

Defining Total Corporate Health and Safety Costs Significance and Impact: Review and Recommendations [Original Article]

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Abstract [TOP](#)

This is the first in a series of studies designed to assist directors of occupational health and safety services in defining, measuring, predicting, and integrating total health and safety costs into useful management information. This study was structured to review recent literature on health and safety costs and to categorize costs as either direct or indirect. This delineation should aid in defining total health and safety costs, delineating priority areas for interventions to reduce costs, and evaluating the effectiveness of health and safety programs. The significance of such efforts is underscored by the reported direct health care costs for the nation's work force of over \$418 billion, and indirect costs, using the lower range of estimates for such costs, of over \$837 billion. Reducing the total costs of over \$1.256 trillion would have major impacts on corporate productivity and competitiveness, as well as on availability of health care programs for employees. Recommendations for follow-up activities to define costs and evaluate intervention programs are provided.

Business leaders readily acknowledge the effects of health care expenditures and safety costs on their organizations' competitiveness and profitability. The large sizes of current expenditures, combined with projections of increased proportionate costs in the future, underscore the significance of these costs. Failure to define total health and safety costs in financial planning could have significant, and deleterious, consequences for the organization.

Unfortunately, it is increasingly recognized that typical corporate budgets may seriously underestimate total health and safety costs for that corporation. In some instances, this underestimation reflects omission of some of the direct health care cost drivers. However, another significant reason for the underestimation is that all of the

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extensive, and diverse, indirect costs of illnesses and injuries are not fully considered in planning for health and safety costs. This deficiency occurs with both occupationally related conditions and with health problems that are not related to work activities. Although some investigators consider indirect costs to be relatively negligible, others have suggested these costs may be two to ten times the direct health and safety costs.¹⁻³ This disparity is, in part, a reflection of the difficulty in defining and measuring indirect costs. Whereas direct health care costs can be measured with some degree of certainty, the indirect costs are much more difficult to assess. The difficulty is compounded by the tendency of different investigators to define "indirect costs" differently. Definition difficulties, problems in measurement, and the effects of varying work settings provide particularly complex challenges to financial planners.

This study was structured to review prior studies of health care costs, particularly in a work setting. Information gained through the review, comments from reviewers, and the experience of the authors were used to define the components of total health and safety costs, including both direct and indirect costs. Although the significance of direct health care costs was recognized, and the components of such costs were delineated, the study focused on indirect costs associated with illnesses and injuries. The study also evaluated cost factors related to conditions arising from both work and non-work etiologies. The authors also considered other health and safety costs not associated with specific health problems, such as regulatory compliance and wellness programs, in delineating factors affecting total health and safety costs. Finally, follow-up recommendations were developed.

This effort was designed to provide a qualitative description and definition of major aspects of the total health care cost chain. It is anticipated that applicable portions of the study will be used by other investigators in scheduled follow-up efforts designed to develop approaches to quantifying total cost impacts of illnesses, injuries, and health and safety programs.

The information gained from this initial effort and the planned follow-up studies should be of benefit to directors of health and safety services as they work to control costs, enhance health and safety programs, and evaluate program effectiveness. The results of these activities should also be of assistance in the development of priorities for health and safety efforts. It is hoped that the final outcomes of these studies will include improved health, safety, and productivity of workers and their families.

Methods [TOP](#)

Databases [TOP](#)

The following computerized databases were accessed: Silver Platter, First Search, Byline, Horizon, MEDLINE, ERIC, Uncover, and Wilson Social Science Index. The following key words were used in various combinations: economic, economic loss, economic aspects, costs, direct costs, indirect costs, productivity, health care, illness, injury, corporate, corporation, firm, microeconomic, macroeconomics, occupational medicine, workers compensation, workers compensation costs, occupational health, opportunity costs, intangible costs, cost containment, worker, employee, employee injury, and absenteeism. The database searches were limited to the years 1985 through 1996, with the addition of a few pertinent earlier articles, based on the review of references or bibliographies of items identified through the searches. The described searches identified over 300 citations that were reviewed as part of this study.

Other Sources of Information [TOP](#)

A limited number of corporate medical directors and other experienced occupational and environmental health and safety professionals reviewed drafts of this report and provided their opinions and recommendations regarding the effort. Members of several corporations were interviewed in a nonstructured setting to ascertain their experiences and studies relating to defining health and safety costs. The authors' experiences as corporate health officer, medical director, and manager of occupational health services were additionally used as information sources.

Literature Review [TOP](#)

Although there was some consistency in definitions of direct health care costs, the situation was less clear with respect to indirect costs. Walsh et al⁴ noted that, "Absenteeism is the most frequently measured component of indirect costs." She added that absenteeism is often used as a proxy for the difficult-to-measure productivity impacts (or reductions). Although the Bureau of Labor Statistics has collected absenteeism data, the measurements have constraints, including the fact that information is gained primarily from hourly wage workers, definitions of absenteeism are often "elastic" and ambiguous, and policies and financial arrangements can affect reported absenteeism. Regardless of definition difficulties, absenteeism is often used to measure impacts of health efforts, as in the study of health promotion programs by Smith et al⁵

Koopmanschap et al⁶ described a macroeconomic approach to measuring indirect costs through use of the "friction" method. Instead of using estimates of potential loss of production as a result of disease (the human capital method), the friction method estimates production losses only for the time period required to restore the initial production level. The time period may reflect the time required for the injured or ill worker to return to initial productivity or for replacements to be employed. The authors attempted to consider area economic conditions because such conditions may affect time to return to work or ability to hire replacements.

Berk et al¹ defined indirect costs as "loss of earnings due to morbidity or premature mortality estimated at various discount rates allocated into 18 categories of disease." Rice et al² considered indirect costs as the value of lost output as a result of cessation or reduction of productivity caused by morbidity and mortality.

Greenberg et al⁷ presented their macroeconomic data and applied it at the microeconomic level to describe the corporate costs involved in dealing with clinical depression. Their publication describes two hypothetical companies that view cost differently (out-of-pocket vs system-wide costs). Various categories of costs were delineated with expected values, and several different models were used to estimate costs. Other macroeconomic approaches evaluated the cost of back pain to society in The Netherlands,⁸ health costs of occupational disease in New York State,⁹ and cost of occupational injury and illness in Pennsylvania.¹⁰

In contrast to macroeconomic definitions of indirect and total costs, Gustafson et al¹¹ identified a number of specific factors involved in the total cost of illness. These factors are grouped into four cost categories—medical payouts, nonmedical pay-outs, lost opportunity costs to an employer, and reduced quality. The investigators noted that the first three categories are quantifiable, whereas the fourth category represents—but does not monetize—intangible effects. The report is quite comprehensive and addresses the true costs of illness and injury at the level of an industry. However, it does not consider the costs of health and safety programs that are not related to a specific illness or injury, such as wellness programs, regulatory compliance, other corporate health and safety activities, labor relations, and similar factors.

Although the study by Gustafson et al was limited to back injuries in four hospitals, it provided actual total cost data that would be useful in comparing hospital data and implementing changes in programs. The authors expanded the predictors used in other studies by noting that number of days off and number of hours that workers were unable to perform regular work duties were good predictors of costs, although their final recommendation was to use number of days off. They also found that direct medical costs comprise 44% of the total quantifiable costs of back injuries. The data and techniques developed by Gustafson et al may, or may not, be appropriate for other industries, but their process and systems planning have potential applicability to all industries.¹¹

The reported significance of indirect costs in total health and safety varied markedly. Berk et al¹ suggested that indirect costs approximated 50% of total illness costs, whereas Rice et al² noted that indirect costs may be as low as 20% of total costs, depending on the specific disease condition. Rice et al observed that, in 1963, indirect costs were three times that of direct costs, but by 1980 direct

costs had increased so much that direct costs were slightly higher than indirect. Other investigators reported much higher proportionate indirect costs. As noted by Anstadt et al,³ estimates for such costs have ranged as high as ten times direct costs. Anstadt et al chose a value of twice direct costs, which the investigators considered conservative.

The following tables summarize costs delineated in this study. [Table 1](#) identifies direct costs related to a specific illness or injury; [Table 2](#), indirect costs related to a specific illness or injury; and [Table 3](#), indirect costs that are not related to a specific illness or injury. It should be noted that many identified costs are applicable to non-work-related illnesses and injuries in both workers and family members covered through organization benefit plans. However, some costs are specific to work-related illnesses or injuries, or to programs designed to prevent such illnesses or injuries, such as compliance with Occupational Safety and Health Administration requirements. Still others are related to methods to accommodate individuals with illnesses or injuries that may be related either to work conditions or to nonoccupational etiologies, such as efforts required by the Americans with Disabilities Act.

Medical Costs
 Physician, other provider services
 Hospital
 Outpatient
 Clinic, hospice services
 Hospital
 Outpatient
 Ancillary diagnostic services, eg,
 Laboratory
 Radiology
 Electrocardiography
 Electromyography
 Other
 Patient-specific medical supplies, equipment
 Medications, therapies, services
 Rehabilitation, occupational/physical therapy
 Employee assistance counseling
 Other to be specified for specific disability
Other Injury or Illness-Specific Requirements
 Workers' compensation payments (as applicable)
 Sick pay (as applicable)
 Other benefits (as applicable)
 Compliance with Occupational Safety and Health Administration other reporting required
 for the illness or injury
 Costs of temporary employees to accomplish tasks of ill or injured worker
 Case management costs
 Vocational rehabilitation counseling
 Case specific litigation costs
 Case specific funeral expenses or personal costs
 Specific accommodations required by the Americans with Disabilities Act
 Other (to be specified for specific situation)

TABLE 1. Direct Costs Related to Specific Illness or Injury

Nonoccupational
 Sick pay
 Workers' compensation
 Other benefits
 Compliance with Occupational Safety and Health Administration other reporting required
 for the illness or injury
 Costs of temporary employees to accomplish tasks of ill or injured worker
 Case management costs
 Vocational rehabilitation counseling
 Case specific litigation costs
 Case specific funeral expenses or personal costs
 Specific accommodations required by the Americans with Disabilities Act
 Other (to be specified for specific situation)

TABLE 2. Indirect Costs Related to Specific Illness or Injury

Organizational Health and Safety Program (In-House, Consultant, Contract) costs for
 staffing to provide care for ill or injured employees on site or costs to arrange such
 capability off site
 regulatory compliance, including medical/industrial hygiene monitoring, surveillance
 programs
 development, maintenance of capabilities for case management
 Employee assistance program, other than costs for medical, disease or injury
 development of health and safety policies
 Data processing and data management costs
 Research expenditures, as appropriate
 Wellness, health promotion, communications
 health and safety committees
 Evaluation of options for prevention of accidents
 Program evaluations
 Interactions with other organization departments and managers, including risk
 managers
 Drug and alcohol testing programs
 The elements, periodic examinations, evaluations
 Other, organization-specific
**Other Organizational Costs Related to Health and Safety Activities—Other Than Those
 Involving Specific Illness or Injury (see Tables 1 and 2)**
 Human resources, personnel
 Benefits
 Legal
 Labor relations, unions
 Management (other than health and safety)
 Other, organization-specific

TABLE 3. Indirect Costs Related to Other Health and Safety Requirements, Not to a Specific Illness or Injury

Discussion [TOP](#)

Limitations of Currently Available Data [TOP](#)

This study demonstrated that there were limited numbers of studies documenting total costs of illnesses and injuries in industries. Although there are larger numbers of macroeconomic studies that present global pictures of costs of injuries and illness, the data from these studies are difficult to apply to individual companies that are attempting to control health and safety costs.

The literature review demonstrated that direct health care costs can be defined and measured more readily than indirect costs. This is not to state that every organization necessarily includes all sources of direct health costs in estimating total health care costs. Indeed, experiences of the investigators, as confirmed by the reviewers, indicate frequent omission of one or more direct cost factors when a corporation estimates future health care costs. However, direct health care costs lend themselves to measurement, and provide a sense of comfort when efforts are directed toward controlling them. The ability to measure is of particular significance in Total Quality Management/Continuous Quality

Improvement programs, where ability to manage an area is often considered to be related to the ability to measure the activities of interest.

In contrast to direct costs, indirect costs are typically more difficult to define and to measure. This study revealed considerable variation in the definition of indirect and total health and safety costs. Such variability may be responsible, in part, for the wide variation in reported proportions of health care costs attributed to indirect costs. Reported values ranged from less than 100% of direct costs to up to ten times direct costs.

Applications of Total Health Cost Data TOP

Regardless of the definitions used for direct, indirect, and total health and safety costs, it is apparent that all costs, including indirect, must be included in financial planning. Both the studies and anecdotal articles document the extensive impacts on performance and productivity that a single illness can produce, with AIDS providing a particularly telling example.¹² Failure to use total cost values can preclude appropriate, focused interventions. Such omissions may also lead to severe budget impacts that could seriously affect health and safety programs.

Various investigators, including Gustafson et al.¹¹ TM Anstadt¹³ and Bernacki et al.¹⁴ have demonstrated that it is possible to measure employer costs reliably. The sources and types of health and safety costs may vary from company to company and from industry to industry, but, in general, the major components will remain the same. Gustafson et al also identified two predictors of costs-number of days off and number of hours workers were unable to perform regular duties. Other studies have identified other predictors of injuries or costs, such as health-risk appraisals,¹⁵ employee work perception,¹⁶ history of alcohol or drug abuse,¹⁷ and the economic loss caused by depression.¹⁸

An expanded role of corporate health services (in-house, contract, or consultant) in defining and predicting the total health and safety costs would be an invaluable source of financial information to a corporation's efforts to estimate future costs. Although the methodology of collecting the data could be standardized, each company and industry would have its own specific information, which could then be compared with similar companies within each industry. However, before this can be accomplished, it must be emphasized that the corporate health services must have timely access to pertinent databases. First Chicago Bank's integrated health data management computer system is an excellent example of an information system that can track health care costs.¹⁹ Under a research grant, First Chicago is currently examining the relationships among and between health, disability, risks, productivity, and other factors.* Data obtained from such efforts can be used to delineate "cost-offsets" of various health and safety programs. Offsets may include decreased health and disability costs from both on- and off-job illnesses and injuries, and should be quantified.*

The need for appropriate data integration can present a problem, in view of current legislative efforts regarding "privacy of medical information." It is essential that employers have access to medical data, with appropriate protection of employees' confidentiality, to develop and evaluate intervention programs to improve health and reduce costs. Legislative constraints on corporate medical departments' appropriate access to medical and disability claims data would adversely affect efforts to manage the total burden of illness and injury costs.

The tremendous economic impact of work force health care costs underscores the importance of defining total health care costs so that targeted interventions can be designed and implemented. The Health Care Financing Administration reported that direct health care costs per person were \$3510 in 1994.²⁰ For a work force of 119.3 million,²¹ this equates to an annual charge of \$418.7 billion. If one were to apply the conservative approach used by Anstadt³ to estimate indirect costs as twice the direct, the figure for such costs is \$837.5 billion. The combined total exceeds \$1.256 trillion. Intervention programs that reduce these costs by even a small percentage can yield major dividends for corporations, in terms of increased productivity, profitability, and competitiveness. Additionally, a portion of the savings could result in increased benefits, including expanded health care programs, for the work force. If the studies in a corporation indicate the indirect costs represent an even larger

multiplier for indirect costs, as a number of investigators have suggested, the potential benefits would be even larger.

Company-Specific Considerations [TOP](#)

The company-specific information could begin with the definitions of direct costs, indirect costs, and compliance/enhancement costs, as summarized in [Tables 1 through 3](#). Although the information summarized in the tables is based on review of a significant number of studies, it cannot be considered comprehensive. Furthermore, the classifications are arbitrary, and inclusion of various items can be readily challenged. However, the information in [Tables 1 through 3](#) can serve as a starting point for follow-up investigations to define and ascertain the significance of health and safety cost factors.

Once appropriate components of total costs have been identified, the next step is to develop methods to collect the necessary data for analysis routinely.¹¹ Information systems are needed to obtain and monitor pertinent data. An expert system can be part of the information system used to advise management of various alternatives and also to identify areas of rapidly rising costs. With this information, proactive interventions can be designed, accomplished, and evaluated.

The preceding comments underscore the fact that valid data are essential in developing comprehensive health and safety services. Appropriate data gathering and analyses will permit "real time" monitoring so that interventions or efforts to control costs can be adjusted in midstream, rather than after an unwelcome surprise at the end of the fiscal year. Appropriate analyses may also indicate predictors that can be used to estimate, with reasonable certainty, the total cost of a particular illness or injury.

Although valid data are essential in developing effective health and safety programs, today's information system capabilities can also set the stage for information overload that will stifle a program. Key indicators and predictors may be invaluable, but microreporting and analyses may rapidly reach the point of diminishing returns, with excessive expenses for the final data points. Furthermore, the information can be presented in such detail that major trends or impacts may not be readily recognized. Those directing programs must be sufficiently facile with information systems so that essential information is obtained and used, but so that ongoing processes selectively exclude extraneous details.

If total health and safety costs are defined in a corporate setting, it should then be possible to ascertain sources of high or excessive expenditures, develop appropriate interventions, and evaluate the effectiveness of the interventions. Applying the Pareto principle to use limited intervention resources should help assure maximum return on investment. The overall process will permit appropriate modifications of interventions to increase their effectiveness and financial returns. The evaluation processes could utilize health and safety financial surveillance and monitoring programs in the same manner that medical surveillance and monitoring programs are used.

As previously noted, the cost information collection procedures and outcomes could be shared with other companies in the same industry to refine the management procedures. However, in reality, once these management procedures have been tested and refined, they can also serve as an area of proprietary information that would give a company a competitive edge by controlling its costs.

Various commercial and nonprofit organizations are working to provide software programs that can be used to collect and analyze illness and injury data. Some of these programs are structured to provide both direct and indirect cost impacts of illnesses and injuries. It can be expected that these programs will be refined over time to provide even more assistance to those concerned with managing health and safety costs.

Development of Comprehensive Health and Safety Services for Corporations

[TOP](#)

Comprehensive health and safety services in many industries are, or can be, structured to develop and implement programs that incorporate appropriate financial indicators. Whether in a corporate, contract, or consultant setting, it appears that those directing such programs must establish long-term, trusting relationships with other relevant members of the organization. Belk et al²² emphasized the role of a management team that included representatives of benefits, employee and labor relations, financial, legal, management information systems, health, and other pertinent departments. Additionally, members of the health and safety team need to become experienced with the illness and injury patterns of the organization over time, impacts of seasonal or other variations in activities, outcomes at different sites in the United States and other countries as appropriate, availability and costs of health services, availability of temporary workers to replace ill or injured employees, and similar factors.

The preceding discussion underscores the varied capabilities that those persons directing health and safety programs need. Members require expertise in such areas as financial planning, data processing and analysis, other management techniques, epidemiology, and outcomes evaluations. These areas are not taught in typical medical school, nursing, or safety curricula, nor are they presented in the majority of medical residencies, other than in occupational medicine or other preventive medicine residencies. However, a number of health and safety professionals do have these capabilities, developed either through formal training or through self-study. In many instances, these individuals are in occupational health and safety settings. Anstadt¹³ and others noted that occupational health may make up only 10% of a corporation's total health program. However, those directing occupational health programs frequently have the expertise required to manage total, comprehensive health and safety programs. Many of these professionals also have the tenure and relationships needed to consider recent and past company experience in designing health and safety programs.

Summary and Recommendations [TOP](#)

Summary [TOP](#)

Corporations face increasing health costs that must be incorporated into their financial plans. In developing financial programs, it is essential that total health and safety costs be defined and assimilated in the planning process. Direct costs ([Table 1](#)), and some indirect costs associated with overall health and safety program activities ([Table 3](#)), can often be defined with some degree of certainty. In contrast, the significant indirect costs delineated in [Table 2](#) (and some in [Table 3](#)) are typically poorly defined cost components. Health and safety personnel need to depict total health care and safety costs to develop effective, organization-oriented programs to control and reduce health and safety costs. Appropriate delineation of all cost drivers is also essential in evaluating the effectiveness of interventions directed toward specific illnesses or injuries, as well as in evaluating the benefits of comprehensive health and safety programs. The significance of efforts to develop interventions to reduce health care costs is underscored by the estimated total health care costs for US workers of over \$1 trillion.

Appropriately structured corporate health and safety programs can play major, particularly important roles in maintaining and enhancing the health and safety of workers and their families, as well as in advancing the goals of the organization.^{3,23} The increased morale, productivity, and competitiveness associated with reduced illnesses and injuries can pay important dividends that may lend themselves to quantification. Although it may not be possible to quantify all benefits and savings, it should be possible to demonstrate a sufficient return on investment to delineate the need for comprehensive health and safety programs clearly.

Recommendations [TOP](#)

The following are therefore recommended:

1. Corporate information systems should be structured to provide data on illnesses and injuries that will permit identification of total health and safety costs, specifically including indirect costs data.

2. 2. Studies should be accomplished to delineate, by industry and by disease or injury condition, high-cost events that are amenable to intervention.

3. 3. Studies are needed to ascertain whether one or more indicators can be used to provide reasonably accurate estimates of total health costs for high-frequency illnesses and injuries in a work force or organization.

4. 4. Data should be presented in a format that will permit identification of areas where interventions will produce maximum benefits without sacrificing quality of care.

5. 5. Data must be presented in a format that will facilitate incorporation of total health and safety costs in organizational financial planning.

6. 6. Data-management systems should include provisions to monitor and evaluate illness and injury data with sufficient frequency so that appropriate revisions of health and safety programs and interventions can be accomplished on a "real time" basis. The systems must be constructed to assure appropriate protection of the confidentiality of employees' medical information.

7. 7. Data obtained from the preceding processes should be utilized to evaluate health and safety programs, including effectiveness of interventions and, when appropriate, continuation or expansion of corporate health and safety programs, and return on investment.

8. 8. Educational programs for those professionals designing and directing corporate health services should develop employees' expertise in financial planning, data processing and analysis, other management techniques, epidemiology, and outcome evaluations.

As a final comment, it is suggested that efforts directed toward accomplishing recommendations 1 through 7 above should be focused on well-designed short-term efforts, using available data to the extent possible, that will provide useful information in the near future. Long-duration, complex investigations may provide more sophisticated data, but the results may be of limited use in today's rapidly changing health care and corporate environments.

Acknowledgment [TOP](#)

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