

# Developing a Business Case to Demonstrate the Value of Safety

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*"The findings and conclusions in this presentation have not been formally disseminated by the National Institute for Occupational Safety and Health and should not be construed to represent any agency determination of policy."*



# Today's Discussion

- **Overview**
- **OSHA's Safety Pays**
- **CDC Business Case Guidelines**
- **AIHA Value of the Industrial Hygiene Profession**
- **Other Initiatives**



# *WHY BE CONCERNED WITH SAFETY?*

## *Safety is good business*

1. Right thing to do...
  - Employee morale / protection of most valuable resource
  - Control costs (direct and indirect)
2. Safety and health excellence correlates with business excellence...
  - Quality
  - Efficiency
  - Profitability



## *Final Thoughts...*

**“ Establishing a safety and health culture that leads to superior performance is not only the right thing to do or the socially responsible thing to do...**

**It is also the right economic approach.**

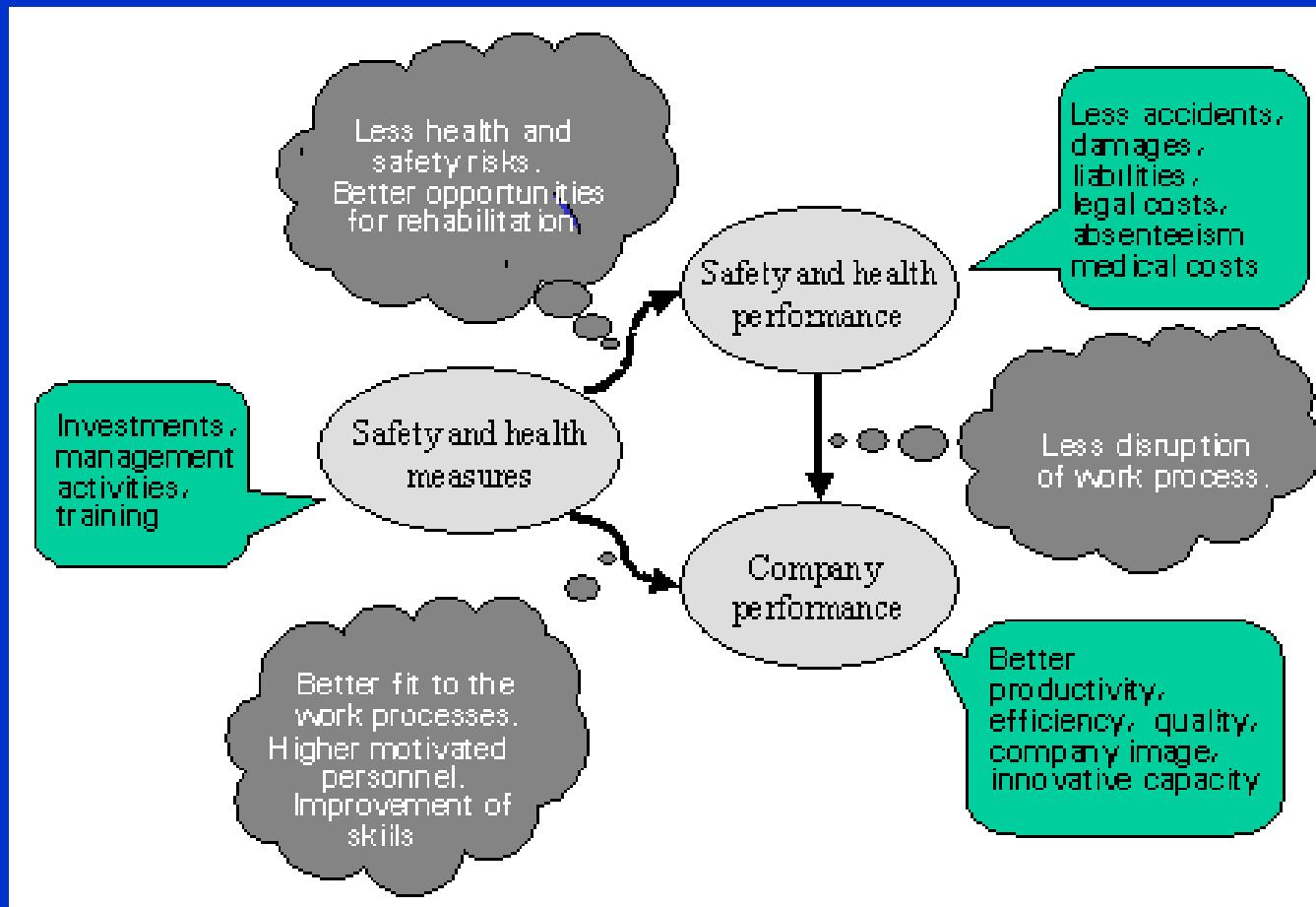
**Reducing workplace injuries and illnesses conserves critical resources and improves the use of those resources. It saves money, avoids unnecessary costs and ultimately maximizes returns on business investments.”**

**John Henshaw,**

**Former Assistant Secretary of Labor, OSHA**

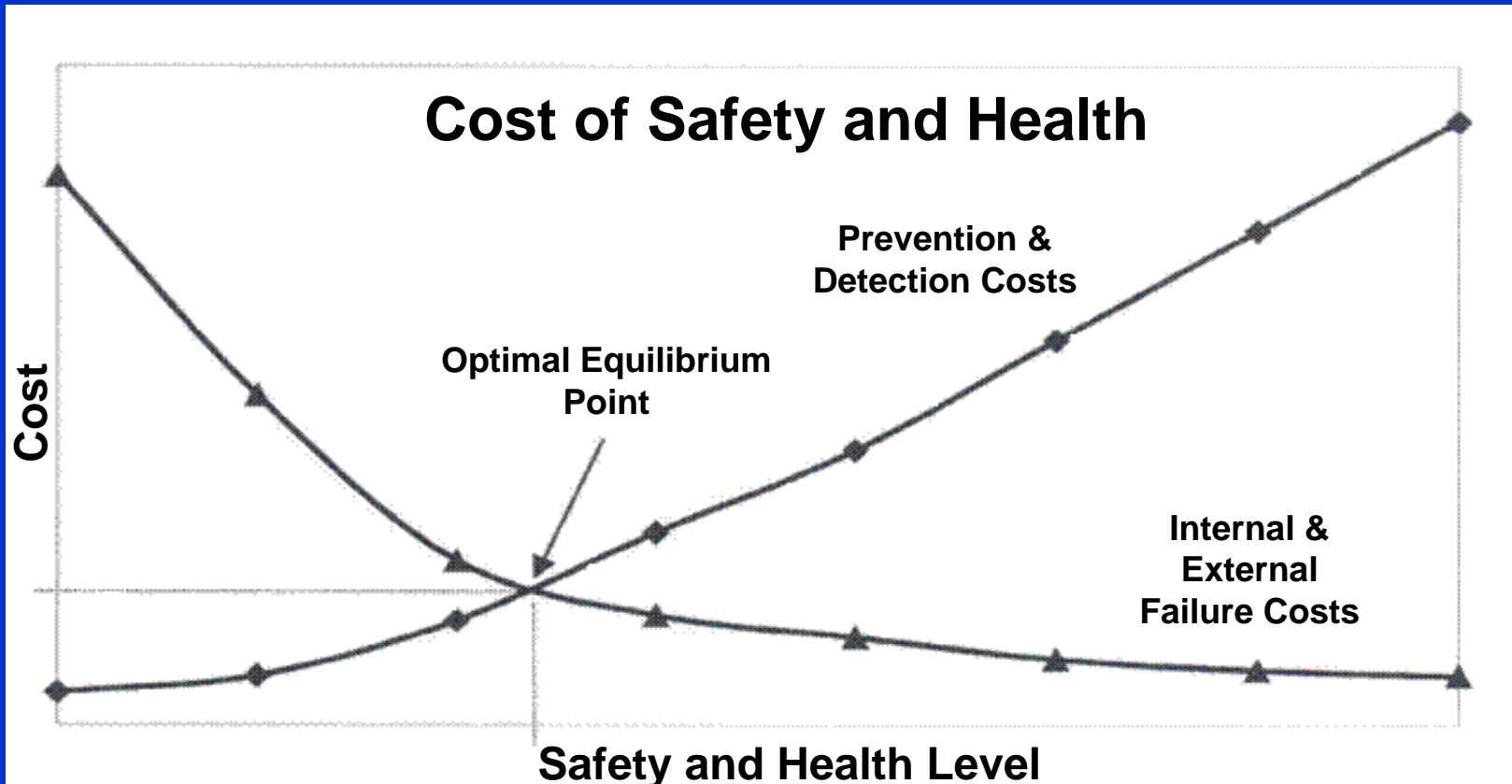


# Impact of Employees' Health and Safety on Company's Performance



Source: Mossink JCM, Nelson DIN. Understanding and performing economic assessments at the company level. Protecting Workers' Health No 2 WHO, Geneva 2002.

# How Much Safety and Health?



Source: M.Behm, A. Veltri, and I.K. Kleinsorge. The Cost of Safety. Professional Safety, April 2004, p22-29



# OSHA's \$afety Pays Program



*\*Source: OSHA's Safety Pays Web Site, 2008*





# OSHA's Safety Pays Program

## Estimated Costs of Occupational Injuries and Illnesses and Estimated Impact on a Company's Profitability

[\[Text Version\]](#)

"Safety Pays" helps estimate cost gains realized through the prevention of occupational injuries and illness claims. Businesses can use this information to predict the direct and indirect costs of injuries and the sales needed to compensate for these losses. Your local [OSHA Area Office/Consultation Office](#) can provide information and assistance on developing and implementing an effective safety and health management system that can help prevent injuries and/or illnesses to provide a safe working environment for your employees.

### Direct Costs

1. Select an injury type from the drop-down menu OR enter the total workers' compensation costs.
2. Enter the profit margin (leave blank to use default of 3%).
3. Enter the number of injuries (leave blank to use default of one).
4. Select "Add/Calculate" to compute the total direct and indirect costs.
5. Repeat the step to add additional injuries to the list.

**Injury Type** *or*  
**Workers' Compensation Costs**  
*(annual sum of costs)*

**Enter Profit Margin (%)**  
*(leave blank to use default of 3%)*

**Enter Number of Injuries**  
*(leave blank to use default of one)*

### Estimated Total Cost

The extent to which the employer pays the direct costs depends on the nature of the employer's workers' compensation insurance policy. The employer always pays the indirect costs.

Injury Type	Instances	Direct Cost	Indirect Cost	Total Cost	Additional Sale (Indirect)	Additional Sale (Total)
-------------	-----------	-------------	---------------	------------	-------------------------------	----------------------------

### Totals

Estimated Direct Costs:



\*Source: OSHA's Safety Pays Web Site, 2008





# OSHA's \$afety Pays Program

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**Injury Type** *or*

**Workers' Compensation**

OR

**Costs**

*(annual sum of costs)*

**Enter Profit Margin (%)**

*(leave blank to use default of 3%)*

**Enter Number of Injuries**

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**\*Source: OSHA's Safety Pays Web Site, 2008**



# OSHA's Safety Pays Program

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## Totals

Estimated Direct Costs:

Estimated Indirect Costs:

Combined Total (Direct and Indirect Costs):

Sales To Cover Indirect Costs:

Sales To Cover Total Costs:

*\*Source: OSHA's Safety Pays Web Site, 2008*



# OSHA's \$afety Pays Program

**"\$afety Pays"** uses the sliding scale table at right to calculate the indirect costs of the injuries and illness. Statistically, the larger the amount of claim, the smaller the ratio used for the calculation.

For additional information on how "\$afety Pays", see [Background of the Cost Estimates](#).

Direct Costs	Indirect Cost Ratio
\$0 - \$2,999	4.5
\$3,000 - \$4,999	1.6
\$5,000 - \$9,999	1.2
\$10,000 or more	1.1

\*Source: OSHA's Safety Pays Web Site, 2008



## SALES TO COVER COSTS\*

Accident Costs	1% Profit	2% Profit	3% Profit
\$ 1,000	\$ 100,000	\$ 50,000	\$ 33,000
\$ 5,000	500,000	250,000	167,000
\$ 10,000	1,000,000	500,000	333,000
\$ 25,000	2,500,000	1,250,000	833,000
\$100,000	10,000,000	5,000,000	3,333,000

**It is necessary to sell an additional \$250,000 in products or services to pay the cost of \$5,000 annual losses**



\*Source: OSHA's Safety Pays Web Site, 2004



*Developing Business Cases  
for Investments in Health and  
Safety: A Guide for CDC Analysts*



# What is a Business Case?

**A business case is an *ex-ante* or a *priori* structured proposal that assist executives, medical or financial officers in making investment decisions in health protection activities, projects, programs, interventions, practices, services or policies**

**The business case can also take the form of an *ex-post* proposal in cases where existence of a current program needs to be justified or a case is needed for securing funds to continue or expand a program**



# What a Business Case is not?

**A business case is more comprehensive than a budget proposal or financial analysts. Considers ethical, medico-legal, human resources or other considerations and presents decision makers with alternative options to a health problem**

**A business case it is not just a retrospective ROI analysis on a program already implemented – which it is the most common business case found in the literature**





# When is a Business Case required?

- **Business resources or collaboration with a business is required either to carry out an intervention or to include it in the employees' health benefit package**
- **CDC programs wish to promote the adoption of a health protection strategy by businesses or in a business setting**
- **The proposed intervention or program will be implemented in the workplace**



# Business Case Guidelines: Seven Steps

**Step 1: Describe the current situation**

**Step 2: Define Objectives**

**Step 3: Identify Options**

**Step 4: Define the analytic framework**

**Step 5: Assess outcomes, benefits, and costs**

**Step 6: Identify Preferred options**

**Step 7: Finalize the business case**



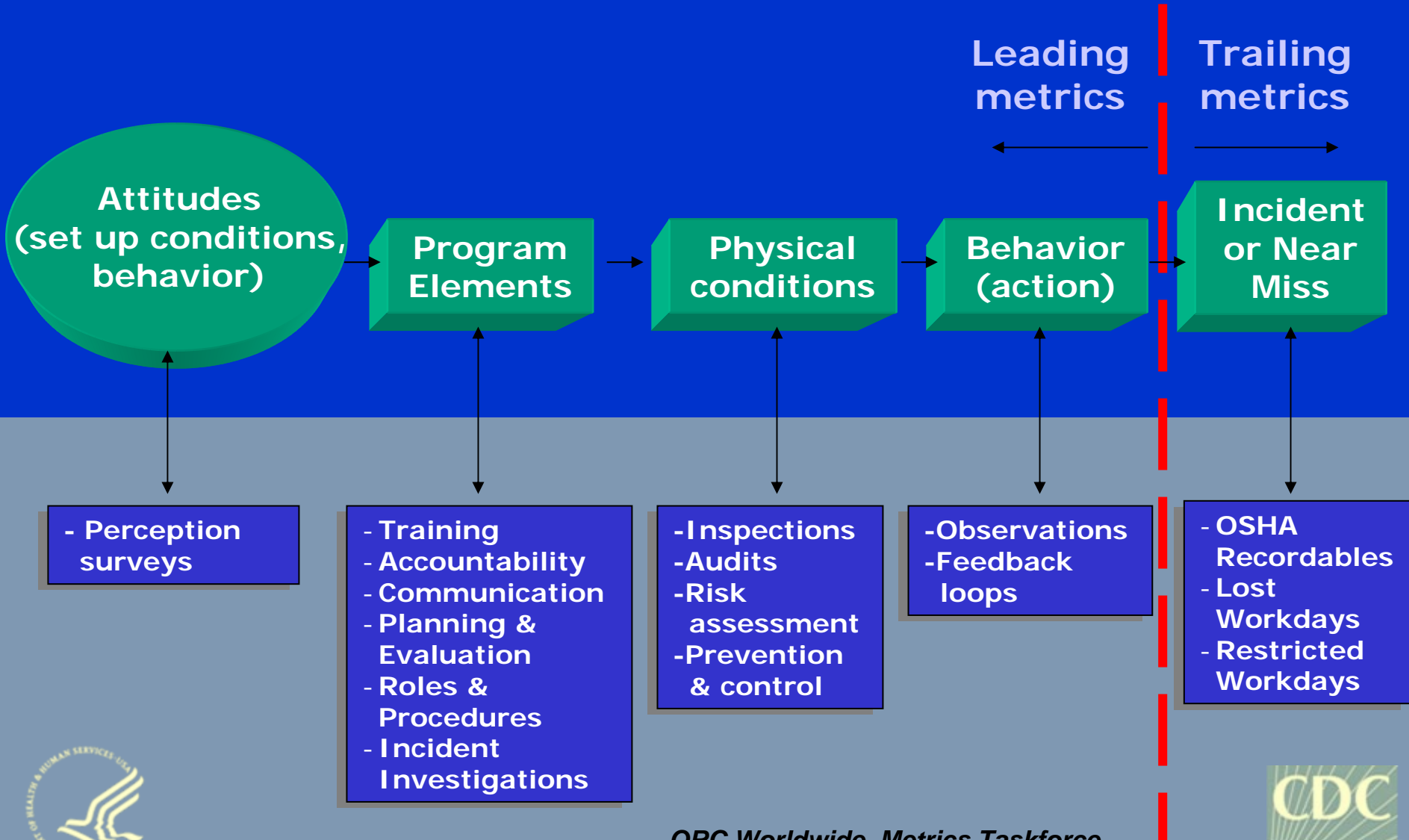
# Step 1: Describe the Current Situation

**1.1 Define the safety or health problem**

**1.2 Describe current programs**



# SYSTEMS Performance Metrics



# Describe Current Programs

1. No interventions addressing the problem are known to exist,
2. Interventions are already in place but their effectiveness is not satisfactory,
3. Interventions that successfully reduce illness or injury exist, but are not in place because they are too expensive or perceived as too expensive,
4. Interventions are successful, but continuing funding or expanding to other locations needs to be justified on a financial basis.



# Step 2: Define Objectives

**2.1 Consider national and agency goals**

**2.2 Consider company goals**



# Consider Safety and Health Goals

The Dow Chemical Company developed and publicly announced their 2005 goals for environment, safety and health in 1996:

- Reduce injuries and illness per 200,000 work hours by 90 percent
- Reduce transportation incidents per 10,000 shipments by 90 percent
- Reduce motor vehicle incidents per 10 million miles by 50 percent,
- Reduce process safety incidents by 90 percent.



# Step 3: Identify Options

- 3.1 Gather evidence of effectiveness**
- 3.2 Develop a long list of options**
- 3.3 Select a short list of options**





# Gather Evidence on Effectiveness

1. Conduct a pilot study
2. Evaluate past experiences from organization records
3. Use effectiveness interventions from systematic reviews
4. Conduct our own literature review



# Develop Long List: Consider Feasibility of Options

<i>Type of Factor</i>	<i>Factor</i>
<i>Environmental – Internal (Firm)</i>	Strong Union opposition to implementation
	High resistance from employers
	Contrary to internal policies
	Incompatible with industrial culture
<i>Environmental – External (Industry or Sector)</i>	Regulatory challenges
	Political challenges
	Lack of partners' buy in
	Market structure
<i>Physical Resources</i>	Size or location of organization
	Unavailability of infrastructure
	Transportation challenges
<i>Technological Resources</i>	Intellectual property challenges: patent, copyright, etc
<i>Internal Staff</i>	Insufficient staff
	No staff qualified
	Training of staff will take considerable time and resources
<i>Time Constraints</i>	Insufficient time for implementation
	A long pre-implementation time
	Insufficient prep time

# Select a Short List: Effectiveness and Feasibility Matrix

	<i>Effectiveness</i>				
	<i>None</i>	<i>Low</i>		<i>Medium</i>	<i>High</i>
<i>Feasibility</i>	<i>High</i>	High Feasibility No Effectiveness	High Feasibility Low Effectiveness	High Feasibility Mid Effectiveness	High Feasibility High Effectiveness
	<i>Medium</i>	Mid Feasibility No Effectiveness	Mid Feasibility Low Effectiveness	Mid Feasibility Mid Effectiveness	Mid Feasibility High Effectiveness
	<i>Low</i>	Low Feasibility No Effectiveness	Low Feasibility Low Effectiveness	Low Feasibility Mid Effectiveness	Low Feasibility High Effectiveness
	<i>None</i>	No Feasibility <sup>[1]</sup> No Effectiveness	No Feasibility Low Effectiveness	No Feasibility Mid Effectiveness	No Feasibility High Effectiveness



# Step 4: Define the Analytic Framework

**4.1 Define the audience**

**4.2 Define the time frame and analytic horizon**

**4.3 Consider study design**



# Consider Study Design

***Quality and credibility  
depends on  
study design rigor***



# Categories of Study Design

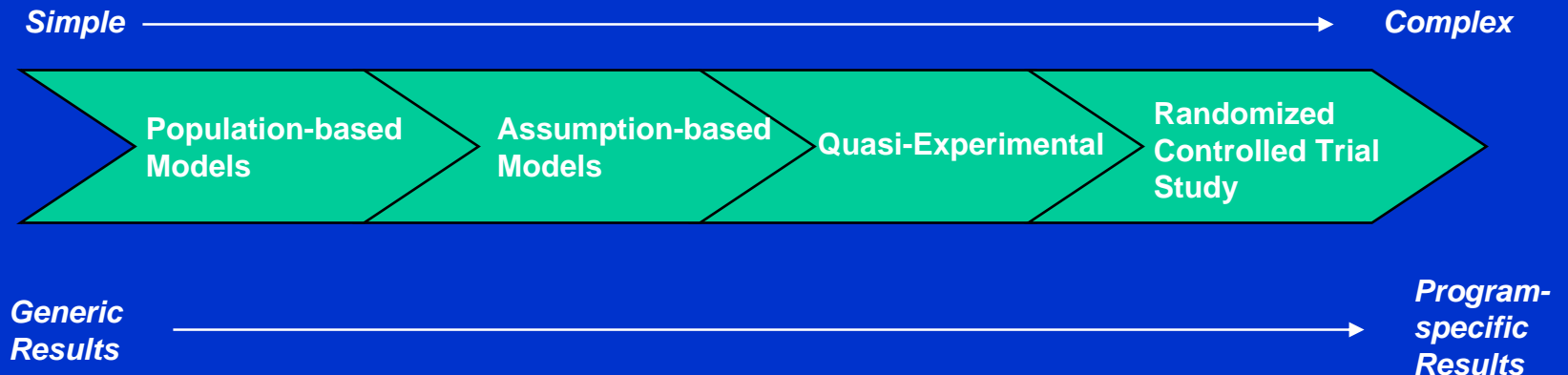
*Quality and credibility depends on  
study design rigor*

- **Experimental**
  - randomized control trials
- **Non-experimental**
  - observational, including cohort, case control, pre-post approach, decision analysis, cost-effectiveness analysis, cross-sectional, retrospective regression analysis, simulations



# Alternative Approaches

“The Institute [National Business Group on Health] studied the significant variation that exists in the market around appropriate ROI methods. An employer needs to understand the differences in these methods and when they are appropriate.”



# Step 5: Assess Outcomes, Benefits, and Costs

**5.1 Measure health and non-health outcomes**

**5.2 Assess and value benefits**

**5.3 Measure or estimate costs**





# Measure Health and Non-health Outcomes

<u>Health Outcome</u>	<u>Non-Health Outcomes</u>
decrease mortality	reduced health care services
decreased morbidity	decreased absenteeism
increased life expectancy	decreased presenteeism
reduced injury	increased worker productivity
reduced disability	reduced worker turnover
improved quality of life	environmental improvements
increased screening	improved service quality
increased testing	quality standards accreditation
increased counseling	improved corporate citizenship
increased immunizations	increased enrollee tenure
decreased risk for health outcomes	decreased penalties or fines
decreased risks for complications	increased brand identity
Improved functionality	improved relationship with key stakeholders
Improved mental health	improved business strategic position
	improved corporate culture



# Cost-savings as Benefits

Type of Benefit or Cost-Saving	Description	Type of Cost	Description
Medical	Medication/ vaccines	Staff Related	Reduced absenteeism
	Labs/diagnostic procedures		Reduced presenteeism
	Inpatient costs		Less workman's comp payments
	Outpatient costs		Change in work conditions
	Rehabilitation services		Reduced stress
	Home care costs		Add flexibility in work schedules
	Ancillary services/ambulance		Moral boost
	Equipment/home devices	Organizational	More uniform provision of services
	Side effect costs		Better image
	Disease sequelae costs		Better quality product or service
	Disease complication costs		Improved competitive advantage
	Follow-up costs		Improved emergency assistance
	Self-care training/education		Lower life insurance premiums

# Cost-savings as Benefits

Type of Benefit or Cost-Saving	Description	Type of Cost	Description
Non-medical	<ul style="list-style-type: none"> <li>Volunteer time</li> <li>Caregiver out-of-pocket costs</li> <li>Time lost and Travel costs</li> <li>Staff time lost</li> <li>Staff travel costs</li> <li>Staff income foregone due to illness</li> <li>Staff income foregone due to death</li> <li>Income foregone by caregiver</li> </ul>	Operational	<ul style="list-style-type: none"> <li>Lower life insurance payments</li> <li>Reduction in fines and legal costs</li> <li>Loss of corporate history</li> <li>Less training</li> <li>Faster responses to inquiries</li> <li>Improved time to react to changes</li> <li>Improved communications</li> <li>Improved accuracy of information</li> </ul>



# Achieving Business Objectives as Benefits

Category	Objective
Financial objectives	Improve earning per share
Sales/marketing objectives	Increase market share
Operational objectives	Shorten product development time
Image objective	Win award for service excellence
Product/service objective	Improve product reliability
Internal objectives	Improve employee morale
Other business objective	Establish strategic alliance



# Step 6: Identify Preferred Options

**6.1 Calculate economic and financial measures**

**6.2 Conduct sensitivity analyses**

**6.3 Rank and prioritize options**



# Calculate Economic and Financial Measures

<b><i>Most Common Merit Measures</i></b>	<b><i>Definition</i></b>
Cash Flow	The flow of cash into and out of the business
Simple Cash Flow	Cash flow that does not consider the value of time, undiscounted.
Discounted Cash Flow	Cash flow that is adjusted to consider the uncertainty and value of time or discounted.
Net Cash Flow	“The bottom line” or benefits – costs for each period under consideration.
Net Present Value (NPV)	Sum of the discounted present values of the annual cash flows—the net benefits (benefits – costs) generated from the program or intervention during its lifetime. Cash flows are adjusted by incorporating the uncertainty and time value of money.
Payback Period	The period of time needed to recoup an investment through the expected cash flows from the investment.
Discounted Payback Period	The period of time necessary to recoup the initial investment through the expected cash flows from the intervention or program using discounted cash flow.
Return on Investment (ROI)	The amount of income generated, or costs averted, by an investment.
Internal Rate of Return (IRR)	The discount rate that produces a zero Net Present Value.



# Cash Flow

## Proposal Scenario

Full value cash flow in \$

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
<b>Cash Inflows / Benefits and Gains</b>						
Benefit item 1	120	170	150	275	300	1,015
Benefit item 2	500	615	704	755	812	3,386
Benefit item 3	866	876	812	900	1,010	4,464
<b>Total cash inflows</b>	<b>1,486</b>	<b>1,661</b>	<b>1,666</b>	<b>1,930</b>	<b>2,122</b>	<b>8,865</b>
<b>Cash Outflows / Costs &amp; Expenses</b>						
Cost item 1	(90)	(95)	(88)	(85)	(89)	(447)
Cost item 2	(400)	(350)	(387)	(320)	(300)	(1,757)
Cost item 3	(1,010)	(849)	(597)	(650)	(650)	(3,756)
<b>Total cash outflows</b>	<b>(1,500)</b>	<b>(1,294)</b>	<b>(1,072)</b>	<b>(1,055)</b>	<b>(1,039)</b>	<b>(5,960)</b>
<b>Cash Flow Summary</b>						
Total inflows	1,486	1,661	1,666	1,930	2,122	8,865
Total outflows	(1,500)	(1,294)	(1,072)	(1,055)	(1,039)	(5,960)
<b>Net cash flow</b>	<b>(14)</b>	<b>367</b>	<b>594</b>	<b>875</b>	<b>1,083</b>	<b>2,905</b>



# Discounted Net Present Value

Time Period	$A_t$	Discount Factor for 8% interest	Annual Discounted Value
0	-315.2	1.0000	-315.200
1	295.5	0.9225	272.599
2	248.2	0.8573	212.782
3	245	0.7938	194.481
4	475.2	0.7350	349.272
5	591.3	0.6806	402.439
			NPV = 1116.372





# Return on Investment

***Simple ROI is less of an accounting term than a generalized term for the expected value of an investment in terms of added revenue or profits, or averted expenses.***

$$\text{Simple ROI} = (P_b - P_c) / P_c$$

***where  $P_b$  represents the gains or benefits from the program or intervention and  $P_c$  represents the cost of that program or intervention.***



# Step 7: Finalize the Business Case

- 7.1 Business case template**
- 7.2 Report the business case**
- 7.3 Consider factors influencing approval**



# Report the Business Case

Component	Recommendations
I. Executive Summary	Provide a brief overview of the problem explored and its relationship to goals and recommendations. No more than 1 page
II. Problem Statement	Describe the magnitude of the problem
III. Options Evaluated	Describe the options selected for evaluation
IV. Quantitative Results	Provide the results of the financial measures
V. Qualitative Results	Provide the results of any qualitative measures
VI. Summary	Provide a summary of the findings
VII. Recommendations	A brief statement of which option is preferred using the criteria from the business case analysis



American Industrial Hygiene  
Association (AIHA)  
Value of the Industrial Hygiene  
Profession



# System Barriers: The Current State Of S&H Financials

- **Direct S&H costs can be quantified, but identifying and tracking costs is complex and time consuming**
- **No real handle on indirect S&H costs; soft numbers discourage use**
- **Hard to capture and isolate other benefits**
- **Health benefits hard to measure**
- **Existing financial tools support project level analysis**
- **Existing financial systems often do not adequately capture S&H related data**
- **Key business data often not accessible to S&H staff**



Source: ORC Worldwide



# Foundations - A Few Basic Concepts

- Value demonstration requires comparison
  - Compare target “before and after”
  - Compare your program to (like) competitors
  - Compare to control group
- Prospective, retrospective, or current application possible
- Use the language of the business to communicate
  - Financials = often how other parts of the business keep score
  - Leadership focused on business objectives
- Must understand the business and business “drivers;” must understand intersection between risk and the business
- Must understand the process and the relationship between IH activity and downstream benefits



Source: ORC Worldwide



# Broadening the Scope...

- **The traditional strategy for capturing IH value must be broadened from only tracking cost savings to include new revenue generation and other business benefits**
- **A highly effective way to capture business benefits (other than cost savings and revenue generation) is to identify the relationship of IH programs and activities to key business objectives**



Source: ORC Worldwide



# ORC IH VALUE STRATEGY





# Overarching Value Strategy

- **Steps 1 – 2: Identify and assess key IH hazards and key business objectives to structure study and set priorities for value investigation**
- **Step 3: Select program/activity and track impact on risk**
- **Step 4: Determine value assessment approach**
- **Steps 5 – 7: Apply either Quantitative or Qualitative approach, or a combination of both**
- **Step 8: Develop presentation package for target audience**



Source: ORC Worldwide



# Capturing “Other” Business Benefits

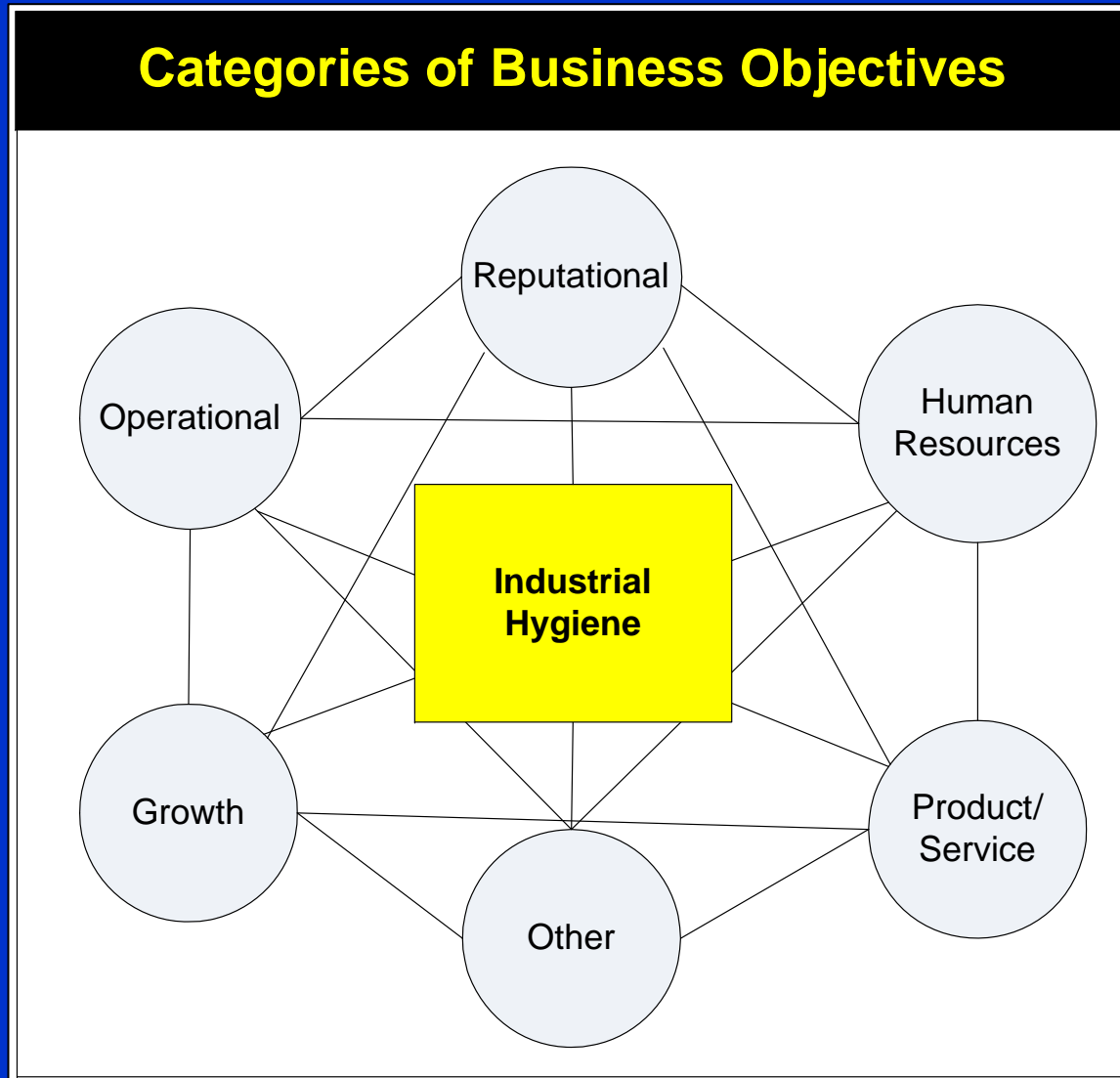
- **All organizations have objectives**
- **Objectives are the means that organizations use to make their vision and value statements actionable**
- **Corporate leadership uses business objectives to set priorities, guide operations, drive accountability**
- **Business objectives provide a “universal” framework for capturing “other” business benefits**



Source: ORC Worldwide



# Business Objective Framework



Source: ORC Worldwide



# The AIHA Strategy Makes the Value Proposition by Capturing:

1. Traditional cost reduction (cost/benefit) analysis
2. Revenue generation
3. Positive impacts on business objectives



Source: ORC Worldwide



# Qualitative Approach Defined

allows the user to:

estimate the value of the industrial hygiene contribution by tracking its impact on health, the IH risk management process, and the business process through an evidentiary cause and effect analysis that isolates and extracts other factors that could have produced the same effects



Source: ORC Worldwide



# Qualitative Approach

- Not an algorithm, but a new way of thinking
- For situations where quantitative data are not available; time is limited; etc.
- Historic approach: no hard data = no value proposition
- Approach estimates value through a series of steps
- Key relationships are tracked through sequential “cause and effect” analyses that demonstrate the links between risk reduction, intermediate outcomes, and business value
- Tool helps users isolate and extract confounding factors at each phase
- **Analogy = evidentiary trail in legal proceeding where case is made by a preponderance of the evidence**



Source: ORC Worldwide



# Quantitative Approach Defined

allows the user:

to calculate generally accepted financial business metrics, such as return on investment (ROI) and net present value (NPV) by capturing detailed data on the industrial hygiene impact on cost savings revenue generation, and other strategic aspects of the business



Source: ORC Worldwide



# Quantitative Approach Goals

- Enable IHs to identify the impacts of IH program/activity to control or eliminate risk
- Capture and analyze the costs and benefits of those changes
- Present the value proposition either prospectively or retrospectively
- Enable IHs to express cost and benefit of programs or activities *in terms of financial value (ROI, NPV, etc)*



Source: ORC Worldwide





# Test Approach

- **Representative IH Programs and Activities**
- **Common areas of focus for IH**
  - **Biological**
  - **Chemical**
  - **Ergonomics**
  - **Noise**
  - **Other Physical Hazards**
- **Hierarchy of controls**
  - **PPE/Administrative/Work Practice**
  - **Engineering**
  - **Hazard Elimination/Material Substitution**



Source: ORC Worldwide



# Conclusion and Next Steps

- **Capturing the value of the Industrial Hygiene contribution to the business is necessary and doable**
- **The AIHA Value Strategy provides new approaches that allow the IH to capture and demonstrate the value of a broad range of IH programs and activities**
- **A quantitative approach facilitates calculation of detailed financial data that should withstand CFO scrutiny**
- **The qualitative approach facilitates value assessment for programs and activities that have heretofore have been hard to capture**



Source: ORC Worldwide



# Other Initiatives



# THE BUSINESS CASE FOR SAFETY

*Adding Value and Competitive Advantage*

A Joint Initiative of OSHA, Abbott, and  
The Center for Business and Public Policy  
at Georgetown University

March 2005



# ORC Worldwide ROHSEI

## ROHSEI Process

1. Understand the Opportunity or Challenge
2. Identify Alternative Solutions
3. Gather Data And Conduct Analysis
4. Recommend a Solution Based on the Analysis

## ROHSEI Tools

Causal Loop Diagram

Causal Loop Diagram

Direct Impact Module

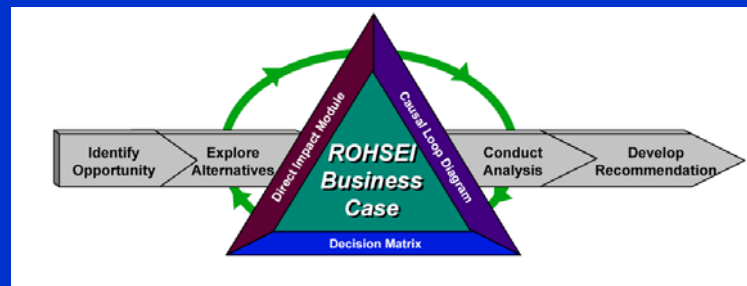
Decision Matrix

Business Case Summary

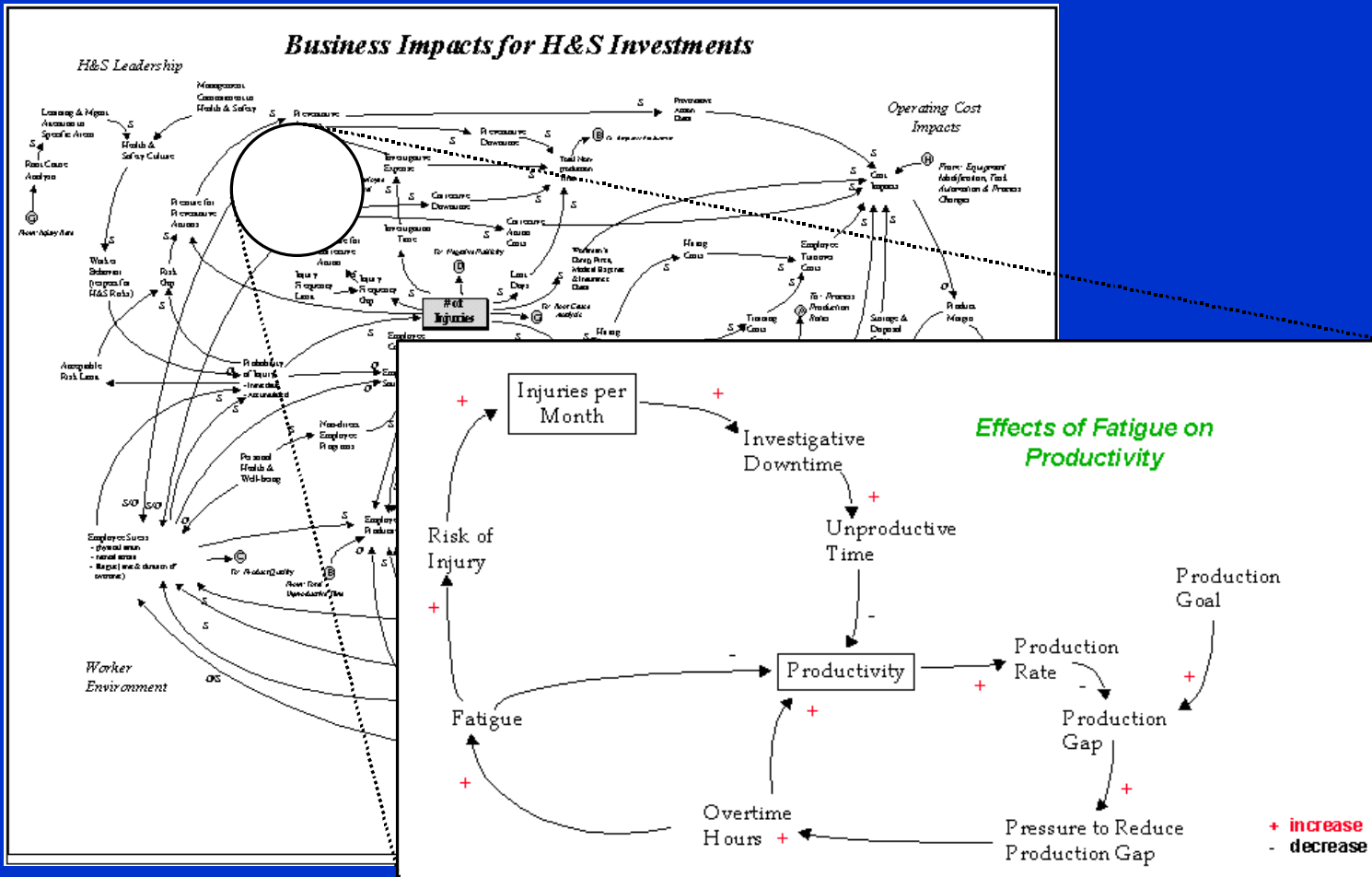
Business Case Summary

Business Case Summary

Business Case Summary



# Causal Loop Diagram



# Benefits and Costs are Input in Today's Dollars

ROHSEI 2.1.10

File Options Move to Top

Railcar Tarping <-- Analysis Name Step 1: Describe Step 2: Set Up Step 3: Analyze Step 4: Recommend Help

Analyze: Life Line Harness (Railcar Tarping)

Life Line Harness <-- Scenarios Memo

Incident Approach Benefits of Project Costs of Project Decision Matrix

Parameter	Year0	Year1	Year2	Year3
Productivity Impact	\$0	\$0	\$0	\$784,000
Operational Personnel Time	\$0	\$3,500	\$0	\$0
EHS Personnel Time	\$0	\$0	\$0	\$0
Design and Engineering Personnel Time	\$0	\$5,000	\$0	\$0
Other Personnel Time	\$0	\$0	\$0	\$0
Vendors, Consultants and Contract Labor	\$0	\$0	\$0	\$0
EHS Supplies	\$0	\$0	\$0	\$0
Medical Costs and Insurance	\$0	\$0	\$0	\$0
Emergency Response	\$0	\$0	\$0	\$0

Regular Costs (Expense) Capital Costs

Net Incident Approach Cost	\$0	\$0		
Costs Before Taxes	\$0	\$8500		
Tax Liability	\$0	\$1975	\$57	
Capital Costs	\$10000	\$0	\$0	\$0
Total Costs	\$10000	\$10475	\$5758	\$784000

Regular Costs (Expenses) Capital Costs

Decision Matrix Questionnaire

Metrics

Decision Matrix Results

Recommendations

ROHSEI automatically calculates inflation adjusted future costs and benefits



## Centers for Disease Control and Prevention (CDC) Health and Productivity Management Return on Investment Tool

Thank you for your interest in the CDC Health and Productivity Management (HPM) Return on Investment (ROI) Tool. This tool will help you forecast the ROI your company can expect by investing in programs that improve the health of your employees.

The tool is based on the fact that health care costs and workplace productivity are influenced by employee health risks (as well as demographic characteristics). For example, employees who eat right, exercise, and do not smoke cost less. By reducing these risks, you can thereby expect to see cost reductions. But you also need to consider how much money you invest in order to achieve these reductions. The tool predicts this financial return based on information you enter regarding your employees' health risks, demographic characteristics, the amount you spend on HPM programs, and the degree of risk reduction among your employees. The tool contains ten additional pages; three for data entry, six for displaying results, and an appendices page.

### I. Data Entry Pages

**Program Costs** - factors that influence the cost of HPM programs, such as number of participants, cost per participant, etc.

**Demographics** - age, gender, race, and job characteristics of the employees who participate in your HPM programs.

**Health Risks** - the percentage of employees with various health habits, and hypothetical health risk reductions achieved by your HPM program

### II. Results Pages

**Summary Page** - identifies the ROI you can expect based on your entries in the Program Cost, Demographics, and Health Risks pages.

**Trend Page** - illustrates trends in health care costs for different scenarios.

**Detail Page** - displays results from the Summary and Trend pages in detailed tabular format.

**Productivity Page** - information on the relationship between modifiable health risks, absenteeism from work, and work productivity.

**Sensitivity Analysis** - illustrates the effect on the ROI of different values for the program cost, demographics, and health risks.

**Confidence Intervals** - the range of uncertainty of the ROI that reflects uncertainty in the program cost, demographics, and health risks.

The **Appendices** page provides links to information about your employees' or beneficiaries' demographics and health risks.

**Each of these pages can be viewed by pressing the navigation buttons above.**

**Questions About the Model:** If you have any questions about the use of this model, please contact Dr. Ron Z. Goetzel, Vice President, Consulting and Applied Research, Thomson Medstat. Dr. Goetzel can be reached at [ron.goetzel@thomson.com](mailto:ron.goetzel@thomson.com).





# Productivity Assessment Tool

- Encourage management
- Concentrates on the people side of production
- One year horizon
- Static production system
- Cost benefit analysis



# Productivity Assessment Tool

	<b>Initial case. Enter data:</b>	<b>Test case(s). Enter data for expected changes:</b>
<b>Data concerning the employees</b>	<ul style="list-style-type: none"> <li>• wage costs</li> <li>• productive hours</li> <li>• supervision</li> <li>• administration</li> <li>• insurance/social taxes</li> <li>• recruitment</li> <li>• productivity</li> </ul>	<ul style="list-style-type: none"> <li>• wage costs</li> <li>• productive hours</li> <li>• supervision</li> <li>• administration</li> <li>• insurance/social taxes</li> <li>• recruitment</li> <li>• productivity</li> </ul>
<b>Intervention</b>		<b>Estimated costs for the intervention</b>
<b>Reports</b>	<b>Cost-benefit analysis calculations. Workplace and employee data.</b>	





Select a table

▼ editing Initial Case

0. Home

◆ **1. Employee Details**

2. Employee Costs

3. Reduced Productivity

4. Allocated Costs

5. Recruitment Costs

7. Workplace Summary

6. Employee Summary

8. Workplace Report

▼ edit employee Employee 1

Employee Category

Number of Employees

Hours

Enter total figures for this employee category

Enter figures for each employee

Unproductive Time, with reasons for that lost time (hours/year)

Illness Absences	<input type="text" value="20"/>
Injury Absence	<input type="text" value="30"/>
Training	<input type="text" value="5"/>
Planned Absences	<input type="text" value="200"/>
Other	<input type="text" value="5"/>

### Employee Details

Name the employee category and enter the number of employees and the PAID hours worked by each employee.

Enter time lost (**unproductive paid time**; total hours per year). You may do this by total hours per year for the whole employee category or by a single employee.

- ◆ Injury Absence refers to absence due to compensatable workplace injury.
- ◆ Training refers to absences from production or service for skills/competence training. Do not add training for new employees here, such costs are added to the Recruitment Costs screen.
- ◆ Planned Absences refers to absences for vacation, statutory holidays and similar absences.

Decided to use an existing, commercially available cost benefit analysis model (Productivity Assessment Tool) which has been designed for determining the economics of ergonomics interventions. The model has been shown to be successful in determining the financial value of ergonomics interventions but this present study is one of integration of the model with existing design and economic production systems.

# CERSSO TOOL KIT

**Step One - Define magnitude of problem**

**Step Two - Risk appraisal**

**Step Three - Preventative measures**

**Step Four - The Balloon Model graph**

**Step Five - Define and derive costs/benefits**

**Step Six - Conduct cost benefit analysis**



FACTORES DE RIESGOS	PARAMETROS	OPERACIONES										total %
		1	2	3	4	5	6	7	8	9	10	
Vibraciones	2 - 20 Hz	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	10
Shock Eléctrico	Voltaje Eléctrico	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Iluminacion/Reflejos	500 - 700 Lux	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Iluminacion/Deslumbramiento	500 - 700 Lux	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Iluminacion/Baja Luz	500 - 700 Lux	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Iluminacion/Laser	T. L. V. de la A. C. G. I. H.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Incendio	Proced. de Seguridad	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Exposicion / Temperatura	Indice T. G. B. H.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Exposicion / Humedad	Indice T. G. B. H.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Exposicion / Ventilación	Indice T. G. B. H.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Exposicion / Ruido	85 dB	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Exposicion / Pelusa	TLV, OSHA 0.5 - 0.75 mg/m3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10
Exposicion / Químicos	TLV (ACGIH)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Heridas Cortadas	Procedimientos de Trabajo	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10
Quemaduras	Procedimientos de Trabajo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20
Atrapamientos	Procedimientos de Trabajo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
Caidas	Procedimientos de Trabajo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10
Manejo Manual de Carga	Carga Dinámica	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10
Movimientos Repetitivos	Carga Dinámica	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	30
Postura Forzada	Cargas Estáticas	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20
Trabajo Pie	Cargas Estáticas	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	90
Trabajo Sentado	Cargas Estáticas	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10
Jornadas Prolongadas	Jornada Laboral	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	100
Contenido de Trabajo	Normas de producción	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	60
Modo de Gestión	Normas de producción	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	30
<b>25 Riesgos y Exigencias</b>	<b>TOTAL</b>	<b>32</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>8</b>	<b>8</b>	<b>24</b>	<b>20</b>	<b>16</b>	<b>20</b>	<b>16</b>



# Qualitative Methods

- **2003 Maine Business Survey**
  - 73% a comprehensive safety and health program reduces workers' compensation insurance rates and improves the work environment..
  - Over 80% believe it reduces overall injury expenses
- **American Society of Safety Engineers (ASSE) members ranked "educating management on the value of safety" as the most critical part of their job responsibility**
- **Liberty Mutual CFO Survey**
  - senior financial executives clearly see the value of workplace safety
  - over 60% of those surveyed reported that each dollar invested in injury prevention returns two dollars or more



More methods and models, but no  
more Time!

**Contact**

**[EBiddle@CDC.GOV](mailto:EBiddle@CDC.GOV)**

