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Engineers | Environmental Specialists

SAFETY & HEALTH:
LAGGING AND LEADING INDICATORS

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Discussion Outline

- **Terminology**
  - Lagging Indicators
  - Leading Indicators
  - Passive Indicators
- **Lagging Indicators**
  - Injury Metrics
  - Near Miss Event
  - First Aid Cases
- **Leading Indicators**
  - Audits
  - Observations
  - Training
- **Passive - Active Indicators**
  - Passive
  - Active
  - Balanced Approach
- **Applying the Data**
  - Input, Activity, Outcome, Impact Metrics

Making a case for investment
Supporting actions and defending results

Lagging and Leading Indicators

How Are These Defined

Outcome indicators:	Completion terms of a task. Pre-established, preventative objectives in planning are taken as a starting point and then observed which ones “actually” were met, and to what extent. These indicators refer to the reason why it was decided to conduct certain interventions.
Efficiency indicators:	Related to the capacity of the teams or areas to carry out their respective tasks. (Systematic / periodic inspections of workplaces and equipment, surveys, Internal audits)

Lagging Indicators:	Lagging indicators measure the occurrence and frequency of events that occurred in the past (injuries, Illnesses, fatalities)
Leading Indicators:	Leading indicators are proactive and preventative measures that can shed light on the effectiveness of a system and reveal issues. (Operations, Systems, & Behavior Based)

Passive Indicators:	Measure of attitudes, behaviors, practices, or conditions that influence safety. An indication of probable safety performance.
Active Indicators:	Efforts made by companies to avoid risks. Safety investments on the condition of machinery or facility, investments in training, coaching, mentoring programs, or road safety.

Deming Cycle: Plan, Do, Check, Act

Lagging and Leading Indicators

How Are These Defined

Absolute indicators:

Absolute indicators provide concrete data points that indicate the presence or occurrence of safety-related events. These indicators are typically based on counts or measurements. Absolute indicators provide a straightforward count of events but do not consider other influencing factors.

- Number of Workplace Accidents
- Total Injuries Reported
- Compliance with Safety Regulations

Relative indicators:

Relative indicators provide context to safety data by relating it to another variable, such as the number of hours worked, the size of the workforce, or other pertinent factors. These indicators allow for comparison over time or between different entities. Relative indicators offer context and allow for comparisons by relating safety metrics to operational factors, leading to a more comprehensive understanding of safety performance.

- Injury Rate
- Lost Time Injury Frequency Rate (LTIFR)
- Safety Performance Index

Lagging and Leading Indicators

Impacts of a Health & Safety Process

Fatality Totals
Recordable Incident Rate (TRIR)
Lost Time Injury Frequency Rate (LTIFR) (Hours)
Lost Time Injury Incidence Rate (LTIIR) (Headcount)
Near Miss Rate
Number of Safety Violations
Penalties Paid
Fleet Safety (Collisions per million miles driven)

Efficiency of a Health and Safety Process

Monthly Health and Safety Prevention Costs
Employee Health and Safety Training Completion
Percentage of Management Trained in Health and Safety
Average Time To Resolution of Risks and Issues (risks not injures)
Management Led Meetings Focusing on Health and Safety
Process Audits – incorporating process owners and workers
Surveys on Safety, Work Environment, Management Commitments

What can be learned? What does the data indicate?

Lagging and Leading Indicators

Data costs time and money and should be obtainable across objective schedule. Will you need to normalize data, how will that be done?

Data

Injury Records

HR, Legal, Safety, Department Members

Citation Data

HR, Finance, Legal, Safety

Training

Cost of Training, Employee Time, HR and Safety Time

Pre-Shift Safety Meetings

Employee time, impacts on process performance

Weekly audits

Safety, Area Supervisors, Department Management

Lagging and Leading Indicators

Outcome Indicators

75% decrease of ergonomic injuries in third shift warehouse operators
- Near Miss
- Injuries
- Complaints

90% attendance at company sponsored safety and health training
- Near Miss
- Injuries
- Training Records

90% reported employee satisfaction with workplace safety
- Complaints
- Multiple same injury types
- Missed workdays

Conversion of 75% injury treatment at clinics with onsite on call nursing
- Minor injuries treated with prescription drugs
- Missed work time for minor injuries while off site
- High OSHA Recordable Costs

Reduction in vehicle insurance costs by 50%
- Roadway accidents
- Unsafe Driving Culture
- Road Rage Situations

Potential Downsides of Leading Indicators

- False Sense of Security: High rates of leading indicators do not guarantee the absence of incidents.
- Data Collection Challenges: Getting accurate and complete data on leading indicators requires commitment and effort.
- Cost and Time: Implementing and tracking leading indicators can be resource-intensive.
- Measurement Difficulty: Quantifying some leading indicators, such as safety culture, can be challenging.
- Overemphasis on Metrics: Focus on metrics may shift from a holistic approach to safety.

Potential Downsides of Lagging Indicators

- Reactive, not Proactive: Lagging indicators show what has already occurred.
- Delayed Information: They provide information after an incident.
- Limited Insights: They may not reveal the underlying causes of incidents.
- Negative Focus: They often focus on negative outcomes, impacting morale and the perception of a positive safety culture.
- Costly Consequences: The cost of accidents and injuries revealed by lagging indicators is far higher than proactive measures.

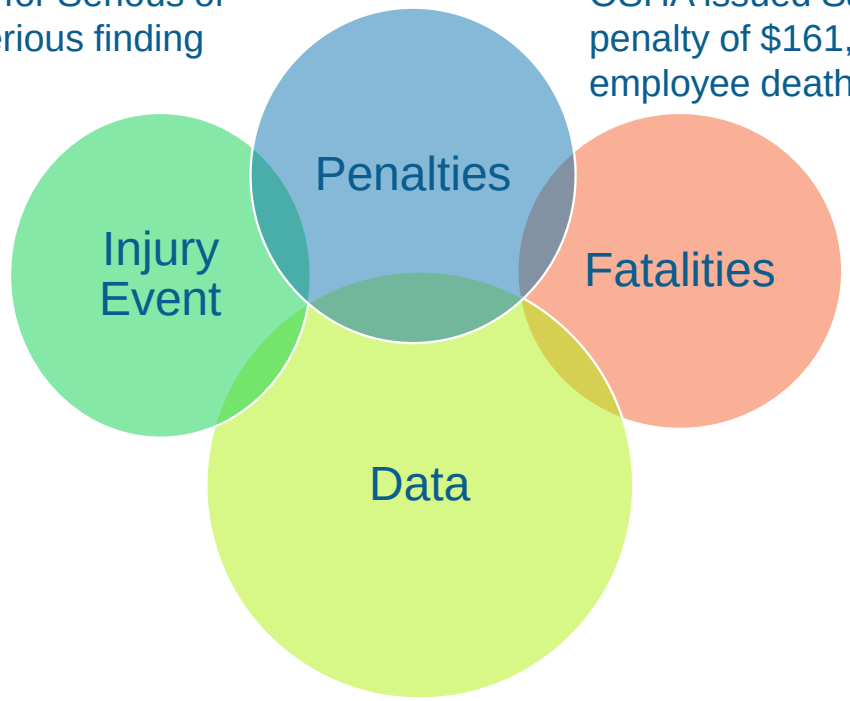
Lagging Indicators

Fatalities
Recordable Incident Rate
Lost Time Injury Incident Rate
Number of Safety Violations
Total Penalties Paid
(Near Miss Rate) – soft lagging factor

Absolute and Relative Indicators

OSHA penalty for Serious or Other Than Serious finding is $16,131 per

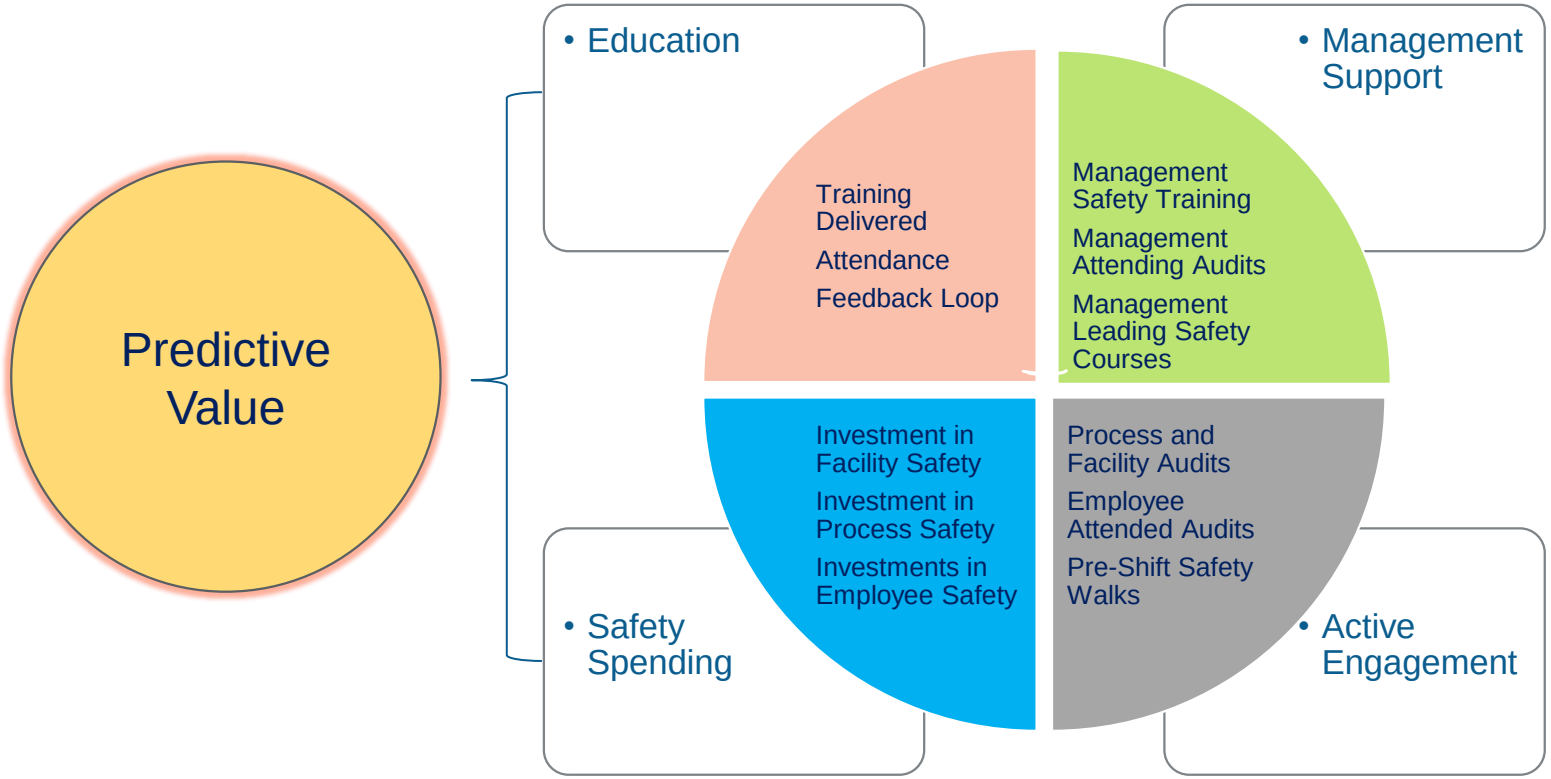
OSHA issued Sam's Club a penalty of $161,259 due to employee death.



Sometimes called “Failure Metrics”

Leading Indicators

Safety Prevention Spends
Safety Training Completion
Management Trained in Health and Safety
Average Time To Resolve Identified Risks
Management Led Meetings Focusing on Health and Safety
Process Audits
Employee Surveys (Work Environment, Management Commitments)



Passive / Active – starting the process

Passive measures can be predictive over an extended period. Passive leading indicators are those that provide an indication of the probable safety performance to be realized within a firm or on a project. These are less effective at being predictive on a short-term basis.

Active indicators and measures are more responsive. Active measures can trigger corrective actions in a short period of time.

Starting the process:

Benchmarking

Outcome Indicator

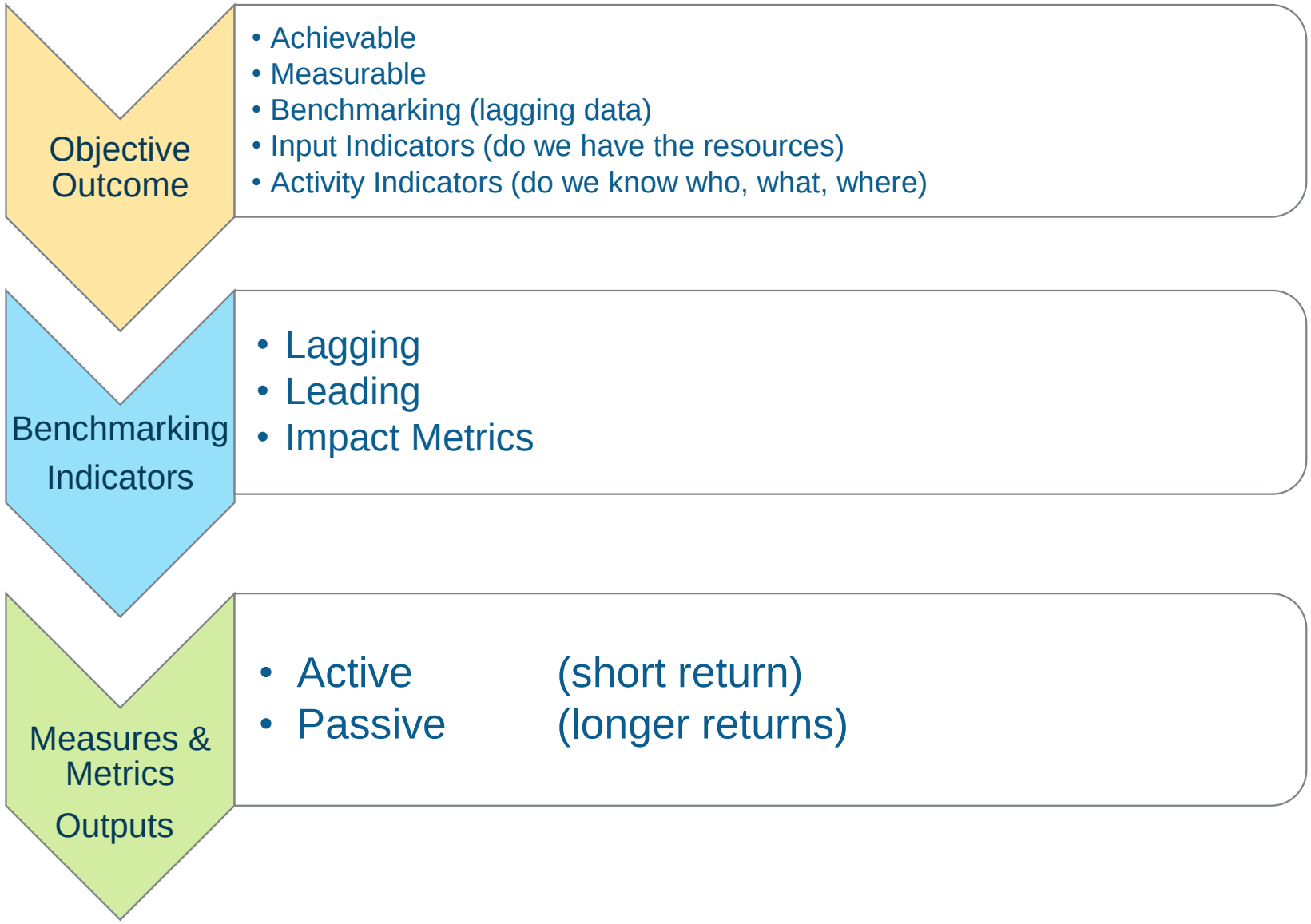
- Lagging
  - Injury Rates
  - Near Miss Reports
- Leading
  - Audits
  - Training
- Passive
- Active
  - Prior start of work (Static)
  - Changed Throughout Job

Stakeholder Communication

Management Commitment

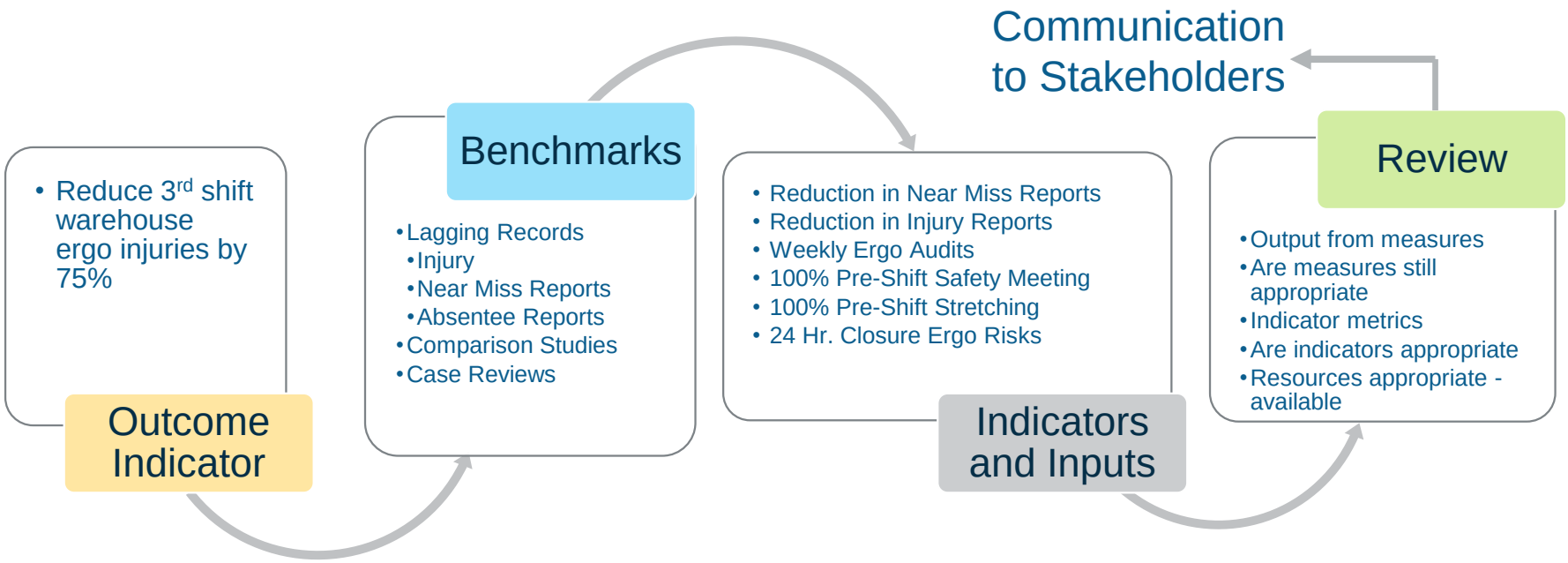
Lagging and Leading Indicators

Example:



Simple Process Model:

Objective: Reduce third shift ergonomic injuries in the warehouse



Making a case for investment
Supporting actions and defending results

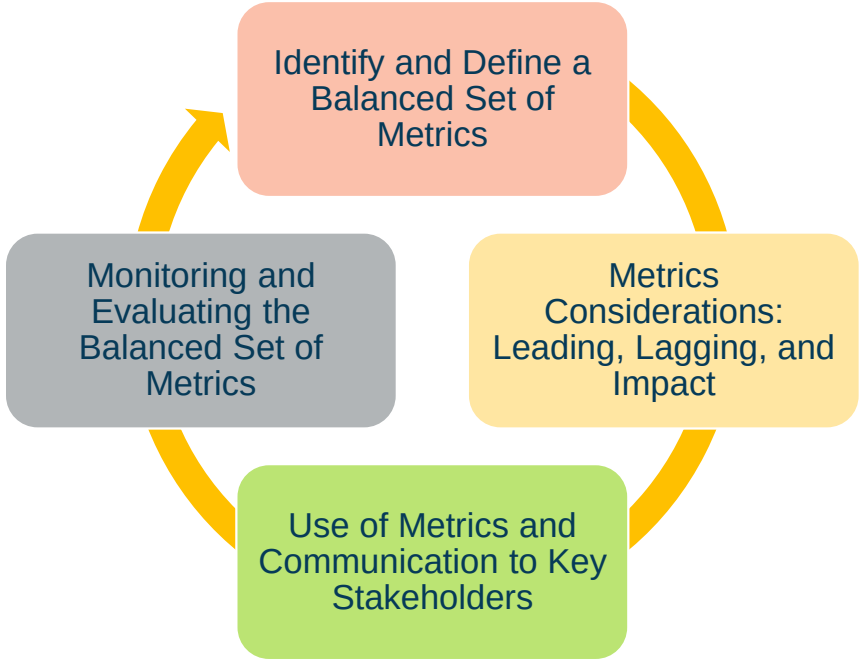
Metrics and Performance Measures

ANSI/ASSP Z16.1-2022 Safety and Health Metrics and Performance Measures

Provides a broader framework of metrics to better understand and improve safety metrics. Provides a set of leading metrics (inputs and outputs) to help influence and predict outcomes and results (lagging and business impact metrics).

It is a process that encourages integration with organizational management systems facilitating continuous improvement. Provides you with a walkthrough from gap analysis to management.

Continual Improvement Driven



Metrics and Performance Measures

ANSI/ASSP Z16.1-2022 Safety and Health Metrics and Performance Measures

Scope:
The standard outlines the scope and objectives of implementing safety and health metrics and their relationship with the overall safety management system.

Definitions:
ASSP Z16 provides definitions for key terms related to safety and health metrics to ensure consistent understanding and interpretation.

Metrics Selection:
The standard offers guidance on selecting appropriate safety and health metrics that align with an organization's goals, objectives, and specific industry requirements.

Leading and Lagging Indicators:
ASSP Z16 emphasizes the importance of both leading and lagging indicators. Leading indicators are proactive measures that predict and prevent incidents, while lagging indicators are reactive measures that provide information about past incidents.

Metrics and Performance Measures

ANSI/ASSP Z16.1-2022 Safety and Health Metrics and Performance Measures

Data Collection and Analysis:
The standard provides recommendations for collecting, analyzing, and interpreting safety and health data. It emphasizes the importance of accurate and reliable data to drive informed decision-making.

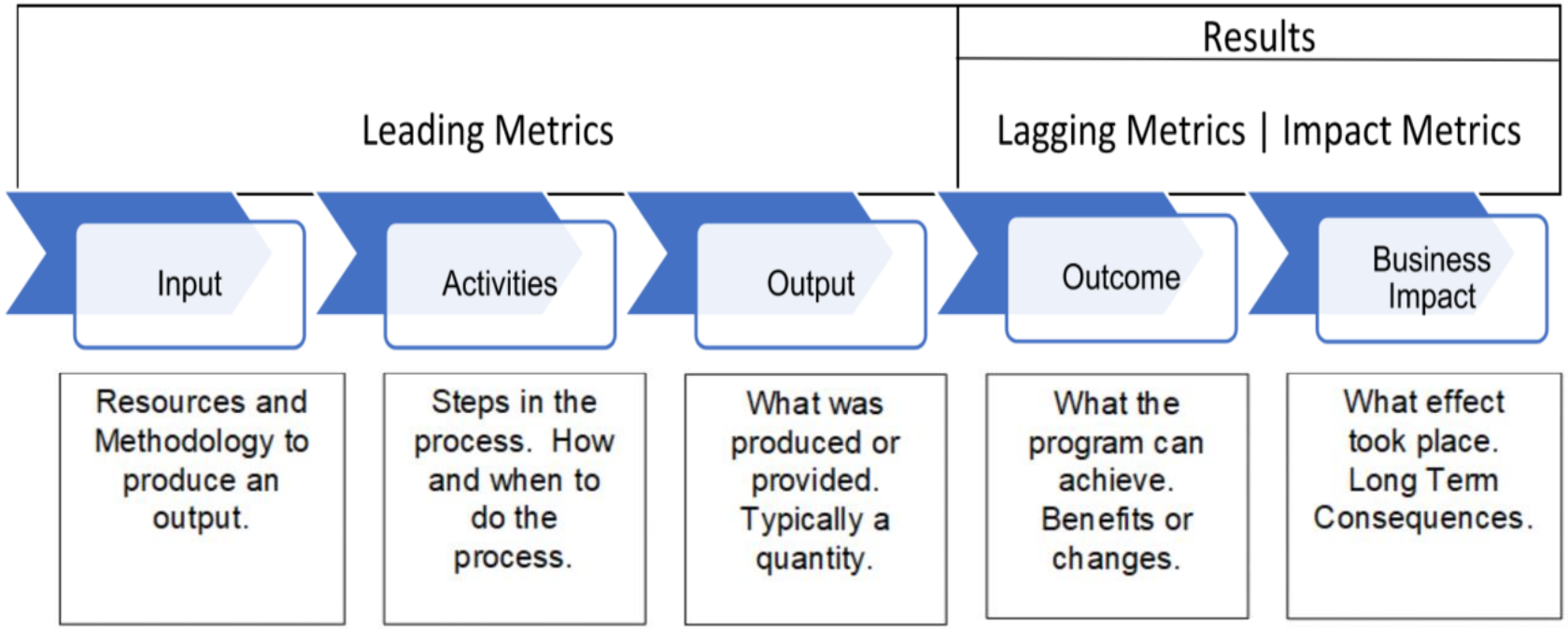
Performance Monitoring:
ASSP Z16 highlights the significance of regularly monitoring safety and health performance using established metrics. This helps organizations identify trends, measure progress, and take appropriate actions for continuous improvement.

Reporting and Communication:
The standard emphasizes effective reporting and communication of safety and health metrics to relevant stakeholders within the organization, including management, employees, and external entities.

Metrics and Performance Measures

ANSI/ASSP Z16.1-2022 Safety and Health Metrics and Performance Measures

Figure A-1 Logic Model of Metrics



Metrics and Performance Measures

ANSI/ASSP Z16.1-2022 Safety and Health Metrics and Performance Measures

Figure A-2 Risk and Safety & Health-Based Management System Set of Logic Metrics

Hearing Loss Example				
Input	**Activities**	**Output**	**Outcome**	**Impact**
Risk-Based				
% of workplace with noise surveys	% of overexposed with audiograms	% of hazards controlled	Fewer Threshold Shifts	Productivity enhancements due to less administrative down time administrating a HCP
% of population overexposed	% of new equipment over the noise limit	# of new controls	Fewer hearing loss cases Fewer personnel in the hearing conservation program (HCP)	HCP cost reduction

Summary

Using Lagging and Leading Indicators To Improve Processes

1) Establish a clean and detailed objective outcome
2) Set a completion date to establish time frameworks (often annually)
3) Select indicators that add value to your objective outcome
4) Select indicators that can be obtained and managed
5) Ensure you have the resources to collect and maintain data
6) Use active and passive tool sets to measure changes, continually benchmarking
7) At end of time frame, review findings, assess positives and negatives
8) Using that data, change objective as need, selected corrected indicators

Take your pick!

Percent training completed vs. required
Percent of IH samples completed vs planned
Injury follow up within 72 hours
Number of SHMS system reviews
Number of SHMS procedure reviews
Percent of corrective actions completed by due date
Percent of similar exposure group requirements completed versus required
Progress on annual injury/illness reduction plan (action items complete)
Number of job observations vs. target per supervisor/manager or per number of hour's worker
Number of near miss or concern reports

Job coaching/mentoring
Closing a safety work order within 30 days
Competency skills complete before job change or assignment
Wellness program participation
Incident investigations complete per schedule
Equipment and tool pre-use inspection
Pre-job briefings
Stretch and flex programs
Safety contact- tips/reminders sent around
Supervisors and managers one on one on the floor to talk about safety

Number of monthly safety management meetings I safety committee meetings
Quarterly snapshot program
Number of safety critical preventative maintenance done
Number of employees included on specific safety teams I elements
Number of SSAs (serious safety events?) reviewed by hourly employees
Monthly management step up meetings
Risk identification and reduction
Safety committee monthly meeting
Monthly safety work order day (% completed)
Number of OFI days (safety/cost saving/process improvement)

Employee stop works
Safety fair participation
Number of coaching sessions post training
Safety related preventive maintenance completed on time
Number of concern reports
Number of employees participating on teams
JSAs completed by hourly employees
Number of repeat findings
Number of coaching sessions for employees who did not pass competency requirement
PPE usage
Permit completeness

Resources on Indicators:

OSHA Questions on the Use and Development of Leading Indicators

Using Leading Indicators to Improve Safety and Health Outcomes

Remote Learning Opportunities

OSHA Region 1 Virtual Training

Online Safety & Occupational Health Applied Sciences Masters Program

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