Using Leading Indicators to Improve Safety and Health Outcomes

OSHA®

Occupational Safety and Health Administration

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CONTENTS

SECTION 1. INTRODUCTION TO LEADING INDICATORS 2

1.1 What Are Leading Indicators? 2

1.2 The Benefits of Using Leading Indicators 2

1.3 Characteristics of Effective Leading Indicators 2

SECTION 2. USING LEADING INDICATORS 4

2.1 Leading Indicators Based on Data You Are Already Collecting 5

EXAMPLE: Percentage of Workers Attending Safety Refresher Training 5

2.2 Leading Indicators for Controlling an Identified Hazard 6

EXAMPLE: Inspection and Clearing of Walkways 6

EXAMPLE: Truck Brake Replacement 7

EXAMPLE: Arrival Time of Lift Teams 9

2.3 Leading Indicators to Improve an Element of Your Safety and Health Program 10

2.3.1 Management Leadership 10

2.3.2 Worker Participation 11

2.3.3 Hazard Identification and Assessment 11

2.3.4 Hazard Prevention and Control 12

2.3.5 Education and Training 12

2.3.6 Program Evaluation and Improvement 13

2.3.7 Communication and Coordination 13

2.3.8 EXAMPLES: Using Leading Indicators to Improve a Safety and Health Program Element 14

SECTION 3. CONCLUSION 17

ACTION PLAN CHECKLIST 17

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Employers are encouraged to use this document to learn how they can use leading indicators to improve safety and health outcomes in the workplace. While large businesses may already be familiar with the benefits of using leading indicators, many small and medium-sized businesses may not know what they are or how to use them. This document can help such businesses get started. This document may also be useful to large businesses seeking new approaches to using leading indicators.

SECTION 1. INTRODUCTION TO LEADING INDICATORS

1.1 What Are Leading Indicators?

For purposes of this document, leading indicators are proactive, preventive, and predictive measures that provide information about the effective performance of your safety and health activities. They measure events leading up to injuries, illnesses, and other incidents and reveal potential problems in your safety and health program. In contrast, lagging indicators measure the occurrence and frequency of events that occurred in the past, such as the number or rate of injuries, illnesses, and fatalities.

While lagging indicators can alert you to a failure in an area of your safety and health program or to the existence of a hazard, leading indicators allow you to take preventive action to address that failure or hazard before it turns into an incident. A good program uses leading indicators to drive change and lagging indicators to measure effectiveness.

For example, one good leading indicator might be the amount of time it takes to respond to a safety hazard report. A decrease in the response time may demonstrate an increased awareness in safety and managers' commitment to workplace safety. Conversely, an increase in response time could signal a lack of management concern, which could mean that hazards are likely to remain uncontrolled, and incidents are more likely to occur. Furthermore, workers may decide to discontinue reporting hazards if they feel that management is not being responsive to their concerns. This can affect morale, which could have broad implications for the workplace.

1.2 The Benefits of Using Leading Indicators

Leading indicators can play a vital role in preventing worker fatalities, injuries, and illnesses, as well as strengthening safety and health outcomes in the workplace. Employers that use leading indicators as a tool for achieving these goals have a substantial advantage over their competitors. By taking deliberate and measured actions that can prevent fatalities, injuries, and illnesses, these employers demonstrate their commitment to maintaining a socially responsible workplace that values workers. By strengthening key elements of their safety and health programs, they also can improve their overall organizational performance.

In addition to the social benefits, employers that use leading indicators to find and fix hazards can realize direct savings to their bottom line. These include savings in repair costs, production costs, workers' compensation costs, and other legal and regulatory costs that are commonly associated with incidents. For example, by fixing hazards that lead to roadblocks in production, employers may be able to complete daily tasks more efficiently and reduce production costs related to those activities.

> **"Today, EHS practitioners continue to rely on injury rates, absenteeism, and other lagging metrics despite the growing acceptance of the fact that these failure-focused measures are ineffective in driving continuous improvement efforts. Leading indicators, on the other hand, appear to offer a more useful gauge of EHS activity by providing early warning signs of potential failure and, thus, enabling organizations to identify and correct deficiencies before they mature into accidents and injuries."**
>
> ***— Campbell Institute, Transforming EHS Performance Measurement Through Leading Indicators***

1.3 Characteristics of Effective Leading Indicators

Good leading indicators are based on **SMART** principles, meaning they are **S**pecific, **M**easurable, **A**ccountable, **R**easonable, and **T**imely:

- **Specific:** Does your leading indicator provide specifics for the action that you will take to minimize risk from a hazard or improve a program area?
- **Measurable:** Is your leading indicator presented as a number, rate, or percentage that allows you to track and evaluate clear trends over time?

- **Accountable:** Does your leading indicator track an item that is relevant to your goal?
- **Reasonable:** Can you reasonably achieve the goal that you set for your leading indicator?
- **Timely:** Are you tracking your leading indicator regularly enough to spot meaningful trends from your data within your desired timeframe?

The chart below demonstrates how to create a SMART leading indicator to address the issue that workers have not been attending monthly safety meetings. It walks through a good and bad example for meeting each SMART criterion using the leading indicator "Number of workers who attend a monthly safety meeting."

Example Leading indicator: Number of workers who attend a monthly safety meeting **Goal:** 97% worker attendance rate at monthly safety meetings	
SPECIFIC: Does your leading indicator provide specifics for the action that you will take to minimize risk from a hazard or improve a program area?	
GOOD EXAMPLE	BAD EXAMPLE
Workers will attend a safety meeting every month. *This is specific because it clearly identifies what the activity is and who needs to attend.*	Safety meetings will be held monthly. *This is not specific because it does not describe who needs to attend.*
MEASURABLE: Is your leading indicator presented as a number, rate, or percentage that allows you to track and evaluate clear trends over time?	
GOOD EXAMPLE	BAD EXAMPLE
Workers will attend a safety meeting every month. *This is measurable because you can track the number of workers that attend every month.*	Workers will attend safety meetings. *This is not measurable because it does not track a number, rate, or percentage with respect to your goal.*
ACCOUNTABLE: Does your leading indicator track an item that is relevant to your goal?	
GOOD EXAMPLE	BAD EXAMPLE
Workers will attend a safety meeting every month. *This indicator is relevant to your goal because it asks workers to attend the meeting.*	Safety meetings for workers will be held monthly. *This indicator is not relevant to your goal because it does not specify that your workers would be asked to attend.*
REASONABLE: Can you reasonably achieve the goal that you set for your leading indicator?	
GOOD EXAMPLE	BAD EXAMPLE
Workers will attend a safety meeting every month. Your goal is a 97% attendance rate. *Your 97% goal is achievable because it takes into account that you will not have a make-up meeting and workers missing work will not be able to attend on the day the meeting is scheduled.*	Workers will attend a safety meeting every month. Your goal is a 100% attendance rate. *Your 100% goal is not achievable because you know that some workers will occasionally miss work on the day the meeting is scheduled.*
TIMELY: Are you tracking your leading indicator regularly enough to spot meaningful trends from your data within your desired timeframe?	
GOOD EXAMPLE	BAD EXAMPLE
You decide to track meeting attendance monthly. *This is timely; because you track your meetings monthly, you can identify meaningful trends before the end of the year, which is when you wanted to analyze your data.*	You decide to track meeting attendance twice a year. *Because you only tracked two meetings, you cannot see any meaningful trends until at least the following year.*

SECTION 2. USING LEADING INDICATORS

There is no "one size fits all" way to use leading indicators. Employers with newer programs may use indicators that focus on starting a program, while employers with more mature programs may use them to monitor how close they are to achieving higher performance targets. Some employers may also find it helpful to limit the number of leading indicators they start out with or how many they use at any one time. How employers assign who will track and carry out goals for leading indicators can vary based on the size of the business, who the business has on staff, whether the business has a safety manager, and the scope of job duties of the employers' workforce.

This document will explain three approaches for developing leading indicators. The order in which they are listed does not suggest that any one approach is better. OSHA recommends using an approach that works best for you, or even a combination of two or more, that may help you to achieve a specific safety or health outcome.

- Leading indicators using data that you already collect to achieve a safety or health goal (Section 2.1).
- Leading indicators for controlling an identified hazard (Section 2.2).
- Leading indicators for improving a safety and health program element (Section 2.3).

THE STEPS FOR USING LEADING INDICATORS

PLAN

Choose a Leading Indicator

Choose the leading indicator you will use. (See Sections 2.1–2.3 for examples of approaches for developing leading indicators.)

Set a Goal

After you have decided on the leading indicator, set a goal for that indicator.

DO

Communicate

Talk with your workers about the indicator, the goal, and how you will track it. Be sure to explain why you chose that specific indicator.

Start Using Your Leading Indicators

1. Collect the data.
2. Periodically measure progress toward your goal and take action if you are not meeting it.
3. Communicate your progress with workers. For example, you may post graphs of the data in comparison to your goal over time. If you are not meeting your goal, talk to your workers about how to get on track.

CHECK

Periodically Reassess Your Goal and Indicator

After tracking your indicator for a while, evaluate progress toward your goal and assess whether you have been meeting it. For some indicators and goals, it can take longer to see progress. You should review it regularly, and consider whether you need more time to assess its effectiveness.

ACT

Respond to What You Learn

Respond to what you learn from the results of your leading indicator, share the information with relevant personnel in your organization and, when necessary, change your leading indicator based on what you learn.

2.1 Leading Indicators Based on Data You Are Already Collecting

If you are just getting started with leading indicators, you may find it easier to work with data that you already collect, whether it is data that can improve an element of your safety and health program or data that can help address a hazard or achieve some other safety or health outcome. The following example shows how you can turn this data into a leading indicator to help you to achieve any one of these goals.

EXAMPLE: Percentage of Workers Attending Safety Refresher Training

Step 1: Choose a Leading Indicator

Every quarter, you ensure that you have administered mandatory safety refresher training to your workers; however, in the past you noticed that some of your workers did not attend these trainings. Because you already keep track of who attends training, and you want to ensure that you provide adequate training to your workers, you decide that this might be good data to turn into a leading indicator. Therefore, you define your leading indicator as the percentage of workers that receive quarterly refresher training.

Step 2: Set a Goal

In this example, your leading indicator is the percentage of workers that receive refresher training, and your goal is 100% of your workers completing the refresher training by the end of each quarter.

Step 3: Start Using Your Leading Indicators

1. Collect the data.

To collect the data, you may decide to review the attendance sheet that workers use to sign in before the training begins.

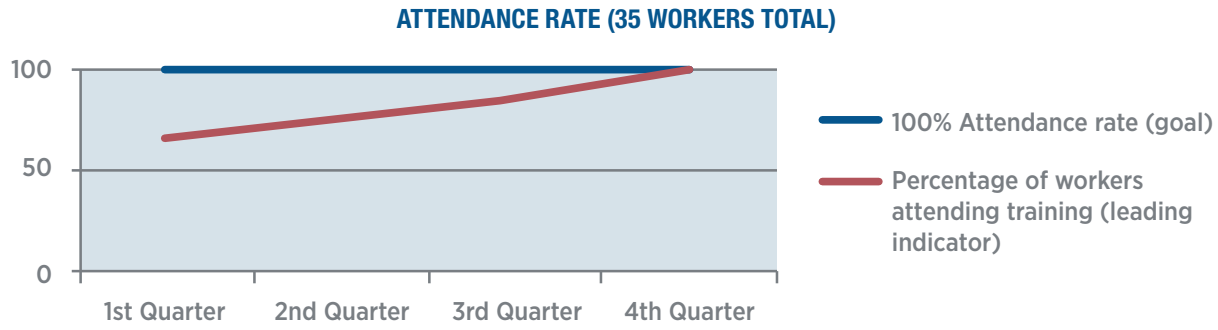
Attendance Sheet
Ron Dufresne
Zhihao Chan
Kim Layton
Martino Nunez
Rebecca Morigny

2. Periodically measure progress toward your goal and take action if you are not meeting it.

Count the number of workers that attended the refresher training in each quarter. If some workers did not attend the training, find out why and try to address the issue.

Step 4: Periodically Reassess Your Goal and Indicator

Check whether you are meeting your 100% attendance rate.



Below are three scenarios that could arise after you start tracking this leading indicator. Each scenario shows the kind of insights you can obtain and actions you can take once you start using your leading indicator.

- **Scenario 1:** You reviewed the attendance sheet from the last quarter. 70% of workers attended the mandatory refresher training—good, but below your goal of 100%. After discussing this with your workers, you learn that some of them did not attend because they were out from work that day. For the future sessions, you ensure that makeup sessions are scheduled and continue to track your leading indicator.
- **Scenario 2:** You reviewed the attendance sheet from the last quarter. The number of workers that attended the refresher training improved from the previous quarter, but you did not achieve your goal of 100%. After discussing this with your workers, you learn that some of them had already left work at the time the training was scheduled. You remind your workers that the training is mandatory and instruct them to notify a supervisor if they are unable to attend. You continue to track your leading indicator.
- **Scenario 3:** You reviewed the attendance sheet from the last quarter. The percentage of workers that attended the refresher training was 100%. You decide whether to continue tracking attendance every quarter after it has become routine (or consider decreasing the tracking frequency to every two quarters). Then begin to develop and track a new leading indicator for other data that you already collect.

2.2 Leading Indicators for Controlling an Identified Hazard

Leading indicators can help you improve your safety or health performance in work areas or activities where you have identified hazards. Below are some examples that walk you through the steps for using leading indicators to control the hazards that you have identified. Consider referring to the "Hazard Identification and Assessment" section of OSHA's *Recommended Practices for Safety and Health Programs*[1] for an overview of how to identify and assess your workplace

hazards. In deciding which hazard to start with, consider the severity of potential outcomes if a hazard is not addressed in a timely manner, the likelihood that an event or exposure could occur, and the number of workers that could be exposed to this hazard.

EXAMPLE: Inspection and Clearing of Walkways

Step 1: Select a Leading Indicator

You operate an automotive assembly line. During your hazard identification process, you identified trips and falls that are occurring on your assembly line floor as a top incident leading to injuries. A review of your injury records showed that 22 workers were hurt from trips and falls in the past year. Due to the frequency of injuries caused by tripping hazards, you decide this might be a good hazard to start with. The number of trips and falls is a lagging indicator that you hope to drive down with a leading indicator.

After discussing it with your workers, you learned that most of the trips and falls were caused by floors cluttered with tools and equipment that workers used to assemble automotive parts, including air hoses used for pneumatic tools. You decide that a good first step to address this hazard might be to inspect and clear assembly line floors daily.

1 https://www.osha.gov/shpguidelines/docs/OSHA_SHP_Recommended_Practices.pdf

Step 2: Set a Goal

In this example, your leading indicator is the frequency of inspecting and clearing the floors, and your goal is once daily.

Step 3: Start Using Your Leading Indicators

1. Collect the data.

To collect the data, you may decide to use a checklist, marking off tasks as you complete them each day.

DAILY CLEANUP CHECKLIST

- ☐ Rewind air hoses
- ☒ Package tools and equipment away from work station floors
- ☐ Store unused car parts in storage areas away from floors
- ☒ Sweep floors of debris and other objects that can lead to slips or falls

2. Periodically measure progress toward your goal and take action if you are not meeting it.

Every week, you review your checklists to make sure you have completed all daily tasks. If you have not completed a task on any given day, find out why and try to address the issue.

Step 4: Periodically Reassess Your Goal and Indicator

Determine if you are seeing a decrease in your number of trips and falls.

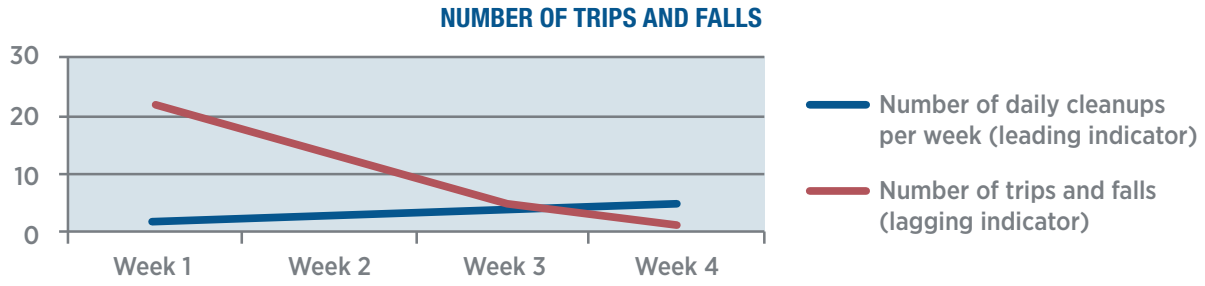
Below are three scenarios that could arise after you start tracking this leading indicator. Each scenario shows the kind of insights you can obtain and actions you can take once you start using your leading indicator.

- **Scenario 1:** Workers are cleaning the assembly floors once daily, but trips and falls are still occurring. After discussing this with your workers, you find that they are completing the cleanups in the afternoon, but the floors are cluttered again by the time work starts in the morning. Based on this discussion, you change your policy to require workers to clean floors just before leaving work, and revise your leading indicator to the frequency of daily cleanups that occur at the end of the work day.
- **Scenario 2:** Workers are cleaning assembly floors once daily, and trips and falls have decreased but are still occurring. After discussing this with your workers, you learn that the daily cleanups are helping, but tools and equipment are being stored in areas that create narrow work stations and introduce new trip and fall hazards. You find other places to store tools and equipment and continue to track your leading indicator. You also invest in automatically retracting pneumatic hose reels and overhead connections to keep hoses off the floor, and consider converting to battery-operated tools to eliminate the use of hoses altogether.
- **Scenario 3:** Workers are cleaning assembly floors once daily, and trips and falls have decreased significantly. You decide whether to continue tracking the daily cleanups after they have become routine (or consider decreasing the tracking frequency from daily to weekly). Then begin to develop and track a leading indicator for a different hazard.

EXAMPLE: Truck Brake Replacement

Step 1: Select a Leading Indicator

During your hazard identification process, you review recent worker injuries caused by trucks that failed to properly stop while being operated. In discussions, your injured workers tell you that they heard squeaking brakes before the trucks failed to stop. Recognizing that squeaking brakes could result from worn brake pads, you review your inspection records and



learn that you were not replacing brake pads every 30,000 miles as recommended by the truck manufacturer. You decide that a good way to address this hazard might be to track the number of trucks that have the brake pads replaced every 30,000 miles. The number of incidents and injuries caused by trucks failing to stop is the lagging indicator that you hope to drive down with a leading indicator.

Step 2: Set a Goal

In this example, your leading indicator is the number of trucks with brake pads that are changed every 30,000 miles, and your goal is 100%.

Step 3: Start Using Your Leading Indicators

1. Collect the data.

To collect the data, you decide to submit a maintenance request to record the number of miles driven since the last time brake pads were changed. You check each truck on the first of each month, and use a sheet to check off the trucks that had brake pads changed every 30,000 miles.

TRUCK MILEAGE SINCE LAST BRAKE CHANGE

	# of miles since last brake change	Goal met?
Truck A	26,000	✓
Truck B	30,200	
Truck C	27,300	✓
Truck D	29,000	✓

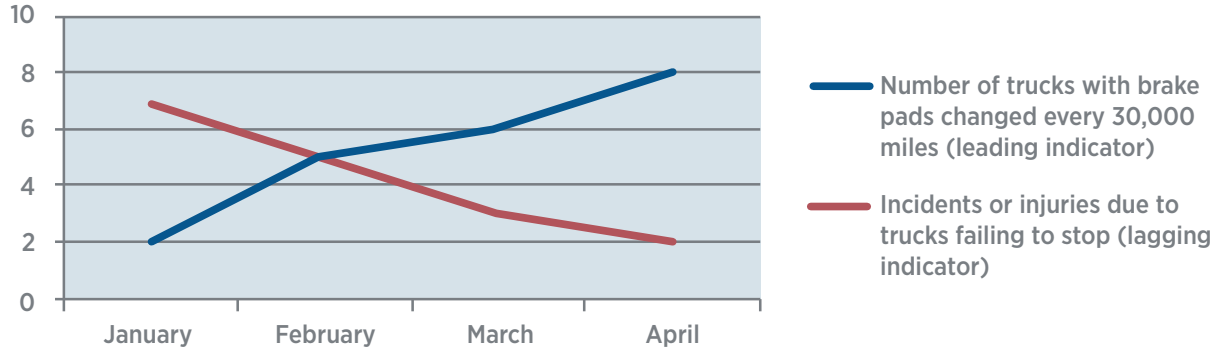
2. Periodically measure progress toward your goal and take action if you are not meeting it.

On the first of each month, you count the number of trucks that had brake pads changed at the 30,000-mile mark. If you did not change the brake pads every 30,000 miles, find out why and try to address the issue.

Step 4: Periodically Reassess Your Goal and Indicator

To assess your goal, determine if you are seeing a decrease in the frequency of worker incidents and injuries from trucks failing to stop.

NUMBER OF INCIDENTS OR INJURIES FROM TRUCKS FAILING TO STOP



Below are three scenarios that could arise after you start tracking this leading indicator. Each scenario shows the kind of insights you can obtain and actions you can take once you start using your leading indicator.

- **Scenario 1:** Every month, you review the number of trucks with brake pads that were changed every 30,000 miles. While incidents and injuries have decreased, some are still occurring. After discussing this with your workers, you learn that maintenance only checks the brake pads at the beginning of the month and some trucks reached 30,000 miles two weeks before the next month's review. Based on this discussion, you begin requiring maintenance to review the miles every two weeks instead of every month, and continue to track your leading indicator.
- **Scenario 2:** Every month, you review the number of trucks with brake pads that were changed every 30,000 miles. While the number of incidents and injuries have decreased, some are still occurring. After discussing this with your workers, you learn that checking the miles on a monthly basis has helped; however, maintenance staff did not receive the keys to the trucks to prevent their use beyond 30,000 miles, because no procedure was in place that required the trucks to be taken out of service when they reached a mileage threshold. Consequently, workers continued to

use the trucks without any knowledge of this hazard, and the brakes were never replaced. You start giving your maintenance staff the keys to trucks that require maintenance as soon as you identify this issue, and continue to track your leading indicator.

- **Scenario 3:** Every month, you review the number of trucks with brakes that were changed every 30,000 miles, and incidents and injuries have decreased significantly. You decide whether to keep tracking the brake pad changes every month after it has become routine (or consider changing the tracking frequency from monthly to quarterly). Then begin to develop and track a leading indicator for a different hazard.

EXAMPLE: Arrival Time of Lift Teams

Step 1: Select a Leading Indicator

During your hazard identification process, your hospital identified manually lifting patients as a hazard. A review of your injury log showed that in the past year 15 hospital workers suffered from back injuries after manually lifting or repositioning patients. Due to the frequency of injuries from manual lifting, you decide that this might be a good hazard to start with. The number of back injuries from patient lifting is the lagging indicator that you hope to drive down with a leading indicator.

You have six two-person lift teams with lifting equipment available throughout the hospital. After discussing back injuries with your workers, you learn that it takes too long for a lift team to arrive to a patient's room after being paged. Consequently, many workers continue to manually lift patients on their own. You decide that a good way to address this hazard might be to ensure that lift teams arrive within five minutes of being paged, which is a reasonable goal given the size of your hospital.

Step 2: Set a Goal

In this example, your leading indicator is the arrival time of your lift team, and your goal is for arrival to be within five minutes.

Step 3: Start Using Your Leading Indicators

1. Collect the data.

To collect the data, you may decide to have nurses use a timer that tracks how long it takes for a lift team to arrive to a room after the team has been paged. The nurses then note the time on a daily sheet that is posted on a board in the hallway and shared by all nurses on the floor.

LIFT TEAM ARRIVAL TIMES

Monday	Tuesday	Wednesday	Thursday	Friday
5 minutes	5 minutes	5 minutes	11 minutes	9 minutes
4 minutes	5 minutes	5 minutes	5 minutes	10 minutes
12 minutes	4 minutes	7 minutes	5 minutes	5 minutes
15 minutes	8 minutes	6 minutes	5 minutes	5 minutes

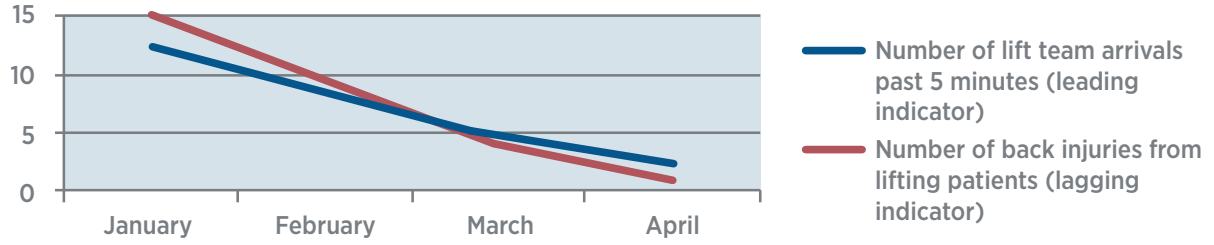
2. Periodically measure progress toward your goal and take action if you are not meeting it.

You decide to review this sheet every week. If lift teams are not arriving within five minutes, find out why and try to address the issue.

Step 4: Periodically Reassess Your Goal and Indicator

To assess your goal, determine if you are seeing a decrease in the number of back injuries among nurses and counting the number of arrivals past five minutes.

NUMBER OF BACK INJURIES FROM LIFTING PATIENTS



Below are three scenarios that could arise after you start tracking this leading indicator. Each scenario shows the kind of insights you can obtain and actions you can take once you start using your leading indicator.

- **Scenario 1:** You review the sheet every week to make sure that lift teams are arriving within five minutes. While back injuries have decreased since you last checked your progress, they are still occurring. After discussing this with your workers, you learn that although lift teams are arriving within five minutes, you need additional lift teams because there are not enough available to get to the next patient when they are paged. Based on this discussion, you review your staff levels, decide to add three more lift teams with lifting equipment, and continue to track your leading indicator.
- **Scenario 2:** You review the sheet every week, and back injuries have decreased further since the last progress update but are still occurring. After discussing this with your workers, you learn that some lift teams are not using the equipment properly, causing them to fall behind on getting to the next patient. You plan a training session so that your lift teams can learn how to correct errors in using the equipment, and continue to track your leading indicator.
- **Scenario 3:** You review the sheet every week, and back injuries have decreased significantly. You decide whether to continue tracking lift team arrival times after it has become routine (or consider changing the tracking frequency from monthly to quarterly). Then, begin to develop and track a leading indicator for a different hazard.

2.3 Leading Indicators to Improve an Element of Your Safety and Health Program

Effective safety and health programs incorporate all of the core elements outlined in OSHA's *Recommended Practices for Safety and Health Programs*:[2]

- Management leadership
- Worker participation
- Hazard identification and assessment
- Hazard prevention and control
- Education and training
- Program evaluation and improvement
- Communication and coordination for host employers, contractors, and staffing agencies

Leading indicators can help you improve on these core elements of your safety and health program. Tying elements of a safety and health program directly to lagging indicators such as injury rates may be difficult, but experience shows that better programs do improve safety. [3] This section focuses on how to use leading indicators to improve the elements of a program outlined in OSHA's *Recommended Practices*. However, they can be applied to any safety and health program regardless of what elements the program includes.

Exemplary safety and health programs use all the core elements outlined in OSHA's *Recommended Practices*. Sections 2.3.1–2.3.7 summarize the recommended practices for each core element and provide examples of leading indicators that you can use to measure your implementation of these practices. Section 2.3.8 provides examples of how to use a leading indicator you have chosen and how to measure your performance for that indicator.

2.3.1 MANAGEMENT LEADERSHIP

RECOMMENDED PRACTICES FOR MANAGEMENT LEADERSHIP

- **Communicate your commitment to a safety and health program.**
- **Define program goals.**
- **Allocate resources.**
- **Expect performance.**

2 https://www.osha.gov/shpguidelines/docs/OSHA_SHP_Recommended_Practices.pdf (OSHA also has a recommended practices document for the construction industry, available at https://www.osha.gov/shpguidelines/docs/8524_OSHA_Construction_Guidelines_R4.pdf)

3 *Benchmarking Organizational Leading Indicators for the Prevention and Management of Injuries and Illnesses: Final Report*, Institute for Work & Health, 2011, available at https://www.iwh.on.ca/sites/iwh/files/iwh/reports/iwh_report_benchmarking_organizational_leading_indicators_2011.pdf

Leading Indicators That Support Management Leadership

Below are some suggested leading indicators for measuring the implementation of recommended practices for management leadership:

- Percentage of managers and supervisors who attend mandatory safety and health training for workers.
- Number of times each month that top management initiates discussion of a safety and health topic.
- Average score on survey questions related to workers' perception of management's safety and health commitment.
- Number of worker-reported hazards or concerns for which employers initiated corrective action within 48 hours (compared to the total number of such reports).
- Average time between worker report of a hazard or concern and management acknowledgement of the report.
- Number of safety-related line items in budget and percentage of these fully funded each year.

Take Action

Take action when trends indicate that you could improve your management leadership. For example, if a busy owner or CEO skipped the safety meeting last year, note this year's meeting in their schedule ahead of time so they prioritize attendance. Similarly, if workers are reporting hazards that are not ultimately addressed due to lack of resources or competing priorities, it may be wise to determine what, if any, additional resources you can allocate to control those hazards, or manage competing priorities.

2.3.2 WORKER PARTICIPATION

RECOMMENDED PRACTICES FOR WORKER PARTICIPATION

- **Encourage workers to participate in the program.**
- **Encourage workers to report safety and health concerns.**
- **Give workers access to safety and health information.**
- **Involve workers in all aspects of the program.**
- **Remove barriers to participation.**

Leading Indicators That Support Worker Participation

Below are some suggested leading indicators for measuring the implementation of recommended practices for worker participation:

- Number of workers asked for feedback on good safety goals ahead of safety meetings.
- Number of workers involved in developing safety procedures.
- Number of workers participating in tool box talks.
- Number of workers participating in injury investigations.
- Safety perception survey participation rate.
- Number of workers involved in developing task-specific job safety analyses/job hazard analyses on how to perform routine tasks safely.
- Number of workers participating in accident investigation teams and helping to identify/implement corrective actions to eliminate hazards.

Take Action

Take action when trends indicate that you could improve worker participation. For example, if workers have not been participating in hazard prevention meetings, you should find out why. For example, some workers may feel that their managers do not value their opinions. In such instances, you could take actions to change that perception and meaningfully increase worker participation rates in safety meetings.

2.3.3 HAZARD IDENTIFICATION AND ASSESSMENT

RECOMMENDED PRACTICES FOR HAZARD IDENTIFICATION AND ASSESSMENT

- **Collect existing information about workplace hazards.**
- **Inspect the workplace for safety hazards.**
- **Identify health hazards.**
- **Conduct incident investigations.**
- **Identified hazards associated with emergency and non-routine situations.**
- **Characterize the nature of identified hazards, identify interim control measures, and prioritize the hazards for control.**

Leading Indicators that Support Hazard Identification and Assessment

Below are some suggested leading indicators for measuring the implementation of recommended practices for hazard identification and assessment:

- Frequency with which preventive equipment maintenance tasks are initiated and completed on schedule.
- Number of hours passed after an incident before an investigation is started.
- Number of hours passed after an incident before an investigation is completed.
- Percentage of incident investigations that include a root cause investigation.
- Percentage of daily/weekly/monthly inspections completed.
- Percentage of inspections that include a follow-up inspection to ensure that the hazard has been controlled.

Take Action

Take action when trends indicate that you could improve your hazard identification and assessment methods. For example, if your goal is to complete all investigations within a week of the incident, and you are finding that the average investigation has taken over two weeks, talk to your workers about the delay and develop a plan to complete them faster. Similarly, if workers only conduct root cause investigations 50% of the time, but your goal is 100% of the time, try to find out why they did not always conduct them and develop a plan that will ensure that they become a routine part of your investigations.

2.3.4 HAZARD PREVENTION AND CONTROL

RECOMMENDED PRACTICES FOR HAZARD PREVENTION AND CONTROL

- **Identify control options.**
- **Select controls.**
- **Develop and update a hazard control plan.**
- **Select controls to protect workers during nonroutine operations and emergencies.**
- **Implement selected controls in the workplace.**
- **Follow up to confirm that controls are effective.**

Leading Indicators that Support Hazard Prevention and Control

Below are some suggested leading indicators for measuring the implementation of recommended practices for hazard prevention and control:

- Length of time interim controls have been in place.
- Percentage of recommendations implemented that pertain to PPE hazard controls, administrative controls, engineering controls, substitution, and elimination.
- Number of special work permits filled out.
- Number of cartridge filers with an end of service life indicator that were returned or replaced before the indicator turned red.
- Number of hazards identified where you used leading indicators to control the hazard.
- Percentage of hazards abated on the same day, week, or month in which the hazard was identified.
- Number of workers required to wear respiratory protection.
- Number of unacceptable risks identified during risk assessments.

Take Action

Take action when trends indicate that you can improve your hazard prevention and control methods. For example, if some recommendations continue to remain open past their due date, find out why this might be the case and try to correct the issue so that you can address recommendations on time. Similarly, if you have not been using leading indicators as a tool for controlling hazards, you may want to implement a leading indicator program, and start with just one or two leading indicators during the program's first year.

2.3.5 EDUCATION AND TRAINING

RECOMMENDED PRACTICES FOR EDUCATION AND TRAINING

- **Provide program awareness training.**
- **Train employers, managers, and supervisors on their roles in the program.**
- **Train workers on their specific roles in the safety and health program.**
- **Train workers on hazard identification and controls.**

Leading Indicators that Support Education and Training

Below are some suggested leading indicators for measuring the implementation of recommended practices for education and training:

- Number of trainings provided to workers on hazard recognition and control as compared to worker attendance rates at these trainings.
- Percentage of workers receiving mandatory training on schedule.
- Percentage of incident investigations listing insufficient Number of workers trained on how to recognize and report a hazard or near miss as compared to the number of workers that report understanding the training they have received.
- Percentage of improvement on post-training assessment scores over pre-training assessment scores.

Take Action

Take action if trends indicate that you are not effectively administering training. For example, a leading indicator may reveal that you offer regular training on how to recognize and report hazards, but workers still do not clearly understand how to recognize and report certain hazards after completing the training. In this example, you may want to ask workers that have experience or knowledge of the hazard for suggestions on hands on training approaches and simulations that could be more effective.

2.3.6 PROGRAM EVALUATION AND IMPROVEMENT

RECOMMENDED PRACTICES FOR PROGRAM EVALUATION AND IMPROVEMENT

- **Monitor performance and progress.**
- **Verify that the program is implemented and is operating.**
- **Correct program shortcomings and identify opportunities to improve.**

Leading indicators That Support Program Evaluation and Improvement

Below are some suggested leading indicators for measuring the implementation of recommended practices for program evaluation and improvement:

- Number of inspections completed to identify hazards or program weaknesses.
- Number of lagging indicator rates that improved as a result of using leading indicators to take action.
- Number of goals achieved, number of goals in need of revision, or new goals that you should set for the following year.

Take Action

Take action when trends indicate that you could improve an aspect of your program. For example, if you only conduct an audit once a year, this may not be enough to track how well your program is doing over time. Similarly, if you have not achieved an important goal, it may make more sense to continue working on that goal before pursuing a new one.

2.3.7 COMMUNICATION AND COORDINATION

RECOMMENDED PRACTICES FOR COMMUNICATION AND COORDINATION

- **Establish effective communication.**
- **Establish effective coordination.**

Leading Indicators That Support Communication and Coordination

Below are some suggested leading indicators for measuring implementation of recommended practices for communication and coordination among host employers, contractors, and staffing agencies:

- Frequency of discussions between the staffing agency/contractor and the host employer that address efforts to ensure workers have a safe and healthy work environment at the host site.
- Frequency of discussions about worker safety between contract workers and host site supervisors.
- Frequency of contract employer visits to the host employer site to conduct inspections and collect safety and health information before workers are sent to the work site.
- Number of workers trained on how to avoid exposure to potential hazards before the worker begins work at the host site, including identifying whom to contact to report a hazard on site.

- Number of hazards reported by contract/temporary workers versus total site workers.
- Number of audits conducted to ensure contractors are following site safety and health policies to include in their own safety policies.

Take Action

Take action if a trend indicates that you could improve communication and coordination activities. For example, you might find that contract workers and host employers are not having frequent discussions about worker safety because the contract workers are not comfortable discussing their concerns with the host site supervisor. In this example, you might plan a meeting between your workers and the supervisor to discuss what actions the supervisor can take to help the workers feel more comfortable about having these discussions.

2.3.8 EXAMPLES: USING LEADING INDICATORS TO IMPROVE A SAFETY AND HEALTH PROGRAM ELEMENT

Sections 2.3.1–2.3.7 provided examples of leading indicators that you can use to measure the implementation of a recommended practice for each of the core elements of a safety and health program. This section provides examples of how to use a leading indicator that you have chosen from that section, and how to measure progress on your performance goal for that indicator.

Tracking Monthly Safety and Health Updates for Workers to Improve Management Leadership

Step 1: Select a Leading Indicator

While evaluating your safety and health program, you decide to review your management leadership practices and identify areas for improvement. In a survey, you ask workers whether management communicates its commitment to the health and safety program, and only 50% of workers agree or answer "yes." Because you have a written policy for workplace safety and health, it seems that workers may not believe that your management team takes it seriously. You decide to focus on demonstrating management commitment to the program. You set a goal to have a manager attend all monthly safety meetings and give an update on safety and health performance. The update could include status of your safety and health leading indicators and a discussion of any new safety and health issues.

Step 2: Set a Goal

In this example, your leading indicator is the percentage of monthly safety meetings in which a manager attends and gives a safety and health update. You hope to strengthen the management leadership element of your program. Using results from the next survey, you intend to measure your success by looking for a higher percentage of workers who agree that management communicates its commitment to safety and health.

Step 3: Start Using Your Leading Indicators

1. Collect the data.

To collect the data, you may decide to keep a sheet that notes whether a manager attended a monthly meeting, including a section on what safety and health updates the manager provided.

MANAGER SAFETY MEETINGS ATTENDANCE AND DISCUSSION

JANUARY **Discussion points:**
FEBRUARY **Discussion points:**
MARCH **Discussion points:**

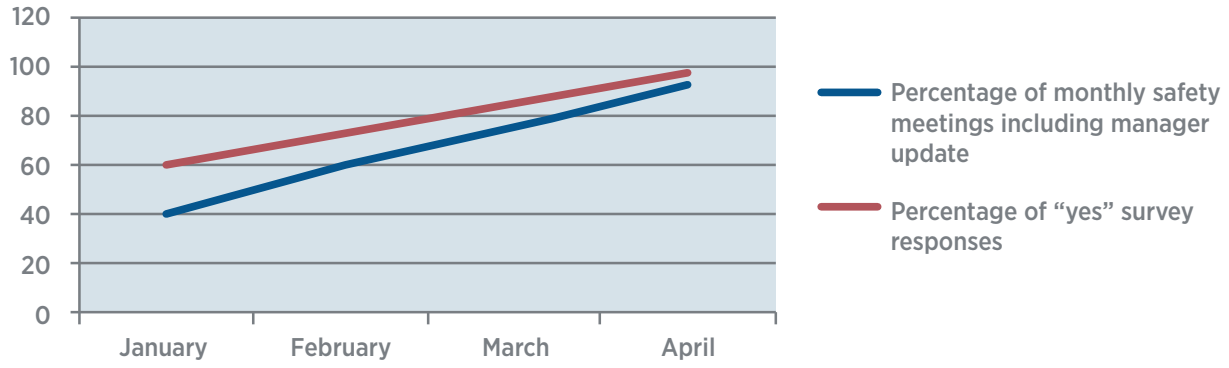
2. Periodically measure progress toward your goal and take action if you are not meeting it.

You decide to review your sheet every few months. If the manager did not attend and adequately discuss safety and health progress and performance, find out why and try to address the issue.

Step 4: Periodically Reassess Your Goal and Indicator

To assess progress toward your goal, determine if you see an increase in the percentage of "yes" responses to your survey. Since it can be difficult to change worker perceptions

MANAGER SAFETY MEETINGS AND SURVEY RESPONSES



of management commitment to safety in a short time, it may take longer to determine whether your indicator is effective in achieving this goal. You should review the results regularly, but consider whether you need more time to assess effectiveness.

Below are three scenarios that could arise after you start tracking this leading indicator. Each scenario shows the kind of insights you can obtain and actions you can take once you start using your leading indicator.

- **Scenario 1:** The manager attends the meetings and provides safety and health updates to all your workers monthly, but the percentage of "yes" responses to your survey has not significantly improved. After discussing this with your workers, you learn that some would like a more detailed explanation about why you are using certain leading indicators. You add this to your discussion points and continue to track your leading indicator.
- **Scenario 2:** The manager attends the meetings and provides safety and health updates to all your workers monthly, but the percentage of "yes" responses to your survey has only marginally improved. After discussing this with your workers, you learn that they would prefer to receive updates more frequently. You start providing updates every two weeks instead of every month, and you continue to track your leading indicator.
- **Scenario 3:** The manager attends the meetings and provides safety and health updates to all your workers monthly, and the number of "yes" responses to your survey improves dramatically. You continue the monthly updates but develop and track a leading indicator for another management leadership practice, or begin working on a different element of your safety and health program.

Tracking Completion of Action Items from Inspections to Improve Hazard Prevention and Control

Step 1: Select a Leading Indicator

While evaluating your safety and health program, you decide to review your program evaluation and improvement practices and identify areas for improvement. You decide to track the number of past-due action items since your last inspection. You set a goal not to exceed 10% on past-due action items before completing your next review.

Step 2: Set a Goal

In this example, your leading indicator is the percentage of past-due action items, and you set a goal of no more than 10%.

Step 3: Start Using Your Leading Indicators

1. Collect the data.

You collect the open action items and calculate the percentage past due.

ACTION ITEMS COMPLETED SINCE LAST INSPECTION

Action Item	Due Date	Status
Repair electrical hazard at main entrance	March 15	Completed by due date
Install new fire protection equipment in work spaces	March 15	Not completed by due date
Provide training on updated emergency procedures	April 15	Completed by due date
Conduct a root cause analysis of recent fire incident	May 15	Not completed by due date

2. Periodically measure progress toward your goal and take action if you are not meeting it.

Each quarter of the year, you calculate your percentage of past-due action items. If you did not complete at least 90% of your action items, find out why and try to address the issue.

Step 4: Periodically Reassess Your Goal and Indicator

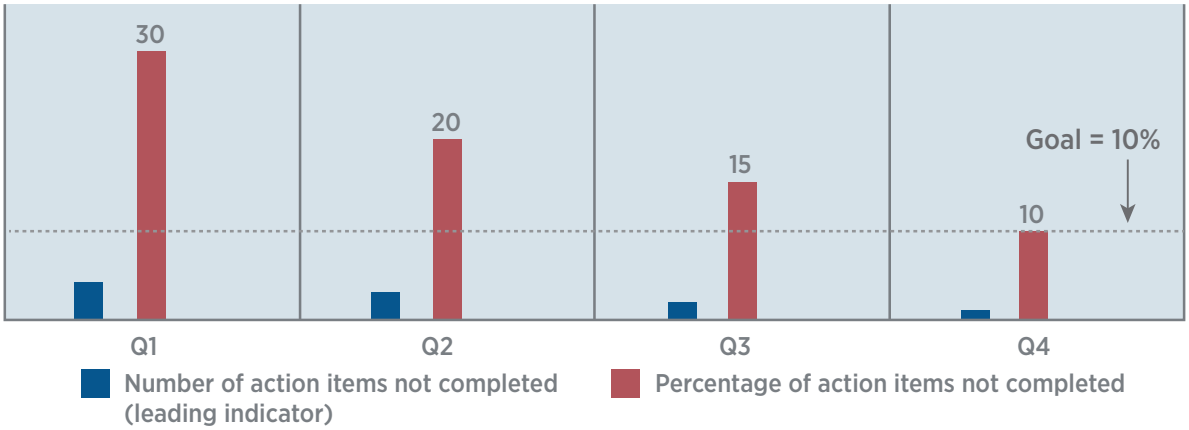
To assess your goal, determine what percentage of outstanding action items you have not completed. Is it no more than 10%?

Below are three scenarios that could arise after you start tracking this leading indicator. Each scenario shows the kind of insight you can obtain and actions you can take once you start using your leading indicator.

- **Scenario 1:** Before completing your next review, you check your results and notice that your percentage of total action items not completed is above 10%. After discussing this with your workers, you learn that no procedure exists to ensure that you would complete your action items on time. You also learn that it may be helpful to give the action item list to a manager to ensure that workers meet the due dates. You set a meeting with your workers to come up with a procedure for completing action items on time, begin giving the list of action items to a manager at the conclusion of each inspection, and continue to track your leading indicator. You also make this tracking log available to workers so they can become more involved with ensuring timely completion dates.
- **Scenario 2:** Before completing your next review, you check your results but your percentage of total action items not completed is above 10%. After discussing this with your workers, you learn that the equipment, parts, or tools needed to complete some of the action items were not available. You take appropriate actions to ensure the parts or tools needed to complete the action items are available, and continue tracking your leading indicator.

- **Scenario 3:** You review your results before your next review, and your percentage of total action items not completed is below 10%. You decide whether to continue tracking your leading indicator, develop and track a leading indicator for another hazard prevention and control item, or begin working on a different element of your safety and health program.

PERCENT COMPLETION OVER TIME



SECTION 3. CONCLUSION

Leading indicators are a valuable tool that you can use to make measurable and long-lasting improvements to safety and health outcomes in the workplace. Leading indicators can be valuable regardless of whether you have a safety or health program, what you have included in your program, or what stage you may be at in your program. Use the checklist below to get started today.

ACTION PLAN CHECKLIST

- **Identify your top problem areas.** For hazards, review your injury logs, and results from your hazard assessments. Start with the hazard with the greatest risk of harming workers by evaluating the severity of the potential exposure and the likelihood that an incident could occur. Prioritize hazards over other areas of your program, particularly if a threat is imminent.

- **For other program elements, talk with your workers about what areas you could improve.** For data that you are already collecting, determine whether it is an area that you should prioritize.

- **Consider what actions you could take to address your key areas.** Talk with your workers and anyone else with knowledge of the issue that can provide suggestions.

- **Set a goal, and use leading indicators to reach it.** Make an informed decision on what your goal should be and how long it might take to achieve. Choose a leading indicator that can help you to achieve your goal over time.

- **Collect the data.** Begin collecting the leading indicator data for the time period you decided on as well as the data for your goal during that same time period.

- **Periodically review the results.** Assemble the results into a graph to determine whether there is a positive relationship between your leading indicator and your goal. Did the action that you took help you to achieve your goal? If not, try something else.

- **Remember that just one or two indicators can make a positive impact.** OSHA recommends getting started today and customizing the type and number of indicators to your needs, resources, and abilities as they evolve over time.