Chapter 1
Disability Among the Working-Age Population
A Conceptual Framework

Our ultimate purpose in this study is to prescribe benefits and services for workers who experience permanent disabilities because of work-related injuries or diseases. That prescription is possible, however, only if we provide a proper framework for analysis. Not only do the criteria and procedures used to provide benefits and services to workers with permanent disabilities vary substantially among jurisdictions, but different jurisdictions, as well as different groups and individuals, use different terms to describe the same phenomena. Some, though not all, of the apparent differences among various programs are due to the inconsistent use of terminology.

In describing the conceptual framework to be used throughout this book, we will employ much of the terminology in use within the workers’ compensation field, including the terms in the glossaries of The Report of the National Commission on State Workmen’s Compensation Laws (1972, p. 137) and of the American Medical Association’s Guides to the Evaluation of Permanent Impairment (1984, pp. 225-27). However, we also take some concepts from literature concerned less with workers’ compensation per se than with disability programs in general, including the disability insurance program under Social Security.

Causes of Injury or Disease

Chart 1.1 briefly categorizes injuries and diseases. We define an injury as damage to the body resulting from an acute traumatic episode, and a disease as damage to the body resulting from a cause other than an injury. These definitions differ from those usually used within the workers’ compensation program. Injury, for example, is commonly defined so as to include disease. In some states, this broad use of injury results from court interpretations. The original intent of the framers of the legislation, to cover only traumatic episodes, was extended to cover diseases as well, even though these often result from cumulative
nontraumatic episodes. In some other instances, the term injury has been broadly applied by design. For example, the model Workmen’s Compensation and Rehabilitation Law, prepared by the Council of State Governments in the mid-1960s, defines injury so as to encompass virtually all diseases. We follow the Report of the National Commission in treating injury and disease as mutually exclusive (rather than making disease a subset of injury) because this use of the terms is more consistent with generally accepted usage in the medical literature.

An injury or disease can result from one or more of the causes listed in chart 1.1. There are many possible taxonomies, but, consistent with our particular interest, we have indicated a primary division between (1) work-related causes and (2) nonwork-related causes.

<table>
<thead>
<tr>
<th>Chart 1.1</th>
<th>Causes of Injury or Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Work-Related</td>
<td>2. Nonwork-Related</td>
</tr>
<tr>
<td>(a) employer at fault</td>
<td>(a) congenital</td>
</tr>
<tr>
<td>(b) employee at fault</td>
<td>(b) degenerative</td>
</tr>
<tr>
<td>(c) neither at fault</td>
<td>(c) other nonwork-related</td>
</tr>
<tr>
<td></td>
<td>(i) other person at fault</td>
</tr>
<tr>
<td></td>
<td>(ii) no other person at fault</td>
</tr>
</tbody>
</table>

One way to subclassify work-related causes is by assignment of fault: in some cases the employer is at fault (1a), in some cases the employee (1b), and in some cases neither party (1c). The term fault, of course, can be variously interpreted. For example, it could be taken to mean the standard of negligence defined by traditional tort law; or one could resuscitate the definition of fault acted on in most states in the days before workers’ compensation, when employers made effective recourse to several extraordinary defenses against liability in tort suits.

In general, the fault issue is no longer of major significance in workers’ compensation (as is discussed in chapter 2, below). It is of some importance, however, when we consider the workers’ disability income system and not just the workers’ compensation program. For instance,
work-related injuries that result from the negligence of a third party, such as a supplier to an employer, can lead to successful causes of action by employees against the third party under the legal doctrines used in many states.

Several types of nonwork-related causes of injury and disease affect the working-age population. Some workers have congenital conditions, such as blindness, that affect them throughout their lives. Others have degenerative conditions that reflect hereditary predispositions and the toll of aging; heart disease often, though not always, is in this class. Other nonwork-related causes can be divided between those for which a person other than the injured worker is at fault (2c-i in chart 1.1) and those for which no one other than the injured worker is at fault (2c-ii). For example, an off-the-job automobile accident in which a worker is injured may be the fault either of another driver (2c-i) or of the worker himself (2c-ii).

This classification system is designed with an analysis of the workers’ compensation program in mind. It reflects the division between work-related and nonwork-related causes, a key element in the workers’ compensation program, and it indicates the necessity to go beyond a two-way classification even in workers’ compensation. As discussed below, determining whether an injury or disease is work-related, as a criterion for awarding compensation, is not always a straightforward matter, particularly since the causes catalogued in chart 1.1 are not mutually exclusive categories. Indeed, for certain types of injuries and diseases, notably back injuries and heart diseases, the relative importance of work-related and nonwork-related factors in explaining the occurrence of the injury or disease is often at issue.

**Consequences of Injury or Disease**

The various consequences of injury and disease (chart 1.2) can be categorized as temporary and permanent, a distinction that has an important bearing on the types of benefits provided under workers’ compensation. The differentiation we utilize between temporary and permanent is consistent with the use of those terms in the *Report* of the National Commission. *Temporary* refers to the period from the onset of injury or disease until maximum medical improvement (MMI) has been achieved; *permanent* refers to the period following MMI.¹ Not every statute would draw the dividing line between permanent and temporary this way. Further, in practice, that line may be unclear. For ex-
ample, in California the “permanent” status is equated with a permanent and stable medical condition, but in fact permanent partial benefits may have to be paid before such a medical condition is reached.

In this book, temporary and permanent refer to mutually exclusive time periods. All workers who have an injury or disease temporarily experience some or all of the consequences indicated in chart 1.2. A minority of workers also permanently suffer some of those consequences.

**Chart 1.2**

**Possible Consequences of an Injury or Disease**

<table>
<thead>
<tr>
<th>Impairment</th>
<th>Functional Limitations</th>
<th>Work and Nonwork Disability</th>
<th>Other Influences</th>
</tr>
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</table>

*Impairment and Functional Limitation*

The initial consequence of an injury or disease is an impairment. An impairment “is an anatomical, physiological, intellectual or emotional abnormality or loss” (Nagi 1975, p. 8). Similarly, the National Commission Report (1972, p. 137) defines permanent impairments as “any anatomic or functional abnormality or loss after maximum medical rehabilitation has been achieved.” Examples of impairments are an amputated limb and an enervated muscle.

An impairment can be manifested (and perhaps measured) in several ways. Some manifestations, such as restricted motion or ankylosis, may be regarded as “objective.” Subjective manifestations include pain, which may be constant, intermittent, or dependent on the activities undertaken by the worker. Other subjective manifestations are weakness and limited endurance.

The impairment experienced by the worker may not lead to functional limitations, the next concept shown on chart 1.2. When it does not, we term it “nonlimiting.” More often, however, impairments do give rise to functional limitations (or limitations in the worker’s performance).
Although overlapping in some respects, three dimensions of performance are . . . separable: physical, emotional and mental. Physical performance refers to sensory-motor functioning of the organism as indicated by limitations in such activities as walking, climbing, bending, reaching, hearing, etc. Emotional performance refers to a person's effectiveness in psychological coping with life stress and can be manifested through levels of anxiety, restlessness, and a variety of psycho-physiological symptoms. Mental performance denotes the intellectual and reasoning capabilities of individuals which have been most commonly measured through problem-solving (I.Q.) tests. (Nagi 1975, p. 3)

A few examples may clarify some of the terms we have introduced:

1. *Temporary nonlimiting impairment.* A worker is injured by flying glass, which inflicts a minor laceration on his arm. The result is a physiological disturbance of the skin (impairment). However, the wound is cleaned and bandaged, and is completely healed in a few weeks. Even during the healing period, the impairment is not limiting; that is, there are no resulting functional limitations.

2. *Temporary limiting impairment.* A falling box breaks a worker's great toe. The result is a physiological disturbance of the bone structure (impairment), which manifests itself in pain and, after the bone is set, in temporary ankylosis. During the healing period, the impairment limits the worker's ability to walk and climb (functional limitations). After the healing period is over, however, there is no residual impairment.

3. *Temporary limiting impairment and permanent nonlimiting impairment.* A worker is scalded on his back by hot acid. The temporary result is burnt tissue (impairment), accompanied by pain and weakness, which results in temporary inability to bend and lift (functional limitations). After the healing period, the worker's back is still scarred (impairment) and painful when touched, but the worker is able to bend, lift, and perform all other activities he could before his injury.

4. *Temporary and permanent limiting impairments.* A falling box strikes a worker's back and causes a compression fracture of a vertebra (impairment), which manifests itself in pain and complete loss of motion in the back. During the healing period, the worker is unable to walk, bend, and so on (functional limitations). Even after maximum
medical rehabilitation is reached, a physical abnormality (impairment) remains and the worker has limited motion in his back. Moreover, when the worker is asked to lift a 25-pound object, he is weak (barely able to lift the object), he experiences increasing levels of pain with continued lifting, and he is only able to lift the object twice (limited endurance). These manifestations of his impairment (weakness, pain, and limited endurance) are indications of a functional limitation (inability to lift).

These examples enable us to contrast the varying approaches to the assessment of impairment and functional limitations. The *AMA Guides*, for example, largely confine the measurement of impairment to objective manifestations, such as restricted motion. The reason given (1971, p. iii) is that “competent evaluation of permanent impairment requires adequate and complete medical examination, accurate objective measurement of function, and the avoidance of subjective impressions.” Subjective manifestations of impairment, however, are considered important for certain types of injuries and diseases by workers’ compensation programs in a number of jurisdictions, such as California. Thus a medical examiner following the *AMA Guides* approach in evaluating the extent of permanent impairment in example (4) above would confine himself to determining the limitations of motion in the back, whereas, following the California approach, he would also consider the subjective manifestations of pain, weakness, and limited endurance.

Disabilities

As a result of functional limitations, a worker may experience a disability. A broad definition of disability is offered by Nagi (1975, pp. 3-4): “inability or limitations in performing social roles and activities such as in relation to work, family, or to independent community living.” We distinguish two types of disability in chart 1.2, namely, work disability, a loss of actual earnings or earning capability as a consequence of the impairment, and nonwork disability, the other consequences for the worker included in Nagi’s broad definition.

In much of the literature on disability, including the *Report* of the National Commission, that term has been treated as synonymous with work disability as defined above. Nonwork disability, as defined above, is not included in the glossary of the *Report*, but for our purposes it is worthwhile to recognize the consequences for workers resulting from functional limitations other than the consequences for the work role. In later chapters, however, when we use the term disability without
the modifier work or nonwork, we intend it to mean work disability as defined here.

As mentioned, not all impairments are attended by functional limitations. Similarly, not all functional limitations are attended by a disability; some functional limitations are "nondisabling." For example, an impairment may render a worker unable to lift heavy objects, but lifting ability may be irrelevant to the worker's job (college professor).

*Other Influences on Disabilities*

One aspect of both the work disability and the nonwork disability concepts is that the extent of a given worker's disability depends not only on the extent of his functional limitations but also, as indicated in chart 1.2, on other influences. For example, the loss of actual earnings or decrease in earning capacity (that is, work disability) depends not just on functional limitations, but on the worker's personal characteristics (age, education, experience, and other factors), the labor market conditions in which he must compete for employment, and the sources of assistance available to him (including cash benefits, such as workers' compensation and welfare, and other assistance, such as medical care and rehabilitation services).

Age, education, and previous work experience are examples of personal characteristics that might interact with a worker's functional limitation to affect the extent of his work disability. Thus an older worker with a given impairment may have more difficulty finding employment than a younger worker with the same impairment. An employer may be reluctant to pay for retraining the older worker, given his relatively short expected job tenure. Also, a given functional limitation may affect a highly educated worker less than a poorly educated worker, because the more educated worker is likely to rely on mental rather than physical skills for his job market success. Similarly, a worker with greater experience prior to his work-related injury or disease, who can draw on this reservoir of skills to overcome a functional limitation, may also have an easier adjustment.

The relationships among functional limitations, workers' personal characteristics, and work disabilities are complex, and only relatively few hypotheses describing them have been adequately tested in terms of actual labor market experience; great care must therefore be taken in making judgments about them. An important general point, however, and one that appears quite likely on the basis of what we know about
the operation of the labor market from studies by economists, is that any factor that may influence the employability of a worker, whether it be a functional limitation, age, education, or other personal characteristic, will interact with the other factors in determining the earnings experience of that worker.

The actual work disability experienced by workers with functional limitations will also be affected by general labor market conditions. It seems likely that workers with functional limitations will be more adversely affected when labor market conditions deteriorate than workers who are otherwise equivalent except for the functional limitations.

The extent of work disability (and nonwork disability) that results from a particular functional limitation also depends on the sources of assistance for disabled workers. Here it is useful to draw a distinction between work disability in the sense of loss of wage-earning capacity and disability in the sense of loss of actual earnings. The actual loss of earnings for a worker with a given functional limitation will certainly depend in part upon the alternative sources of income for the worker and his family. Thus, as workers' compensation benefits are increased, at least beyond certain limits, a worker's incentive to overcome a given functional limitation and return to work may decline. Because of this effect, disability (earnings loss) may increase as workers' compensation benefits increase. The same relationship can be expected for increased availability of benefits from programs such as disability insurance, welfare, and private pension plans.

We do not want to suggest that we are opposed to increases in benefit levels for these programs. Indeed, one of the purposes of workers' compensation benefits is to reduce the pressures on workers to return to work under onerous conditions. There are complex policy issues (discussed later in this book) concerning the proper trade-off between the work disincentive effects of higher benefits and the purpose of providing workers adequate support in a period of adversity. The main point here is simply that the extent of disability (as measured by earnings loss) in the working age population is affected by the nature of the income programs available to disabled workers.

Disabled workers have sources of assistance other than cash benefits, including medical care and rehabilitation services. At a conceptual level, it is again important to stress that the quality and quantity of these other forms of assistance are interrelated with the extent of work disability and nonwork disability that will occur for a worker with a functional
limitation. For example, a worker whose work-related back injury makes it impossible to continue a previous job involving lifting may, after rehabilitation, find a new job, such as sales work, in which his functional limitation does not affect his work performance.4

Actual Loss of Earnings

Graph 1.1 illustrates an example of the actual loss of earnings resulting from a work-related injury or disease. In this example, wages increased through time from A to B, reflecting the worker's increasing productivity, as well as economywide inflation. At point B, the worker experienced a work-related injury that permanently reduced his earnings. Had he not been injured, his earnings would have continued to grow along the line B-C. Although these potential earnings cannot be observed, they can be estimated from information such as the worker's preinjury earnings, age, occupation, and work experience. The worker's actual earnings in this example dropped from B to D and continued

[Graph 1.1: Economic Consequences of a Work-Related Injury (for Workers with Permanent Disabilities)]
at this zero earnings level until point E, when the worker returned to work at wage level F. Thereafter, actual earnings grew along the line F to G. As this example is drawn, it is assumed that the worker’s actual earnings never return to the potential earnings (line BC) that he would have earned if he had never been injured.

Of course, not all workers with permanent impairments or permanent functional limitations have wage histories that correspond to the example in graph 1.1. Some may return to their old jobs at the wages they would have earned if they had never been injured; others may experience a total loss of earnings after their injuries. The example shown illustrates an intermediate case, in which the worker has a partial but not total loss of earnings.

As previously discussed, permanent disability cases are defined as those for which the worker has consequences that extend beyond the date of maximum medical rehabilitation, or maximum medical improvement (MMI). In a workers’ compensation program, the date of MMI is when the worker’s medical condition is considered stable, so that he can be rated for the purposes of deciding the permanent disability benefits to which he is entitled. For the case illustrated in graph 1.1, MMI occurs after the worker returns to work, which is a typical sequence.

**Questions To Be Answered**

The conceptual framework presented in this chapter raises several questions which must be answered by any program that compensates disability. These include:

(1) Which causes of injuries and diseases (as shown in chart 1.1) should be covered by the program?

(2) Which of the consequences of an injury or disease (as shown in chart 1.2) should be compensable? That is, should temporary consequences or permanent consequences or both be compensable? And which of impairments, functional limitations, work disability, and nonwork disability should be compensable?

(3) What should be the amount of compensation for those consequences that are compensable?

(4) How should compensation benefits be distributed among workers?
(5) How should the delivery system for compensation benefits be evaluated?

The next chapter develops some answers to these questions.

NOTES

1. The glossary of the 1972 National Commission Report, in defining permanent impairment, indicates that permanent means the medical condition must be declared stable or nonprogressive by a physician (p. 137).

2. The definition of permanent impairment contained in the glossary of the National Commission’s Report is virtually identical to the definition in the 1st edition of the AMA Guides (1971, p. iii). The 2nd edition of the AMA Guides (1984, p. 225) defines impairment as “the loss of, loss of use of, or derangement of any body part, system or functions” and permanent impairment as “impairment that has become static or well stabilized with or without medical treatment, or that is not likely to remit despite medical treatment of the impairing conditions.”

3. We rely on the classification system developed by Nagi (1975), which distinguishes among impairments, functional limitations, and disability. The definition of impairment in the AMA Guides (1984, p. 225) includes functional limitations, and thus has only two consequences of an injury or disease: impairment and disability. Another three-consequence classification system published by the World Health Organization (1980) utilizes impairment (which includes functional limitations), disability, and handicap. The Nagi system is the most useful in explaining the operational approaches in workers’ compensation.

4. Medical care and rehabilitation services will also affect the extent of impairment and functional limitation that result from a given injury or disease, a relationship not shown in chart 1.2. Although this is an important relationship, it is largely beyond the scope of this study.