 30 days 	<p>Electronic Health Records Clinic staff</p>	<p>Health records Key informant interviews</p>	<p>Review electronic health records at the end of every month Conduct interviews with clinic staff during third quarter of Year 1</p>
<p>Outcome evaluation: What were the fall-related health outcomes before and after implementing the fall prevention program?</p>	<p>Long-term outcome: Fewer older patients fall</p>	<ul style="list-style-type: none"> - Number of older patients who fell in the past six months and every six months after program implementation 	<p>Older patients Providers and staff</p>	<p>Surveys</p>	<p>Conduct telephone surveys with patients after 6 months of enrolling in the recommended fall prevention program Conduct surveys with providers and staff every 6 months</p>



FRAMEWORK STEP 5

Justify Conclusions

Data analysis: Consult early (at least by [Steps 3](#) and [4](#), and preferably earlier) with the individual or persons on your team about who will be responsible for analyzing the data. It is important to develop a clear plan for data cleaning (e.g., checking for errors and completeness of data), management (e.g., choosing database to store data) and analysis (e.g., type of analysis to perform). Early discussion with the analysis team can help identify and resolve potential problems in answering your evaluation questions. Analysts must also be briefed on program goals, study design, evaluation questions, and the data collection plan.

Typical analyses for process and outcome evaluations include:

- Thematic analysis of qualitative data such as from open ended interview questions
- Descriptive analysis to display numbers, percentages, and averages
- Inferential analysis such as logistic regression with a health-outcome-dependent variable and independent variables such as screening, assessment, and intervention status while controlling for demographics and comorbidities

Clinics should determine the type of analyses possible in their setting, and might want to partner with local institutions or universities to carry out complex analyses.

You can choose the best way to display data analysis results. Common examples include tables, charts, and graphs.

Once evaluation results are completed, programs must compare the results to benchmarks called **program standards**. These standards are set by stakeholders to judge how well the program is doing, and help make justified conclusions ([Figure 4](#)). Setting standards requires discussion and negotiation, but ensures that results will be relevant and useful to stakeholders. Each indicator should have an expected benchmark, quantitative or qualitative in nature, that helps decide whether or not program implementation and effectiveness are at the desired levels.

For example: an evaluation team collected and analyzed data to measure the proportion of older patients screened for fall risk in the past 30 days ([Table 5](#)). They found that screening is at 50% overall. Stakeholders agreed that the program should screen at least 80% of their older patients (age 65 and over) in 30 days (program standard). Comparing the evaluation result (50%) to the program standard (80%) showed that the screening efforts are below expectations, and need to be improved.



Engage stakeholders to define what “success” means to the group.

TABLE 5: Example of a data analysis plan

LOGIC MODEL COMPONENT	EVALUATION QUESTION	INDICATORS	DATA ANALYSIS PROCEDURE	DATA ANALYSIS RESULTS	PROGRAM STANDARD	INTERPRETATION	CONCLUSIONS & NEXT STEPS
Clinic staff screen older patients for fall risk	What percent of older patients is screened for fall risk in the past 30 days?	Percent of older patients screened for fall risk in the past 30 days	<ol style="list-style-type: none"> Obtain the following numbers from medical records: <ol style="list-style-type: none"> number of older patients seen at practice in past 30 days number of older patients screened at the practice in past 30 days Divide the number of older adults screened by the total number of older adults seen and multiply by 100 to get percent of older adults screened for fall risk 	50% of older patients who visited the clinic were screened in the last 30 days	Screen at least 80% of older patients seen at practice in the past 30 days	Screening is 30% below expectation	<p>Program needs to be revised</p> <p>Check the following:</p> <ul style="list-style-type: none"> Functionality of medical record system Quality of staff training Time taken to screen Review results of interviews with clinic staff to understand why screening is not going as planned
Older patients visit appropriate specialist or other healthcare professional	What percent of older patients complied with prescribed physical therapy visit for fall-risk-reduction interventions in the past 30 days?	Percent of older patients referred to a physical therapist who attended one or more therapy sessions for fall risk reduction in past 30 days	<ol style="list-style-type: none"> Obtain this number from medical records: number of older adults referred to physical therapy for fall risk reduction in past 30 days Survey older patients to obtain: the number of older patients who attended one or more physical therapy sessions for fall risk reduction in past 30 days Divide the total number who attended at least one physical therapy session for fall risk reduction by the total number referred to physical therapy for fall risk reduction and multiply by 100 to get percent compliance 	46% of older patients who were referred to a physical therapist attended one or more of their recommended sessions	Expect at least 75% of older patients referred to a physical therapist to attend one or more sessions	Attendance to a physical therapy session is 29% below expectation	<p>Need to understand why patients are not attending all of their physical therapy sessions</p> <p>Collect and analyze data from patients on their receptiveness to attending physical therapy sessions using methods like:</p> <ul style="list-style-type: none"> Semi-structured interviews Focus groups Patient survey

Adapted from: Centers for Disease Control and Prevention. Division for Heart Disease and Stroke Prevention. Sodium Reduction in Communities Program Outcome Evaluation Toolkit.



FRAMEWORK STEP 6

Ensure Use and Share Lessons Learned

Evaluation findings should be shared with stakeholders to:

- ▶ Improve the fall prevention program
- ▶ Justify use of resources
- ▶ Show effectiveness
- ▶ Share best practices
- ▶ Maintain support

All of your stakeholders, regardless of their level of involvement in the evaluation, should be informed of the results and the next steps. Stakeholders who are more involved in the evaluation or who are responsible for following up on the evaluation findings will need more specific results. Each stakeholder's preferred way to receive and discuss evaluation findings should be discussed and documented ([Table 6](#)).

Evaluation results can be shared with varying formats, methods, and frequencies depending on the stakeholder needs. These formats for sharing findings might include trainings, full reports, short briefs, fact sheets, webinars, conference calls, articles, and presentations. Some stakeholders (such as champions) may want or need a detailed report, while others (such as health IT personnel) may prefer a short brief of the results related to their area. While disseminating your findings, ensure that recommendations are within the scope of each stakeholder's role and interest. For instance, nurses may want to know the progress of their screening efforts and ways to improve that, while pharmacists may be interested in effects of changing medications. Other fall prevention programs may also be interested in the evaluation process (e.g., indicators used) and findings (e.g., effectiveness). Additionally, depending on the audience, findings may need to be communicated by the most influential stakeholder for that audience. For instance, if evaluation findings need to be shared with older patients, their physician might be the best person to do so.

It is important to disseminate your evaluation findings and ensure uptake for program improvement.



TABLE 6: Example of a communication plan

EVALUATION FINDINGS	TARGET STAKEHOLDER	PURPOSE OF SHARING FINDINGS	RECOMMENDATION FOR TARGET STAKEHOLDER	PERSON RESPONSIBLE TO SHARE FINDINGS	FORMAT OF SHARING FINDINGS	METHOD AND FREQUENCY OF SHARING FINDINGS	FOLLOW-UP PLANS
50% of older patients who visited the clinic were screened in the last 30 days	Nurses and physicians	Fall screening needs to be increased by 30% to reach the intended goal of 80%	To identify the cause of low screening: <ul style="list-style-type: none"> • Discuss screening burden with clinic staff involved in screening patients • Provide refresher training • Check medical records for any technical issues 	Member of the evaluation team	PowerPoint presentation and a 1-page brief	Oral presentation at monthly meetings, either in-person or webinar	Check in biweekly with STEADI champions to remind them about recommendations and see if any support is required

Evaluation Management

Managing evaluation activities can be challenging. The following tools can help you manage the evaluation.

First, it is useful to create a list of evaluation team members along with each person’s specific role and responsibility. Having this list ensures that all evaluation activities are assigned to someone, and that each team member understands their role in conducting the evaluation. Here is an example:

EVALUATION TEAM: ROLES AND RESPONSIBILITIES		
Team Member	Role	Responsible For
Full name	Project Manager	Coordinating evaluation project tasks and manage budget
Full name	Analyst	Conducting data analysis and assist with report writing

Second, an evaluation timeline is a valuable tool. The timeline helps with planning for evaluation activities. It also communicates progress to evaluation team members, program staff, and other stakeholders. Here is an example that can be modified and adapted.

EVALUATION TIMELINE				
Activity	Responsible Person(s)	Due Date	Progress	Notes
Develop data collection tools				
Collect data				
Analyze data				
Summarize data				
Develop evaluation report				
Share evaluation report with stakeholders				

Third, an evaluation budget can help identify and manage evaluation resources. Expenditures might include: evaluation staff salary and benefits, travel, disseminating study results, printed materials, recruiting subjects, supplies, and equipment.

EVALUATION BUDGET				
Type of Expenditure	Amount Budgeted	Amount Spent	Amount Remaining	Notes

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APPENDIX
Worksheets

EVALUATION PURPOSE

What is the purpose of your evaluation?

How will the evaluation results be used?

EVALUATION STAKEHOLDERS

Which stakeholders do you want to include in the evaluation?

Note: Some stakeholders will be very involved and others will be less involved. Stakeholders may be involved in one or more roles such as planning the evaluation, developing data collection tools, implementing evaluation activities, collecting data, and making sure evaluation results are used.

EVALUATION STAKEHOLDERS FOR FALL PREVENTION

Stakeholder name, title	Role in fall prevention	Interest in evaluation	Role in evaluation	Mode of communication	When to involve in evaluation

PROGRAM DESCRIPTION

Describe the program components, and include a logic model.

Refer to [figure 4](#) for an example of a fall prevention program logic model.

Statement of need

Target population

Stage of development

Inputs

Activities

Outputs

Outcomes

Context

EVALUATION QUESTION(S)

List the questions you will answer through your evaluation.

Note: The number of questions selected should be manageable and align with the logic model.

Logic model component	Evaluation question

INDICATORS & PROGRAM STANDARDS

For each evaluation question, list the indicator(s) that will be used.

For each indicator, include the program standard set by the evaluation stakeholders.

Evaluation question	Indicators	Program standards

EVALUATION DESIGN

Describe the evaluation design and why it was selected.

DATA COLLECTION

For each evaluation question, fill out a data collection table as shown below.

Evaluation type & question	Logic model component	Indicators	Data source	Data collection method	Logistics of data collection (timing, duration, frequency)

DATA ANALYSIS AND CONCLUSION

For each evaluation question, fill out a data analysis table as shown below.

Logic model component	Evaluation question	Indicators	Data analysis procedure	Data analysis results	Program standard	Interpretation	Conclusions & next steps

SHARE EVALUATION RESULTS

Use the table below to develop a communication plan.

Evaluation findings	Target stakeholder	Purpose of sharing findings	Recommendation for target stakeholder	Person responsible to share findings	Format of sharing findings	Method and frequency of sharing findings	Follow-up plans

EVALUATION MANAGEMENT

Use this table to list the evaluation team members, their role, and their responsibilities in the evaluation.

Team: Roles and Responsibilities		
Team Member	Role	Responsible For

Evaluation Timeline				
Activity	Responsible Person(s)	Due Date	Progress	Notes
Develop data collection tools				
Collect data				
Analyze data				
Summarize data				
Develop evaluation report				
Share evaluation report with stakeholders				

Evaluation Budget				
Type of Expenditure	Amount Budgeted	Amount Spent	Amount Remaining	Notes



Centers for Disease
Control and Prevention
National Center for Injury
Prevention and Control

STEADI Stopping Elderly Accidents,
Deaths & Injuries

www.cdc.gov/steady