Inventing a Future for Work Disabled Individuals: Strategic Thinking for American Health and Disability Policy to the 21st Century

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Summary

Rapid demographic, social, and technological changes are unsettling current approaches to health and disability care in the United States. Projections indicate rapid growth in disability prevalence for the foreseeable future, making disability management the greatest challenge to health and social services in the late 20th century. And as population life expectancy approaches the limits of the conventional human life span, there will be an irresistible demand to gauge national health on the quality of personal health and functioning rather than by death rates and longevity.

In addition, the barely suppressed sense of frustration that underlies many discussions of disability and health costs reflects a confusion and uncertainty over what we are trying to accomplish by health and disability services and how well we are succeeding.

Using employment assistance to work disabled citizens as a case study of disability management issues, this paper examines:

- the use of futures methods, i.e., techniques to identify trends and predict the future, to define critical issues and suggest alternatives to current strategies,
- "inventing a future" for disabled persons through public policy and rehabilitation science, and
- "the present crisis in health and disability management," and recommendations for strategic thinking about health and disability policy to the year 2000.

A first step in thinking comprehensively about employment of work disabled citizens is to define the extent of the problem in the future. If present trends continue:

- the work disabled population (persons 18 to 64 years) in the United States will grow from 21.9 to 29.5 million persons between 1978 to 2000, a 35% increase against an overall working age population growth of 30.4%,
- the greatest growth will be among persons 35 to 54 years of age, prime working years, and
- 17.1 million persons in the work disabled population will be jobless in 2000, because they are unemployed, have failed to enter the labor force, or (predominantly) have left the labor force.

This prediction of joblessness among disabled persons in 2000 implicitly includes all current public and private sector employment assistance activities for disabled citizens. These findings indicate the limitations, if not outright inadequacy, of present strategies to address joblessness among disabled citizens to the year 2000.

In developing creative strategies to increase employment among disabled persons between 1985 and 2000, a key perspective is that the increasing prevalence and shifting age distribution of the work handicapped population occurs over time. The youngest members of the year 2000 workforce, i.e., persons 18 to 34 years, are today between the ages of 3 and 19 years. The largest group of year 2000 work handicapped (persons 35 to 54 years) are today between 20 and 39 years old.

This perspective recommends:

- a long-range attitude to devising, implementing, and evaluating employment-relevant goals and strategies,
- early interventions to prevent disabling health conditions, but when impairments have occurred, to prevent such conditions from becoming work disabilities, and
- disaggregating the "work disabled population" into distinct markets or categories for employment assistance strategies by age-defined service needs. Market segmentation addresses the heterogeneity of the disabled population.

By this analysis, for example, The Education for All Handicapped Children Act (P.L. 94-142), enacted by the Congress in 1975, is an important strategy for increasing employment opportunities among the younger age group. This strategy has the potential advantage of preparing disabled young people for careers, not merely jobs. Similarly, transitional employment and supported work initiatives may be properly understood within this conceptual scheme.

For persons moving into the age group 34 to 55 years between 1985 and 2000, employer and union-sponsored return-to-work programs (RTW) (job retention) for employees who develop work disabilities are one strategy to reduce the projected numbers of disabled persons not working. Although RTW programs are presently few in number, of the 17.1 million work disabled persons predicted to be jobless by the year 2000, forecasting suggests that between 21.3 and 42.5% might be employed if RTW programs were widely available.

RTW is an example of worksite <u>disability management</u> (DM). DM asks "how are we to manage disability" and is defined as the risk assessment, prevention, early intervention, and rehabilitation of disabling health conditions. Two features distinguish DM from current health care practice: an emphasis on <u>active</u> management of health and disability, rather than insurance protection against medical costs and income loss, and conceptualizing <u>all</u> health and disability services as a <u>system</u> with the common <u>goal</u> of preventing or minimizing health impairments and their effects.

RTW programs have other recommendations. RTW recruits private sector involvement in vocational rehabilitation, thus increasing services without expanding public sector activities. By enabling disabled employees to remain on the job, RTW bypasses the traditional vocational rehabilitation sequence of labor market exit, assessment, preparation, and placement. RTW also reduces or eliminates "work disincentives" (i.e., disability income replacement as a motive for labor force withdrawal) and the lining up of disabled workers at the end of the "labor queue" for hiring.

Two key devices for "inventing a future" for work disabled persons are:

o national disability policy, and

o rehabilitation science.

Disability policy answers the question: What do we wish to accomplish between now and the year 2000 for both disabled citizens and those at risk for developing a disability? At present, national disability policy lacks clearly articulated, time-oriented, quantified goals and ready indices to assess progress in disability management. With regard to employment of disabled persons, a suggested goal is to reduce the level of jobless among disabled persons to the national average by 2000 (from 58.9% in 1978 to 20.8% by 2000). In this context, the forecasted impact of RTW programs (as one employment assistance strategy) assumes immediate relevance.

Central to any discussion of the future are the opportunities of science and technology. Rehabilitation science is lagging in its contribution to the lives of disabled citizens; futures methods, e.g., technological forecasting, are examined as techniques to inform and organize national rehabilitation research priorities.

Through futures studies we might also ask the broadest questions relevant to health and disability management: What may be done to reduce the numbers of persons expected to become disabled? How might this best be accomplished? How are services to be paid for, and how do government actions influence health and rehabilitation service markets? What new resources for disabled persons may be developed? Where this paper focuses on trends in demographics and technology, emerging legislative, political, social, economic, and media trends could be examined for their impact on disability issues.

A third device for "inventing a future" for disabled persons, a joint factor of the other two, and the medium for translating policy into action, is the institutions that deliver health and disability services, including insurance and direct care. This paper argues that this institutional base is in crisis. Although most visible in complaints about costs, this crisis presages the emergence of a new "paradigm" or approach to health and disability care, and is rooted in six historical circumstances and present trends:

- o a shift in expectations of health and disability care from access to services to performance evaluated by quality of personal functioning,
- o a return to active management of public health and disability from merely insuring against the costs and consequences of health impairments,
- o a disconnection of many health and disability benefits from their original rationales,
- o isolation and neglect of rehabilitation and chronic disease by the human services and biomedical establishments,
- o a failure to conceptualize health and disability services as one system, with a common set of goals, and
- o the unprecedented scope of our endeavors and the real possibilities of health and disability care through research and practice advances.

An emerging paradigm for health and disability care that is responsive to these issues follows from expansion of the earlier definition of disability management to a national scale and stresses both a systems approach and active management strategies.

To address the issues raised in this paper, a **Presidential Research Commission on Health and Disability Strategies for the Year 2000** is proposed. This Commission would be charged with fact-finding for strategic thinking for the future of health and disability management in the United States, and answering five critical questions:

1. What are our goals for health and disability management in the United States?
2. Where have we been? Why have we succeeded or failed in achieving expected results?
3. What future trends may change these results, positively and negatively?
4. What are our strategies? How should we invest our resources?
5. How will we monitor the effectiveness of our strategies?

Inventing a Future for Work Disabled Individuals: Strategic Thinking for American Health and Disability Policy to the 21st Century

Preface

The World Rehabilitation Fund, which recently published Paul Cornes' The future of work for people with disabilities: A view from Great Britain, organized a conference in Chicago on 29-30 April 1985 to discuss this book. This paper was one of several invited responses to Cornes' work. The larger subject of the conference was the future of public policies designed to promote the employment of disabled people, and further the future of public vocational rehabilitation services. Although federally-funded vocational rehabilitation has proven a durable program in the United States, given rapid demographic, social, and technological changes, the question arises as to how appropriate and successful these services will continue to be in the future, and what new employment assistance strategies might be implemented to increase the number of working disabled persons.

In subsequently revising this paper for publication, the scope of treatment of this subject was broadened. The central argument developed here is that until health and disability management are seen as one system, with a common set of goals, and the natural boundaries for discussion of all health and disability issues (including apparently unrelated subjects as health research expenditures and occupational disease liability), we will not have a fruitful and satisfying prospectus for health and disability care for the last quarter of the 20th century.

Although this paper was written for a diverse audience of vocational rehabilitation specialists, given its strong emphasis on integrating disability and health policy, and undertaking common strategic thinking for the future, it is intended to be of general interest to other health and disability policy researchers.

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Introduction

In the Preface to his recent monograph The future of work for people with disabilities: A view from Great Britain Paul Cornes quotes this observation of Norman Acton regarding a fundamental weakness of current public policy thinking for employment assistance to persons with work handicaps: "We continue to plan for yesterday to overcome the deficits of a decade ago" (1).

In his book, Cornes extends this critique. He argues that employment assistance planning for disabled persons must consider the future context for service delivery, and examines trends which are both transforming labor markets (e.g., a shift from manufacturing to service jobs) and unsettling accepted concepts of the role of work in people's lives in the emerging "post-industrial societies" of Europe and the United States (2). From this broad discussion of the "future of work," Cornes challenges vocational rehabilitation strategies developed to enable disabled persons seeking jobs in an "industrial society."

The intent of the Cornes monograph may be summarized by this neat phrase from the French poet and essayist Paul Valery (3): "The trouble with our time is that the future is not what it used to be."

Perhaps we plan for the past, as Norman Acton suggests, and are failing to anticipate the future, as Paul Cornes suggests, because the past, although unchangeable, is knowable, where the future, albeit changeable, is unknowable (4). If we do not have a sound basis or method for thinking about the future, it is difficult to proceed with a directed and confident manner.

Thus, in this paper, I take a different tack to thinking about "the future of work for persons with disabilities." Where Cornes takes as his point of departure general description and speculative vignettes of "the future of work" (of which employment of the disabled is a special case), I take as mine the subject of futures methods, i.e., techniques to identify trends and predict the future, and their use to define critical issues and stimulate creative thinking about alternatives to current employment assistance strategies for disabled citizens.

Futures methods are widely used in business and government. Today there are perhaps 100 distinct techniques for future study (5). The diverse applications of futures methods have included modeling of the global ecosystem in the year 2000 (6), economic futures and strategy at the corporate, national, and international levels (7), American military preparedness (8), forecasting new technologies (9),

long term care of the aged (10), and broad matters of employment and manpower (11); the results of such future studies have directly stimulated national policy debates and actions (12).

Remarkably, despite the wide attention given health and disability issues in the United States today, disability policy has been little explored or informed by future study. The small number of relevant papers that have appeared on this subject in the past 17 years (13) have largely focused on a very narrow conception of disability services, either on federally-managed social insurance for disability income (e.g., Social Security) or the Rehabilitation Services Administration's (RSA) vocational rehabilitation program. Moreover, it does not appear that this activity has stimulated a community of scholars, inspired a research tradition, or actually figured in RSA program management (14). Thus, discussion of futures methods is intended to redress these lacuna and demonstrate their power to promote fertile and precise thinking about disability.

Another reason for interest in futures methods is that at best disability policymakers can only "react" to the particular changes Cornes examines; I am more interested in identifying trends that can be directly managed by disability policy. In the initial sections of this paper, the size, changing demographics, and extent of joblessness in the work disabled population are forecast for the year 2000. This data is used as a measure of the "universe of need" for employment assistance, a stimulus for thinking about new options, and a baseline to assess the potential impact of any innovative strategies.

A second theme of this paper is "inventing a future" for work disabled citizens through public policy and rehabilitation science. With Cornes I agree that future thinking is meaningless unless linked to policy actions, and explore the role of futures methods in constructing a rational disability policy (where employment assistance is a case study) for the United States. In thinking about the future, I am also concerned with rehabilitation science which I believe to critical to the future of disabled citizens, yet seriously neglected and falling far short of its contribution.

These remarks together serve as a preface to the broader concerns of this paper. Disability management is the greatest challenge to health and other human services in the last quarter of the 20th century. Projections in this paper find the percentage of the population with disability will increase rapidly for the foreseeable future. And as population life expectancy approaches the limits of the conventional human life span, there will be an irresistible demand to assess national health on measures of quality of personal health and functioning rather than by (as at present) mortality and longevity.

In addition, a barely suppressed sense of frustration that underlies many discussions of disability and health care costs reflects a confusion and uncertainty over what we are trying to accomplish by these services and how well we are succeeding. Using the language of one philosopher of science, these concerns may be indications of a "shifting paradigm" or worldview of health and

disability care, and a press for a new approach that takes cognizance of outdated historical circumstances and speaks to present and future trends.

To address these several subjects -- insightful use of futures methods, "inventing a future for disabled citizens," and refashioning the "jig saw puzzle" of health and disability care -- we need to engage in extensive strategic thinking about health and disability services and research, and ask such questions as: what are our goals? Where have we succeeded and failed? What future trends will affect these services? Where should we invest our resources? To this end, a Presidential Research Commission on Health and Disability Strategies for the 21st Century is proposed.

Several key terms are defined here at the outset; others are defined as they appear in the text. "Work disability" refers to an impairment from a health condition (either congenital or acquired) on the ability to work. The terms "disability" and "handicap" are used interchangeably.

"Employment assistance" refers to any activity, whether government or privately-provided, intended to enable a work disabled person to maintain or obtain a job. "Vocational rehabilitation" (VR), historically meant to develop job-related skills in persons with work histories, is one form of employment assistance; other assistances include, for example, tax credits for hiring handicapped workers and affirmative action. Although most VR services are funded by RSA, VR is not synonymous with this public program; indeed, this paper examines a private sector vocational rehabilitation alternative. "Vocational preparation" refers to job preparation for disabled persons without previous work experience. In the United States, this is one intended consequence of schooling.

Projection of the Size of the Work Disabled Population in 2000

A first step in thinking comprehensively about employment assistance to disabled citizens is to define the extent of the problem in the future. Projections of the work disabled population are recognized in a 1973 General Accounting Office (GAO) report on federally-funded vocational rehabilitation as essential "to properly plan for the size and direction of the program and the resources needed...to reduce the universe of need and assess the program's total impact and its effects on specific groups" (15).

Projections of the work disabled population or "universe of need" for rehabilitation services also provide a valuable illustration of quantitative forecasting methods, i.e., numerical predictions about the future, applied to strategic thinking for the employment of disabled persons (16). Several questions about the work disabled population in the next 15 years define this initial forecasting task:

> What is the size, age distribution, and severity of work handicaps in the work disabled population in the year 2000?

To answer these questions, I start with data on the work disabled and non-work disabled United States population from the 1978 Survey of Disability and Work (17) conducted by the Social Security Administration (SSA). As shown in Table 1, the total number of work handicapped persons in 1978 was 21.9 million (or 17.2% of the total U.S. working age population), of whom 4.9 million were 18 to 34 years old, 3.7 million 35 to 55 years, 5.7 million 45 to 54 years, and 7.5 million 55 to 64 years. The choice of this particular age breakdown follows the organization of the published SSA survey data, but these age categories have a ready correspondence to stages in a work career.

Table 1 also provides data on the numbers of individuals within these age groups divided into categories of severity of work handicap or disability. Self-applied disability status definitions used in the 1978 Survey (18) are: severely disabled: unable to work altogether or unable to work regularly; occupationally disabled: able to work regularly but not at the same work as before onset of disability or unable to work full time; secondary work limitation: able to work full time, regularly, and at the same kind of work but with limitation in the kind or amount of work; persons with reported limitations in keeping house but not in income-producing work are reported in this group.

Table 1 about here

To estimate the work disabled population in the year 2000, the percentage of work disabled persons within each age category in 1978 (termed "work disability prevalence rates" and abbreviated WDPR) are calculated from Table 1. The WDPR for the four age groups are: ages 18 to 34 years, 8.5%, 35 to 44 years, 15.0%, 45 to 54 years, 24.2%, and 55 to 64 years, 37.0%.

Each WDPR is then multiplied by the projection of the U.S. population in the year 2000 for the corresponding age category (19); these projections are shown in Table 2 in the far right column labeled "Total Working Age U.S. Population." For example, the work disabled population in the age group 18 to 34 years is calculated by multiplying the WDPR of 8.5% by the projected 61.0 million persons in this age segment in 2000, which yields an estimate of 5.2 million work disabled persons. Further applications of this procedure generate the remaining projections in Table 2, including breakdown by severity of work disability.

Table 2 about here

Table 3 presents an analysis of the data from Tables 1 and 2 and shows changes in the prevalence of work disability occurring in the 22 years between 1978 and the year 2000. The United States work disabled population is projected to grow from 21.9 million persons in 1978 to 29.5 million persons in 2000, an increase of almost 35%. The data indicate a modest increase, about 4.9%, in the numbers of work

disabled individuals between the ages of 18 and 34, and dramatic increases in the numbers of work disabled between ages 35 and 54, 75.5% and 56.9% respectively, the prime working years. The projected growth of work disability among persons 55 to 64 years is 17.1%.

Table 3 about here

With regard to severity of work disability, comparisons of Tables 1 and 2 show the greatest numerical growth among severely disabled persons, an increase from 10.9 million persons in 1978 to 14.5 million in 2000 (3.7 million persons), a percentage increase of 33.8%. The category "secondary work limitation," although showing a smaller increase in numbers (2.1 million persons) has the largest percentage growth, 34.8%. Again, and as provided in Table 3, the greatest growth in all categories of work handicap severity is among persons 35 to 54 years of age.

Projection of Joblessness among Work Disabled Persons in 2000

The key concern of this paper is the future employment status of persons with work handicaps. Again, the future inquiry is usefully structured around a question:

> What is the projected labor force status of disabled persons in the year 2000?

This projection may be generated by essentially the same procedures described for the work disabled population. Table 4 presents data on the labor force status of work disabled and non-work disabled persons in 1978 (20). The percentage of individuals within each joint age and labor force category is calculated and these percentages are multiplied against population estimates for the year 2000. However, in this trend analysis, the data is then aggregated across age categories. The projected labor force status of work disabled and non-work disabled persons in 2000 is shown in Table 5.

Table 4 about here

Table 5 about here

Table 6 presents an analysis of changes in the labor force participation of work handicapped individuals between 1978 and 2000. Of the 29.5 million work disabled persons in 2000, 13.2 million persons are expected to be in the labor force (a 36.5% increase from 1978), of whom 12.4 million are projected to be employed (+37.4%) and .8 million unemployed (+25.4%). However, the majority of the work disabled population, 16.3 million persons (+33.3%), will not be in the labor force at all.

Table 6 about here

Comments on the Projections of the Work Disabled Population

In summary, if present trends continue, the work disabled population will grow from 21.9 million to 29.5 million persons between 1978 and 2000, a 35% increase compared to an overall growth in the U.S. working age population of 30.5%. The greatest increases will be among persons 35 to 54 years of age, prime working years. According to these projections, 17.1 million persons can be expected to be without paid employment in 2000, because they are unemployed, have failed to enter the labor force, or have withdrawn from the labor force.

This prediction of joblessness among disabled persons in 2000 implicitly includes all current public and private sector employment assistance activities for disabled citizens. These findings indicate the limitations, if not outright inadequacy, of present strategies to address joblessness among disabled citizens to the year 2000.

What factors are responsible for this projected growth in the work disabled population in the United States? The primary underlying force is the "aging" of the "baby boom" generation, i.e., persons born between 1946 and 1964. During this period, the birth rate increased dramatically, then decreased, creating a large cohort of persons who will mature together, a trend demonstrated by increases in the median United States population age.

In 1820, the median age of the population was 16.7 years, i.e., half the population was below this age and half above. By 1940 the median age had risen to 29.0 years. Between 1940 and the early 1980's, the median age was relatively constant between 28 and 30 years (21). Today (1985), the median age is 31.2 years (22), a historic high. By the year 2000, it is projected to be 36.3 years, and in the year 2050, 41.6 years (23). Increasing age is positively correlated with the likelihood of developing a health impairment (24), a necessary (although not sufficent) condition for work disability.

The shifting age distribution is reflected in changes in the relative contribution of each age segment to the work disabled population. As may be calculated from Tables 1 and 2, both the age segments 18 to 34 and 55 to 64 years show relative declines in their share of the work disabled population between 1978 and 2000, -5.0% and -4.5% respectively. The age segments 35 to 44 and 45 to 54 years both show increases, +5.2% and +4.3%.

These analyses also suggest that growth of the work disabled population will continue vigorously after the year 2000. For example, using the projection methodology described above, a work disabled population of 34.1 million persons is predicted in the year 2010; the additional 12.2 million work disabled persons from 1978 is a 55.8% increase.

Please note that these projections of large increases in the number of work disabled people in the United States are based, as described above, on the aging of the population. They do not consider the impact of medical and other technologies. Technological advances may increase the size of the work disabled population as persons survive conditions that would have, in earlier times, killed them, although they survive with disability. Alternatively, new technologies may restore or offset any disabling conditions, and thus work to decrease the size of the work disabled population. As described below, more sophisticated futures research could factor in such variables to predict the future size of the disabled population with greater precision.

Several other observations may be drawn from the data. Close examination of the 1978 labor force status of the work disabled population (Table 4) suggests a widespread misperception of the issues surrounding employment of disabled persons. Disabled people are not so much unemployed, i.e., not working but job ready, as is sometimes contended (25), but rather have left the labor market altogether. As calculated from Table 4, 3.1% of work disabled population are unemployed versus 55.8% who do not regard themselves as in the labor force. Comparable figures for the not work disabled population are 3.7% and 17.4%. Of the work disabled population who are not in the labor force (12.2 million persons), only 7.5% have never been employed; 92.5% report previous employment. Further, despite the presence of work handicaps, 41.1% of the work disabled population are working. The significance of these analyses for fashioning employment assistance strategies for work disabled persons are considered in the next section.

Given the projected numbers of severely work disabled persons, these figures would appear to buttress federal policy concerns and emphasis on this group (26). A more compelling argument for federal focus on persons with severe work disabilities might develop from a trend analysis of labor force status by severity of work disability. and could be readily accomplished by using the same projection procedures.

Paraphrasing Scrooge's question to the "Ghost of Christmas Yet to Come" in Dickens' A Christmas Carol, we may ask: "Are these the forecasts of the things that Will be or are they forecasts of the things that May be, only?" Scrooge answers his own question with these words: "Men's courses will foreshadow certain ends, to which, if persevered in, they must lead. But if the courses be departed from, the ends will change" (27). With a similar spirit, I turn now to thinking about responses to these forecasts.

Thinking about Strategic Responses to the Projections: 1985 - 2000

Before exploring prospective employment assistance strategies for work disabled persons, I begin with the premise that paid employment will continue to be the most effective strategy for disabled persons to generate an adequate income. Despite the reported

plethora of income replacement programs for work disabled persons, including private disability income pension plans and state and federal programs (28), most data indicate that disabled individuals are far poorer than non-disabled individuals (29). For example, about 25.6% of individuals with severe work handicaps were at or below the poverty level in 1978. The comparable figure for non-disabled persons was 7.9% (30). As an indication of what poverty level means, the poverty threshold for one, non-farm person was defined as an income of $3,075 in 1978 (31).

Although the relationship between income and disability is not apparently well-understood (e.g., does disability "cause" low income, or vice-versa) (32), it does appear that disabled persons who are working earn roughly comparable wages to their non-disabled counterparts (33), suggesting the attractiveness of paid employment versus income replacement for providing income to disabled people. This data should also remind us of the intimate and linked relationship of employment assistance and income replacement strategies, and their differing consequences for the "economic independence" of disabled people (34).

What strategies might reduce the 17.1 million disabled persons projected to be without paid employment by 2000? How may futures analysis be used to structure our thinking to answer this question?

In thinking strategically about employment initiatives for disabled persons, one heuristically valuable perspective is that the increasing prevalence and shifting age distribution of the work handicapped population occurs over time. The youngest members of the workforce in 2000, i.e., those who will be in the age range 18 to 34 years, are today, in 1985, between the ages of 3 and 19. The largest group of work handicapped in the year 2000, i.e., individuals between 35 and 54, are today between the ages of 20 and 39.

This perspective has three implications. First, it reminds us that formulating, implementing, and evaluating strategies requires a long range perspective. In this paper, I have chosen a 15 year time frame (i.e., 1985 to 2000), which is popular for business strategic thinking.

Second, most persons in the future work disabled population are not health impaired or work disabled today. We are really dealing with a population at future risk for developing work handicaps. As the work disability prevalence rates (WDPR) presented earlier demonstrate, the risk of work disability increases rapidly with age. This implied "developmental model" suggests that one approach to reducing work disability is preventing health impairments, but once impairments have occurred, preventing them from becoming work disabilities.

Finally, this perspective also recommends thinking about disaggregating the work disabled population and the population at risk for work disabilities into distinct "markets," "segments," or categories for employment assistance strategies by age-oriented

service needs. "Market segmentation" addresses the heterogeneity of the work disabled population; other approaches to segmentation are also possible (35).

In this context, The Education for All Handicapped Children Act (36), enacted by Congress in 1975, can be meaningfully viewed as an employment strategy for the younger age group to the extent it prevents disabilities from leading to unemployment or underemployment. There is data now appearing (37) linking this law to an increasing number of handicapped young people entering the professions. And entering a profession, is, of course, not just getting a job but beginning a career (38). Similarly, transitional employment and supported work initiatives (39) may be properly understood within this larger conceptual scheme.

However, the projections of the previous section indicate that the largest number of persons who will develop work disabilities by the year 2000 are likely in the workforce today. This finding suggests that there will be a major need for services to persons with established work histories who develop work handicaps at some point during their adult lives. This point is further corroborated by the earlier data that suggest about 92% of the present work disabled population have an employment history. Such individuals are the target of return-to-work programs (RTW) (40).

Theory and Practice of Return-to-Work Programs

Although RTW programs are only one innovation for employment assistance to disabled citizens, I will examine them in some detail in the next three sections for several reasons. First, although RTW programs are a subject of growing popularity to both rehabilitation professionals (41) and business and union management (42), they may be unfamiliar to many disability researchers. Second, unlike other possible exemplary employment assistance innovations, sufficent data exists on these programs to allow at least rough prediction of their effects on joblessness among disabled persons. Third, RTW programs are a powerful illustration of workplace disability management, and challenge conventional wisdom about delivery of vocational rehabilitation and employment assistance services.

Return-to-work (RTW) programs are defined here broadly to include all activities directly provided or coordinated by employer or union staff which have as their goal the successful job retention of an employee who develops a health problem that results in a work disability. In practice, these activities include a simple promise to hold an employee's job open until he or she is sufficiently recovered to return-to-work, to worksite accomodations (43), and re-training for a new position within the company, and involve ad hoc management responses to employee disability (44) to defined company policy.

Although presently few in number, RTW or job retention programs are not historically unknown to American business. For example, as anecdotal evidence, Figure 1 is an advertisement (45) that appeared in the October 1946 issue of Foreign Affairs magazine, one of

the most influential and widely-read of the foreign policy journals in the United States. The heading is "It's good to be back with the telephone company" and it reports on the return of Bell Telephone Company employees from the armed services after World War II. Please note the fourth paragraph: "Of the employees who have returned to work, 1488 had some degree of disability. Practically all have been placed on their old jobs or new ones at the same - or a higher - rate of pay."

Figure 1 about here

Although the ability of business to keep disabled employees on the job has apparently existed all along (46) and some employers claim RTW programs dating to the 1940's, even pioneering programs were only "formalized" (47) after federal legislation was enacted in the early 1970's that both prohibited employment discrimination of handicapped individuals and required affirmative action in hiring disabled workers by federal contractors. RTW may reflect another unrecorded aspect of the history of disability services in the United States (48).

However, current business interest in RTW programs may be a a newly motivated interest because of changing social conditions. To the extent that projected increases in the work disabled population are a current trend (49), employees may be incurring work handicaps in large numbers for the first time. The resulting costs of health and disability benefits, combined with recently developed management information that allows reliable employer measurement and forecasting of these costs (50), make reasonable the development of keen employer interest where earlier lacking. RTW programs may thus be viewed as a cost containment strategy for disability fringe benefit costs (51). In practice,however, most employers with exemplary RTW programs appear to regard RTW as an employee benefit (52).

The present literature on RTW programs is broad, journalistic descriptions of a small number of frequently mentioned programs at the larger corporations. Popular examples include RTW programs at the Du Pont Company (53), the 3M Company (54), and the Sears Roebuck Company (55). Although little systematic description or efficacy studies have been undertaken until recently, RTW programs have several theoretical characteristics that suggest they may be a highly effective employment assistance tactic.

First, RTW may be timely rehabilitation. It is increasingly recognized that the shorter the interval between onset of disability and the beginning of rehabilitation (with contact from the first day of illness or injury), the greater the likelihood of a person returning to work (56). Unlike much vocational rehabilitation, RTW may be easily triggered from onset of a health condition, rather than after a significant job absence. In behavioral language, a consequence is that a worker remains "reinforced" for work behavior rather than coming under non-work related reinforcers (such as sitting at home

watching TV, sometimes called the "soap opera syndrome"). Ninty days appears to be the upper time limit to readily engage an employee in RTW (57).

Second, RTW placement strategies are appropriate. To the extent a person returns to the same job and work group, the least demands are made on his adjustment, a variable that appears to correlate with successful return-to-work (58). Finally, RTW appears efficent. RTW short-circuits the usual vocational rehabilitation cycle: labor market exit, assessment, preparation, and placement. By enabling a disabled person to remain on the job, RTW reduces or eliminates work disincentives (i.e., disability income replacement as a motive for labor force withdrawal) (59) and the lining up of disabled people at the end of the labor queue for hiring (60).

Impact of RTW Programs on Joblessness among Disabled Persons in 2000

Forecasting is also concerned with predicting the effects of programs or policies on a variable of interest. A key question about RTW programs thus reads: What might be the impact of RTW programs by the year 2000 on projections of joblessness among disabled persons?

Estimation of the effect of RTW programs on joblessness among work disabled persons is calculated here from an annual impact forecast cumulated over 15 years. This computation begins with incidence estimates of work disability. Davis, writing from private insurance experience (although presenting no rationale for his data), suggests that 450,000 employed people per year suffer a disabling health impairment that might benefit from rehabilitation services (61). However, Hester and Decelles (62), using two independent, well-described methodologies, find a comparable annual incidence of worker disabilities of between 421,345 and 462,964 persons.

As noted earlier, no satisfactory data is available on the RTW success of employer-based RTW programs. However, private sector, for-profit rehabilitation services working with this client population report a 50% return-to-work rate (63); the in-house, RTW program of the Du Pont company claims almost 100% job retention (64).

Thus, if RTW reduces by half the number of persons who might otherwise leave working, a lower limit of impact is approximately 225,000 disabled persons per year, and 3.4 million persons over 15 years will remain employed. If we assume 100% effectiveness of RTW programs, an upper limit of impact is 450,000 persons per year, or 6.8 million employed work disabled persons in 15 years.

To assess the effect of RTW programs on joblessness among disabled persons by the year 2000 (Table 5), the projected 16.3 million persons "not in the labor force" is reduced initially by an estimate of the number of work disabled persons without employment histories. In the 1978 SSA data this was 7.5% ; applied to year 2000 projections, this percentage equals 1.2 million disabled persons not in the labor force in 2000 and without work histories. Subtracted from 16.3 million, 15.1 million persons with work histories are projected

to be absent from the labor force. To this we add .8 million, the number expected to be unemployed, to yield a final value of 15.9 million persons "eligible" for a RTW program.

Applying an estimated impact of RTW of between 3.4 and 6.8 million work handicapped persons between 1985 and 2000, the numbers of work handicapped persons unemployed or not in the labor force in 2000 would be reduced between 21.3 and 42.5% if RTW programs were widely available.

Disability Management and Return-to-Work Programs

As an alternative to disability retirement, RTW programs are an example of disability management (DM) at the worksite. DM asks "how are we to manage disability" and refers to the recognition and identification, risk assessment, prevention, early intervention, and rehabilitation of persons with disabling health impairments (65). DM differs from current health care management in two ways. First, DM fundamentally stresses active management of the causes and consequences of disabling health conditions, rather than simply insuring against health costs and employee income losses. Second, DM conceives of all health care services as part of a system with the common goal of preventing and managing the consequences of ill health.

With regard to active management of health, DM in the business setting may be viewed as subsidiary to the more established corporate function of risk management (66). Risk management is a recent evolution of the insurance purchasing activities of businesses. Historically, businesses purchased insurance to cover a wide variety of hazards, from property protection to product liability. In the early 1970's, with rapidly escalating insurance costs and the unavailability of some kinds of insurance, businesses began to explore alternate liability protection strategies, which included both financial devices (e.g., self-insurance) and active strategies to prevent losses and to reduce the impact of incurred losses. These latter activities are a succinct description of "risk management."

From both perspectives -- active management and a systems approach -- DM provides a conceptual base for other employee assistance programs. For example, both alcohol and "health promotion" programs are means to control disability losses (including both direct costs of benefits and indirect costs of employee recruitment, training, and replacement). RTW programs also reduce personnel losses.

RTW as DM emphasizes the workplace as an important human services and research site. RTW programs challenge conventional wisdom about employment assistance to disabled citizens. RTW programs emphasize structural characteristics of vocational rehabilitation delivery (e.g., timeliness and appropriateness) rather than client characteristics (e.g., education) (67). For example, although work disincentives are a key preoccupation of much research concerned with determinants of "successful" rehabilitation outcomes (68), this research is largely correlational and has neglected actual

studies of disabled worker behavior. Work disincentives may reflect structural defects in rehabilitation service delivery and the simple lack of rehabilitation services (compounded by high costs and low insurance coverage for such services) rather than reflecting an inappropriate dependence on disability income insurance. Much of this discussion is based on assumptions, i.e., theory; the workplace is an excellent site for definitive investigation.

In addition, as noted in an earlier section, 41.1% of the work disabled population are employed. Given the relative paucity of formal job retention programs, how has this been accomplished? Another workplace-based study might examine actuarial prediction of employee disability, and the success of DM strategies in curbing projected rates of disability occurrence. The workplace also provides a base for prospective, longitudinal research, a key lack in rehabilitation studies.

Proper research could also document the experience of employers and employees in companies with RTW philosophy. For example, given the belief that "attitudinal barriers" restrict both employment and the larger social integration of disabled persons, are attitudes and behavior towards disabled persons any different in companies with RTW experience? We might hypothesize, for example, that both institutional and personal experiences accruing from RTW programs might substantially increase positive regard (or at least offset negative stereotypes) of disabled persons.

A further intent of research on RTW is to permit their effective transfer to other employer settings. Detailed description and demonstrations of program value may encourage companies to adopt RTW programs and reduce the institutional learning necessary to successfully introduce programs.

In this regard, RTW programs demonstrate a theory of "knowledge generation" characteristic of clinical disciplines such as rehabilitation. In "clinical disciplines," including such apparently disparate fields (in terms of content) as medicine and education, much knowledge arises from field-generated clinical or practice innovations (69).

However, the essential weakness of clinical disciplines is that procedures and practices often spread without proper evaluation of their efficacy. For example, little evaluation has been done until recently of the indications and benefits of such common surgical procedures as prostatectomy (removal of the prostate in men), cholecystectomy (removal of the gall bladder), and coronary artery bypass surgery. Indeed, contrary to much popular opinion, it appears that widespread utilization of many surgical procedures occurs less because of physician enthusiasm for their fees than physician belief that the procedure represents common or best practice. Such beliefs persist because of the absence of good data about the proper indications and effectiveness of a procedure (70).

Recognizing the need for rehabilitation practice evaluation, a system for capture, validation, and assisted utilization of such innovations is funded by the National Institute of Handicapped Research (NIHR). Entitled the "Rehabilitation Diffusion Network" (RDN), this system is potentially applicable to a wide range of content, e.g., from validation of physical therapy practices to low tech solutions for the daily living needs of disabled persons. Although the current vocational rehabilitation topics of the RDN are relatively traditional (71), it was specifically intended in its original design that it capture workplace RTW programs (72).

Responding to the vocational rehabilitation potential of RTW programs, relevant formal research on RTW is now underway at Michigan State University (73), the Menninger Research and Training Center (74), and in Washington, D.C. (75). But this research also needs to be done at schools of business administration and public policy to sensitize future business management and policy analysts, who are major target groups to be influenced by DM approaches.

RTW programs also appear to offer a unique opportunity to recruit private sector involvement in vocational rehabilitation, and thus broadening the rehabilitation service and research base in the United States without expanding public sector activities. At the same time, however, RTW raises important questions about the appropriateness of human services provided at the workplace, the allocation of this responsibility to employers, and wider issues of human services availability and social equity (76).

DM is relevant to human resources management. A great deal is made these days of human resources management strategies that emphasize employee worth. For example, the book In Search of Excellence (77) has been cited by rehabilitation professionals (78) as evidence of such a human resources approach. A direct test of the excellence of companies to their employees would be a study of their response to employee disability.

For several reasons then -- including cogent theoretical formulation and forecasted impact on joblessness among disabled persons -- RTW programs appear to have significant promise as an innovative employment assistance tactic. The question remains as to incorporating this tactic, and any other new innovations, in the context of current institutions. This issue is addressed below in a discussion of the full array of health and disability services.

The foregoing projections and forecasts presented are exploratory, that is, they consider trends projected from the present to the future. But it is also possible to study how conscious actions designed to affect present trends can create the future. In this regard, I will now examine ways to "invent the future."

Inventing the Future (1): Public Policy

The name of Scrooge from Dickens' A Christmas Carol is a popular metaphor for miserliness. This equation is curious because it misses the real drama of the story, the personal change Scrooge undertakes. Although the story opens with that characterization of Scrooge, after he reviews his past and the values which have directed it, and experiences a foreshadowing of his future, Scrooge becomes a protean man. As the earlier quote suggests, he becomes imbued with hope, and believes his personal future is not simply a fixed continuation of past trends, but amenable to his direction.

Today, given the acceleration of scientific and technological knowledge, a belief in the possibility of managing and directing the future of our social and physical context appears increasingly true and demonstrable. Futurists have a phrase that reflects the premise that the future does merely occur but is the consequence of human choices and actions. That phrase is "inventing the future" (79).

One practical expression of "inventing the future" is national policy-making. Policy-making establishes goals and sets priorities (80). And having established measurable goals, it is possible to directly chart progress. What is the present status of national policies relevant to employing disabled citizens?

We appear to currently have no comprehensive "national policy for disabled persons," or even a more limited employment and income policy, with visible and precise goals and objectives. The National Council for the Handicapped (NCH), charged by Congress with this responsibility, has taken a first step. In August 1983, the NCH submitted a statement to the President regarding a national policy for persons with disabilities listing 22 areas to be addressed (81). This statement is a mix of topics for goal and objective-setting, general operational principles, and broad intentions. The NCH has a report due to the Congress on a national disability agenda in February 1986.

Policy intentions are also expressed in statements by public officals. The President, in remarks at a November 1983 White House ceremony for the signing of a proclamation creating the National Decade of the Disabled, stated: "Today I am establishing a clear national goal. Let us increase the economic independence of every disabled American and let is begin today" (82). Nine goals for the United States during the United Nations Decade of Disabled Persons (1983-1992), including expanded employment opportunities, are expressed in U.S. Congressional Concurrent Resolution 39.

Other elements of a de facto national policy of employment and income include the agendas of relevant agencies, e.g., the Rehabilitation Services Administration (83), and the various laws and regulations that have been passed by the Congress affecting disabled persons (84), and the products of various study groups (85).

What goals might be suggested for employment of disabled persons? David Symington, writing from a Canadian perspective, suggests a goal that he believes is "both achieveable and in keeping with the desires of handicapped people, government, and the public... [is] a reduction in the unemployment level among employable disabled people to the national average by 1990" (86).

Should a similar goal be adopted as United States public policy, then the forecasts of the impact of return-to-work (RTW) programs on disabled joblessness assume immediate relevance. For example, if we take the year 2000 unemployment and labor force nonparticipation projections for non-disabled persons -- 20.8% (see Table 3) -- as a goal for disabled persons, we need a 38.1% reduction from the 1978 joblessness level of 58.9% among disabled persons to meet the goal. RTW programs (as only one strategy) have the potential for having substantial impact on meeting this goal, and the question arises as to the forecasted effects of other strategies.

Parenthetically, this sequence of activities -- establishing a goal and assessing quantitatively the impact of various possible actions on meeting the goal -- is termed "normative forecasting."

In thinking about goal-setting for national disability policy, specifically employment and income policy for disabled persons, the national public health goals of the United States are a highly relevant model. In 1979, the Surgeon General of the United States published his first report on health promotion and disease prevention (87). This report describes 100 years of decreasing mortality among the U.S. population, identifies preventable threats to health, and delineates 15 areas where specific, defined actions can be expected to make further, measurable gains in reducing mortality. The five major goals established in this report were in 1980 translated into quantified objectives for policy (88) and implementation (89).

Establishing both the broad national health goals and specific objectives was not an idle exercise. They have had continuing public policy attention. In a 22 March 1985 press statement that accompanied release of the report Health United States 1984 (90), Margaret Heckler, Secretary of the U.S. Department of Health and Human Services, describes a decrease in the rate of infant mortality:

> And next week, the National Center for Health Statistics will release provisional data for 1984, showing a further decrease in the infant mortality rate to 10.6 per thousand live births last year. This is the most up-to-the-minute national data available, and it represents continued improvement in the infant mortality rate --- 3 percent lower than the 1983 rate.
>
> More important, it shows we continue to move closer to our national goal of no more than 9 infant deaths per thousand live births by the year 1990 (91).

I wish to draw attention to two aspects of the Secretary's statement. First, she refers to a specific health objective and reaffirmed support of it as a national goal. Second, she reports data -- current data -- that monitors progress towards that goal.

Again, note the several steps involved in devising these national health goals and objectives: commissioning of a detailed study to formulate goals, its translation into objectives and implementation plans, and use of current data to monitor progress with regular public reports and discussion. The availability of current data is a critical problem for disability research and policy-making, and many studies, e.g., estimates of the size of the "disabled population," are based on data sets 5 or 10 years old (92).

Goals, however, develop from larger intentions. John Naisbett, a popular futurist writer, speaks of the concept of "strategic vision," which he defines as a "clear image of what you want to achieve, which then organizes and instructs every step towards the goal" (93). National disability policy answers this question: What do we wish to accomplish between 1985 and the year 2000 for both disabled citizens and those at risk for developing a disability? Addressing this question with quantified, time-oriented strategies appears to be a critical challenge for those engaged in formulating and implementing a national disability policy.

Central to this challenge is establishing effective disability management as the standard of health care success in the United States. But to create this perception, we need to move beyond current measures of population health status which are based on mortality (deaths) and neglect morbidity (disability). Indeed, as population life expectancy approaches the upper limits of the conventional human life span, indicators such as "life expectancy without disability" and physical mobility and independence, as measures of quality of health, appear critically needed (94). The percent of the U.S. population (all ages) reporting any activity limitation increased from 11.7% in 1969-70 to 14.6% in 1979, and a limitation in a major activity from 9.1% in 1969-70 to 10.9% in 1979. By a disability standard, one would be hard pressed to claim recent improvement in the health of the U.S. population (95). Forecasting could be used to project disability rates as death rates (96) are now projected.

Evaluations of new health technologies could also include disability outcome criteria. For example, the need for research to compare alternate procedures to treat coronary artery disease, i.e., coronary bypass surgery, percutaneous transluminal angioplasty, and medical management, has been recently raised (97). This issue again reflects the lack of evaluation of practice innovations in clinical disciplines discussed earlier. One evaluative criterion might be the differential probability of return-to-work from each of these approaches. This point is emphasized by recent data from the Metropolitan life insurance company. Metropolitan Life found that of 147 employees who underwent bypass surgery between 1974 and 1978, only 9 were still actively employed at the end of 1983 (98).

Another potential indicator of the social impact of disability is suggested by the "total dependency ratio," a measure of the financial burden that must be borne by workers for persons outside the working age range used by the Social Security Administration. It is defined as the ratio of the total number of persons under age 20 and over age 65 to the number of persons 20 to 64 years (99). By analogy, a "work disabled dependency ratio" is defined here as the number of work disabled persons 18 to 64 years who are unemployed or not in the labor force to the remainder of the total population (employed work disabled persons plus non-work disabled persons). In 1978, the work disabled dependency ratio was 7.9, and by 2000, this ratio rises to 11.4. Another form of dependency ratio measures family burden for aged family members, a measure that might be usefully extended to work disabled persons and their families.

Inventing the Future (2): Science and Technology

Although critical to achieving practical accomplishments, goal-setting and normative forecasting are still restrained uses of the imagination. Although futurists eschew utopian schemes and unfounded optimism, in part, perhaps, a response to a perceived concern about the credibility of their field, this does not preclude imaginative thinking, as the phrase "inventing the future" itself suggests.

Peter Drucker has been quoted as saying: "Results are obtained by exploiting opportunities, not solving problems" (100). What are our opportunities? How might we best exploit them?

I wish to place this discussion in the context of our "historical position" which I believe to be unprecedented in the history of mankind. Cornes makes reference to the impact of "science-based industries" (101) as a key factor in changing occupational patterns. But what are the larger consequences of science, and to what extent is science responsible for our present and accelerating discontinuity from the past? And if we define rehabilitation as the physical or functional restoration of a disabling health impairment for independent living, what opportunities does science offer to reduce the impact of handicaps?

Let us consider the perspective of an historian in the 26th century, i.e., the year 2500 A.D., which is approximately 500 years from today, who is writing about the late 20th century. Although this perspective may seem impossibly distant, think about 500 years past -- the American continent had not yet regular European visits, most of the world was governed by despots without any concept of citizen rights, many believed the universe geocentric, and our daily technologies were at best imaginal.

But still there are major continuities between the past and the present. The fundamentals of the human condition have not changed. People still fall in love today the same way, I expect, as they did in 2500 B.C.. For the 26th century historian, however, world history is divided into two periods, before the Year 2000 and after.

It is at this breakpoint, for example, that studies in regional history -- events in Europe isolated from events in Asia -- finally lose their meaning and coherence (102) -- marking the beginning of a true "world civilization."

But the critical difference occurring in human history and the basis of a great discontinuity is this: in the late 20th century, the fundamental principles of biology, physics, and behavior began to be understood for the first time, and knowledge of these principles began to fundamentally transform the human condition.

For example, in 1953, Watson and Crick discovered the function of DNA in cell nuclei. It is useful to recall that as organisms we are a protein structure and proteins are coded off DNA. Even bones, which we may think as permanent and fixed in some way, are actually mineralized protein and undergo complete replacement of their mineral content every five years. In 1984, insect and small animal work has begun to demonstrate the feasibility of inserting genes into human DNA, which has as one goal the correction of genetic defects (103).

Having established this principle of genetic control, it is thus possible today, for example, to conceive in a fairly detailed way of moving human consciousness from the protein structure called a body, which is the product of millions of years of adaptations to the specific ecological conditions of this planet, including radiation, gravity, temperature, and available nutrients, and creating either new biological structures to house it or moving our phenomenological selves to inorganic structures. Although the technology for this procedure is not yet worked out, nothing essentially mysterious or unknowable would appear to obstruct this scenario (104).

Indeed, this conference is evidence of the success and changes wrought by biomedical science. Spinal cord injury is one dramatic example. During the Battle of Trafalgar in 1805, Lord Nelson, who was wounded by a gunshot, called for the ship's surgeon: "Ah, Mr. Beatty! I have sent for you to say what I forgot to tell you before, that all power of motion and feeling below my chest are gone." Nelson had suffered a spinal cord lesion. The ship's surgeon replied: "My Lord, unhappily for the country, nothing can be done for you." Nelson died within a few hours (105).

Today, a twenty year old male "incomplete quad" can approach 82.3% of the life expectancy he would have had had he not suffered his injury. In a period of 180 years then, individuals with a "high" spinal cord lesion have gone from living only a few hours to living four or more decades. Indeed, current work on cord injury promises to eliminate the condition entirely, which affects 7,000 to 8,000 persons each year, most of them young people (106). This optimism follows from recent research on the pathophysiology of spinal cord lesions that suggest new opportunities for treatment. For example, damage to the cord often exceeds the actual trauma; the trauma appears to activate an enzymatic process that results in further neuron destruction. Curbing this process might limit the extent of spinal cord injury.

And, despite the traditional neurophysiological belief that the adult human nervous system is not capable of extensive repair after damage, recent research indicates, for example, that nerve re-generation in the spine after injury does occur, however, this growth is undirected. Using the analogy of a old-fashioned telephone switchboard, all the wires (nerves) are pulled out (broken) but then inserted (regrow) into the wrong connections. Indeed, recent work with cats has found that small electrical voltages applied after a spinal cord lesion stimulates directed nerve growth, resulting in some restoration of functioning spinal nerve pathways (107).

As another example of the interim position of medical science, and the current limits of medical care, consider the visible and compelling cases of "Baby Does." "Baby Doe" has become a label to identify infants born with profound congenital impairments. Such infants survive in many cases because of medical advances over the past 40 years. But the questions arises, with what kind of quality of life? And what may be done to improve it?

The point here is that increases in survival from acquired disabling health impairments, such as spinal cord injuries, and from congenital defects are the result of new knowledge. And I assert as a key premise that it is more knowledge, more good science, that will provide remedies, and indeed restoration, from disabling conditions.

What is the state of rehabilitation science, i.e., the physical or functional management and restoration of a disabling health impairment for independent living? Although the implications of a world profoundly changed by basic science are exciting, as Maynard Keynes observed in a widely misunderstood remark, "In the long run we are all dead." Rehabilitation addresses today's needs. To rephrase the question, what is the quality and quantity, the rate of progress if you will, of technical and scientific achievements in rehabilitation research today directed to improve the quality of lives of disabled people? And, as the larger issue, how do we construct a federal rehabilitation science policy?

There is no simple answer to these questions, but a study of this subject is presently underway (108). Assessed as a ratio of the the amount of quality work being done to the number of important scientific questions, funding levels and institutional structures, the productivity of rehabilitation researchers, the historical and continuing isolation of rehabilitation from other biomedical and engineering research (109), the state of the field of rehabilitation science is not encouraging.

Science and technology are then themselves a means of inventing the future, by creating innovations to prevent disabling health impairments, functionally restore (either through assistive devices or prosthetic environments) a capacity, or repair the physical basis of a disabling impairment. Futures techniques for identifying trends and predicting the future might usefully inform rehabilitation research priorities. Although a number of agendas for rehabilitation science (110) have been written, little attention has

been directed to forecasting the impact of technological advances on the lives of the disabled and using these forecasts to establish research priorities and directions.

For example, the earlier discussion of spinal cord injury could be written in terms of a future scenario; "scenario" writing is a basic futures technique (111). The year is 1998 and an accident involving a small passenger car and a motorcyclist has occurred on a major highway. The motorcyclist had come up on the right side of the car as the driver began to move into that lane. Although the car went out of control, because the occupants had used their seatbelts and had selected an airbag option, no one was injured. The motorcyclist was not so lucky; he was thrown a considerable distance from his bike. Although he had the latest in helmet technology, which was computer-designed and used the latest in materials technology to maximally spread the impact throughout the helmet and protect the head, he sustained spinal cord damage.

Paramedics arriving on the scene immediately immobilized his head and and placed a portable device around the neck that allowed the regional SCI (spinal cord injury) center computer (200 miles away) to "visualize" and assess the integrity of the cord through nuclear magnetic resonance technology (NMR). Because of the enzymes released by the injury, undamaged areas of the cord were in danger of destruction. The paramedics injected Cord Factor 4 which arrested the process of further neuron damage and stabilized the patient for transport to the hospital. At the hospital, the cord was opened, microsurgical repair was done of some main structures and microelectrodes were inserted to both promote and monitor the progress of healing through a process of directed nerve growth via electrical stimulation (NGES) under computer control. This process involves reciprocal stimulation in both cord directions to achieve appropriate reconnection of spinal neurons.

Six weeks later, although the patient was still hospitalized, he had regained control over major voluntary and involuntary functions. A nerve graft would probably not be needed. He was discharged a month later without any impairment except some slight stiffness that is expected to pass within 6 months.

How did these innovations come about? The car passengers had the advantage of air bag technology. The major obstacle to introduction of this technology was not product cost (although it was often portrayed that way in 1985) but the potential liability of the manufacturer if it does not work (112). With the passage of federal legislation redefining good-faith liability (based on informed consent of product risks) and creating new sources of recovery for persons with disabilities resulting from product injury or failure, primarily through a manufacturer-funded Products Liability Trust Fund (PLTF) (actually set up in response to prevent future bankruptcies such as Manville), this technology had become widely available by 1990.

The spinal cord intervention was based on a 10-year program funded by the National Institute of Handicapped Research (NIHR) beginning in 1987 to aggressively manage spinal cord injuries to prevent them from becoming spinal cord impairments. NIHR scientists, in conjunction with a private biotechnology company, developed Cord Factor 4, a genetically engineered substance, which attaches to receptor sites on the enzyme responsible for neuron destruction. This enzyme was subsequently marketed by the biotechnology company in 1996.

The portable NMR was an advance over the early NMR technologies which required a small room; the very powerful magnets necessary for this device resulted from some defense research. Basic studies of the applicability of NMR to assessment of spinal cord damage was funded by NIHR. The regional SCI center was an outgrowth of a program initially funded through the Rehabilitation Services Administration (RSA) and later NIHR.

The basic studies on nerve growth regeneration were funded by the National Institute of Neurological and Communicative Disorders and Stroke (NINCDS); actual clinical application was perfected by researchers funded by the Veteran's Administration (VA) and NIHR. Although the treatment for the patient was expensive, it was estimated that as he would not need special housing, attendant care, employment assistance, disability income, and other services, plus he would be a regular wage earner, the actual savings (lifetime projection) was several orders of magnitude above the costs. This evaluation gives new meaning to the concept of health and disability "cost containment." In fact, the duration of his hospital stay alone was about half that in 1985. And of course he could lead a unencumbered life.

Although this example is speculative, no treatment is suggested that is not based on current, known principles. However, the challenge of such applications is far from realized.

Other Applications of Future Methods to Health and Disability Issues

To recapitulate, this paper initially applies futures methods, i.e., techniques to identify trends and predict the future, to estimate the size and labor force status of the work disabled population in the year 2000. These forecasts define a "universe of need" for employment assistance, a baseline to measure the effects of any proposed employment strategies, e.g., return-to-work programs, and a quantitative goal for disability policy. Rehabilitation science is discussed as a means of "inventing a future" for disabled persons, and technological forecasting demonstrated to inform rehabilitation research priorities.

Please note that both the specific forecasts and the strategic thinking stimulated by them are conservative examples of forecasting techniques and their power to explore the future of health and disability issues (113). Through futures studies we may ask the broadest questions of relevance to disability prevention and management: What is the total size of the disabled population in the future, and its characteristics (e.g., age structure and distribution

of impairments)? What may be done to reduce the number of persons at risk for disability? How might this be best accomplished? How are services to be paid for, and how do government actions influence health and rehabilitation service markets? What new resources for disabled persons may be developed? How might science and technology decrease (or perhaps increase) the impact of disability on individuals and society? And where this paper focuses on trends in demographics and technology, emerging legislative, political, social, economic, and media trends could be examined for their impact on disability issues (114).

Methods for answering these questions would be improved by use of more sophisticated modeling procedures than employed thus far. For example, work disabled population estimates for 2000 are based on an implicit model that estimates the number of persons unable to work by applying work disability prevalence rates in 1978 to year 2000 population projections. As this this model is based on correlations between age and work disability rate, it is a "first-order" model.

Although one advantage of this model is that it cuts the "Gordian Knot" that appears to frequently confront disability researchers as to what exactly disability and work disability are, and how they should be measured (115), this "first-order model" aggregates underlying component variables responsible for health impairments and disabilities.

A "second-order" or causal model based on variables that "create" work disability, including both health impairments and social factors, would promote creative thinking about strategies that can be directly managed by disability policy; neither population age nor work disability prevalence rates (which are the sum of all health impairments) are obviously those kind of variables.

With regard to the labor force participation projections, no major changes in labor markets were included, which is a key concern of Cornes (116). Futures research could also factor in other variables, e.g., new technologies and changes in "corporate cultures" due to a "generation gap" (117). Also, the precision and detail of the projections could be readily improved by including variables such as sex and race.

Future methods could also be used to think about the effects of other policy and program options. With regard to alternatives to the present RSA-funded vocational rehabilitation system, what would be the impact of closing down this program, either by moving to a voucher system or "privatizing" it? And what might be the forecasted impact of other employment assistance alternatives, e.g., quotas (118), expanded Projects with Industry (PWI) (119), or tax credits for employers hiring handicapped workers (120)?

With regard to government actions that could create markets for rehabilitation services, given that the development of private rehabilitation vendors ("insurance rehabilitation") has been largely stimulated by compulsory worker's compensation rehabilitation laws in

a small number of states (121), what if worker's compensation laws in every state had a compulsory rehabilitation provision (or if worker's compensation was federalized)?

Or in the realm of disability prevention, what if health insurance was re-designed, so that premiums and co-payments were structured as incentives to manage voluntary behaviors linked to disability through chronic disease (122), e.g., smoking (123), control of blood pressure, and consumption of saturated dietary fats, and trauma, e.g., failure to wear seat belts (124)?

In closing on futures methods, it is useful to note their benefits, particularly of quantitative forecasting. They improve the precision of our thinking, impose rigor, and as the logic used to generate forecasts is accessible and open to inspection, allows meaningful debate about methods. Because findings follow from either an implicit or explicit model, they may lead to counter-intuitive results and create new insights. They are flexible and can treat a range of options within identified variables. They are instructive.

Futures research is not without its limitations. Forecasting models, as implied above, depend on theoretical understanding of the phenomena involved and the availability of methods to measure key variables. Forecasting depends on adequate data, a persistent problem in disability research. Futures research also requires substantial resources (125), a point discussed in later in this paper.

The Present Crisis in Health and Disability Care

The underlying topic of this paper is the future of disability in our society, where discussion of employment assistance serves as a case study to demonstrate methods to think precisely about this future. "Inventing a future" for disabled persons is presented in a conceptual equation as the function of two variables: public policy and scientific advances. If present trends remain constant, the shape of the future (with regard to work disability) will follow the projections of the early sections; if innovations are intended, forecasting may be employed to predict the new shape of the future.

A third variable in the equation for "inventing a future" for disabled persons, a joint factor of the first two, and the medium for translating policy, goals, and intentions into action, is the institutions that deliver health and disability services, including insurance and direct care. As briefly raised with regard to RTW programs, a key issue with any new program is linking it (at least strategically) with current institutions. But the health and disability services base is undergoing rapid change, and to be effective, new strategies must anticipate these changes. In this section, I will sketch hypotheses (126) about stresses that are redefining health and disability care and describe what I believe to be an emerging health and disability service model.

Despite unprecedented progress in improving national health (e.g., life expectancy is at a historic high), there appears widespread uncertainty over what we as a nation are trying to accomplish by health and disability care and how well we are succeeding. Examples of expressed dissatisfaction with current health and disability care are frequently found in journals of public policy commentary. These articles often focus on the costs of health and disability services and have a curious tone of barely suppressed frustration. There is a tendency to assign blame, e.g., to physicians for using high cost procedures, disabled people for claiming disability benefits (or even living in some cases), and lawyers for pursuing negligence claims, rather viewing this human behavior as following a reasonable (and rarely obvious) logic. With regard to the former two examples, as described earlier, actual studies of physician behavior indicate that beliefs about "best practice" are the usual standard for treatment prescription rather than fee considerations. And disability pension claims may be directly related to lack of rehabilitation services and structural characteristics of current delivery systems.

And if the projection of an earlier section about growth in the size of the work disabled population is accurate (and given the aging of the population this trend is indisputable) and only a partial estimate of a growing disability-related press on national resources (given that the work disabled are only a fraction of the total disabled population), we can only expect such concerns to increase.

For example, a recent article in The New Republic entitled "A Disability Primer" (127) reviews income replacement programs for work disabled persons. All such programs, including employer disability benefits and federally-managed disability insurances, are together termed "our nation's largest and most expensive benefit system: disability retirement." Through examples, the author attempts to demonstrate the inequity (through unavailability of benefits to many people) and high cost of the programs comprising this "system."

The key focus of this article is, however, on Social Security Disability Income (SSDI). Created by the Congress in 1956, SSDI was originally estimated to cost $859 million by 1980 and serve 1 million persons; in 1984 it actually cost $17.7 billion and served 3.8 million Americans. Several problems in this program are identified: defining disability and thus program eligibility, benefit levels that create work disincentives, and program costs. The author proposes two solutions to these perceived problems: rigorous selection of beneficiaries, including careful evaluation of new applicants and "manageable" reviews of current clients, and critically a "better definition of disability."

There are several problems with this analysis of the "disability retirement system." First, taking the term "system" to mean "components working together to achieve common purposes" (128), the article's author does not specify his purposes, i.e., expectations and goals, for disability retirement, and therefore cannot meaningfully call it a system (129). However, if one purpose is to provide a decent income to persons unable to work, given the data

earlier on poverty among disabled persons, then this "system" may not be properly functioning. Parenthetically, despite the substantial research and debate on poverty in the United States, from all ideological positions (130), there are few studies of the disabled poor.

Second, rather than asking the interesting question of why the SSDI program has grown substantially beyond the expectations of its creators (were the forecasting procedures too unsophisticated, or did events occur -- rising population disability rates, inflation, unemployment, and major legislative program expansions), the author equates program growth with failure.

Further, his solutions are inadequate and outdated. By the time a person is declared eligible for SSDI (and most other disability income replacement insurances), opportunities to aggressively rehabilitate have passed. As implied in comments on RTW programs, appropriate vocational rehabilitation services can have a substantial impact on work disability in the United States, yet such services do not appear to be readily available.

Fourth, the author does not provide estimates (even within an order of magnitude) of the percentage of inappropriate SSDI beneficiaries. It is therefore not possible to forecast the impact of his solutions on program savings (note, however, that SSDI is the most solvent of the Social Security trust funds).

Lastly, the research necessary to "better define disability" is not described. In an earlier section on other applications of futures methods, I suggested that studies of the natural history of disability associated with specific health impairments be undertaken. Further, prospective studies, i.e., long term investigations of persons before the onset of disability, may assist in addressing this issue. Again, the worksite is an excellent location for such research.

These issues are real, important, and timely, and may be further indications of what Douglas Fenderson (131), writing from another perspective and using the conceptual scheme of Kuhn, describes as a "paradigm shift" in rehabilitation service delivery. Kuhn describes a paradigm shift as:

> A paradigm is the sum total of all the shared beliefs, expectations, formulations, techniques, tools, and values which a disciplinary community holds about and uses on its subject. Very often, these can only be poorly verbalized by members working within the discipline, and as a general rule, the paradigm is communicated not just by formal precepts, but by the set of problems and solutions which members of the community both attempt to deal with and which they consider worthy of their attention. The importance of a paradigm to a disciplinary community is that it gives meaning to certain questions and permits approach to certain problems. Problems outside the paradigm seem amorphous; we say we can't get a handle on them. They

> evoke only confusion and ineffectiveness. Sooner or later within a discipline, the accepted solution techniques don't seem to work so well anymore or new problems arise which one cannot so easily deal. As stresses accumulate, the old paradigm gets stretched and modified, but it becomes less and less satisfying, gets more and more convoluted. Out of this state, a new perspective ultimately emerges and the discipline, seeing its world in a new light, settles back down with new problems and techniques. The transition from one worldview to another is discontinuous and constitutes a shift of paradigm (132).

I believe Fenderson's diagnosis that a paradigm shift is underway in health and disability care is correct. To gain insight into the problem, we need to ask: What are the causes of this paradigm shift? And what new paradigm appears to be emerging?

First, there has been a subtle shift in our expectation of health and disability care over the past 35 years. The implicit intent of health and disability care, which includes a continuum from prevention to medical care to income replacement when a person is disabled and unable to work, in the United States from World War II to the present has been to increase supply and access to these services. Evidence of this proposition may be found, for example, in government support to train physicians, build medical facilities, pay for the cost of medical care to the indigent (e.g., Medicaid and Medicare), and provide a base disability income (e.g., Supplemental Security Income and Social Security Disability Income).

Increasing the availability of these services appears to have been a perfectly reasonable post-World War II goal. But as a consequence of both the increased availability and the very real advances in performance (at least at an impressionistic level) of medical care, expectation of health care has moved from access to quality of personal health and functioning. As the data provided earlier suggest, although there have been real declines in the population death rate (and further declines are projected into the future), there have been increases in the prevalence of disability. Perhaps the cited dissatisfaction and confusion stem from this (often poorly articulated) perception. As Fenderson, quoting a colleague, has written of our expectations of public health, "It is a continuing redefinition of the unacceptable" (133).

Second, in the past 35 years there has been a movement from active management of public health to passive protection from the consequences and costs of ill health, i.e., an insurance strategy. The great increase in life expectancy in the United States -- from 47.3 years in 1900 to 74.7 years in 1983 -- was the largely the result of active management of health -- primarily the reduction of infectious disease through public health measures. These measures, particularly sanitation, followed from a scientific understanding of the causes of such diseases (134). Although there is increasing recognition of the importance of control of the causes of chronic disease (135), public health has only barely begun to redefine its solutions to meet changing demands.

Further, many health and disability services are disconnected from their original rationales. For example, a substantial portion of health and disability services and insurances in the United States are funded by employers as benefits. Business-supplied health and disability benefits grew largely out of a compromise during World War II to freeze wages but provide increased employee compensation through fringe benefits (136). This approach may have worked for 40 years, but the inadequacy of such benefits, both in terms of the real coverage they supply employees and the numbers of persons excluded from them (137), yet who must support them indirectly through an increased tax burden (138), and the costs of these benefits to business (139), for both their employees and retirees (140), argue for a re-examination of rationale and design of the business-funded health benefits system. These remarks should not be read as suggesting a withdrawal of business from supplying such benefits, rather the argument here is for a careful re-thinking of their purposes and effects, and their social equity. Although this proposition is illustrated by employer fringe benefits, it has wide applicability to many health and disability services.

A fourth proposition concerns the historical isolation and neglect of disability and rehabilitation by the larger human services and biomedical science establishments. As one illustration, consider the state-federal vocational rehabilitation program administered by the Rehabilitation Services Administration (RSA) as an invisible giant. A one billion dollar a year program, one of the oldest federally-funded social welfare programs, a rich source of historical experience, a potential exemplar of state-federal cooperation, an important national resource, and who outside the field itself ever reads of it? How many persons in the domestic policy establishment in the United States are knowledgeable about it? And how often is it viewed as an alternative to disability retirement?

In the most visible journals of public commentary of our nation -- for example, The New Republic, The Public Interest, Policy Review -- articles rarely appear on this program, despite regular discussion of other disability services, particularly federal disability income insurance. Go into any book store and one can collect armfuls of books on health policy, and on relatively modest programs such as Head Start, and broad discussions of social welfare policy from every ideological perspective and find with no mention of the state-federal program, or of vocational rehabilitation generally.

Despite its 65 year history, there is virtually no historical research on this program within the federal government. By contrast, the U.S. Air Force has 214 historians, the Department of State 22, the Department of Agriculture 16, the Department of the Interior 110, and the National Aeronautics and Space Administration (NASA) 12. Such work is critical to document institutional memory to learn from the past (141).

Parenthetically, ignorance of the history of disability has consequences. A familiarity with the history of disability income insurance might have predicted the rapid growth in the 1970's of SSDI.

The private disability income insurance market was bankrupted in the 1930's by the depression; similarly, the rapid growth of SSDI claimants appears closely related to economic conditions (142).

As another example, consider the field of rehabilitation medicine. In the United States today, only 71 (57%) of the 124 accredited medical schools have rehabilitation medicine programs; 56 of 71 have department status. Thus, less than half (45.2%) of U.S. medical schools have independent departments of rehabilitation medicine.

Further, exposure to rehabilitation practice and chronic disease management by medical students is practically non-existent. According to the 1984 American Association of Medical Colleges (AAMC) annual survey of graduating medical students, only 4.2% had done a clerkship (i.e., had direct experience) in rehabilitation medicine during their 4 years in medical school. By comparison, only two areas had lower clerkship participation figures (adolescent medicine, 2.7%; public health, 2.2%). The most popular clerkship was cardiology (61.5%) (143).

In part, the reasons for the alienation of rehabilitation medicine from the larger biomedical clinical and research communities follow, as described by Berkowitz (144), from a historical lack of appreciation of rehabilitation's philosophy of care by physicians. Since its emergence in the 1940's, rehabilitation has consistently emphasized comprehensive care involving physical, psychological, and social treatments, stressed continuity of care over acute, episodic interventions, and placed health goals in a context of wider social service goals. It was this approach, so much at variance with prevailing concepts of medical care (until very recently), that Berkowitz suggests led to failure of this medical specialty to receive support from the Public Health Service (and by extension the National Institutes of Health and the larger medical community) and subsequent involvement of rehabilitation medicine with public vocational rehabilitation.

As a fifth hypothesis, there has been a resultant <u>failure to conceive of health and disability services and research as one system</u>. Health and disability services have a common set of goals, which include preventing and offsetting the effects of ill health. Because a systems approach has not been taken, health and disability services appear to be a jig saw puzzle in the United States today. It is a jig saw puzzle that has arrived in a brown paper bag, so we are denied even the benefit of the full picture we are trying to assemble. Policymakers and researchers in the United States have begun to lay out the pieces of this jig saw puzzle. However, most discussions appear to be limited to individual pieces, i.e., specific insurances and programs, and fail to quantify such alternatives as health research to cost containment (145), employment assistance to disability retirement, and health promotion as an alternative to demand for all services.

Given that problems seem poorly defined, it is unsurprising then that proposed remedies have an unsatisfying ad hoc quality to them rather than following from a coherent understanding. Indeed, suggested solutions to health and disability cost issues often seem to resemble squeezing on a balloon. Squeeze it in the middle and the ends expand. For example, companies with disability income benefit plans are moving to require employees to file for SSDI benefits, and these benefits assume first dollar against an overall percentage of income replacement (146). This merely transfers the costs of disability income replacement from companies or their insurers to taxpayers, and may actually have the impact of reducing employer incentives for disabled employee return to work.

Such "cost shifting" is not true cost containment. Nor will equitable lower health costs be achieved by reducing inefficencies (147). True cost containment will only come when their is a reduced need for health services, a reduced need that is a function of the improved health of the population. Given the aging of the population, this is likely to prove a formidable task.

As a final proposition, the larger reason for the current state of affairs in health and disability care is that both the scope of our endeavors and the real possibilities of health and disability care are without precedent in human history. We are making history now. If we consider SSDI a 100 million person insurance plan with no control over insured selection (all employed persons are automatically covered), what historical precedents are available to manage a plan of this size? The advances in genetic research and the longevity of persons with spinal cord injury described earlier are further illustrations of this point.

What emerging paradigm or approach to health and disability care is responsive to these issues? The concept of disability management, as described earlier in the corporate context, might be usefully expanded to define the natural boundaries of study of health and disability care. The concept of the "national health and disability management system" (NHDMS) is introduced here as the system or total set of (largely uncoordinated) public and private sector activities designed to prevent or reduce the impact of health impairments on individuals and society (148).

Components of the NHDMS include, for example, relevant employer fringe benefits and assistance programs, including health and disability income insurances and such direct services as health promotion and job retention, occupational injury and disease programs, including worker's compensation and risk regulation (149), the state-federal vocational rehabilitation program, private sector insurance rehabilitation, federal and state-managed social insurance programs, federal laws affirming the civil rights of the disabled, and health and rehabilitation research and technology development.

The concept of the NHDMS invites active management of the causes and consequences of disabling conditions, rather that mere passive insurance or service delivery after they have occurred. It is the need for active management, rather than passive solutions, that

should structure our response to the paradigm shift. Principles of analysis and revision of the NHDMS should also be based on building incentive structures from appropriate allocation of risk and costs to the various parties affected by disability: individuals and families, employers, unions, "markets," and government.

A Proposal for a Presidential Research Commission on Health and Disability Strategies for the 21st Century

How, then, are we to address the challenges of health and disability management in the late 20th century? To mainstream disability research and services and refashion health and disability care as a system based on active management, it appears timely and appropriate to define its goals, create formal mathematical models for forecasting purposes, establish data collection programs, and develop alternatives and innovative solutions. In other words, to engage in the broadest strategic thinking about health and disability services.

In this regard, the establishment of a Presidential Research Commission on Health and Disability Strategies for the 21st Century is proposed here. A Presidential Commission implies an initiative from the White House; the same intent could be realized by a national commission authorized by the Congress, or a major study group within the federal government such as generated the Global 2000 Report to the President, or a funded outside group such as who wrote Healthy People, which serves to establish our present national public health goals.

This Commission would be expected to answer five questions about the NHDMS, which are key activities in strategic thinking (150):

1. What are our goals for health and disability management?

In thinking about goals, we define our expectations of health and disability services. As noted earlier, we currently have explicit public health goals relating to reduction of the incidence of certain health conditions, and a larger number of implicit goals which include access to services and cost containment. These goals need to be better described, and placed in the context of common system. And how do goals impact on each other? With regard to disability, where all goals are only vague and de facto, a key task appears to be articulating these goals and translating them into quantified, time-oriented objectives and implementation plans.

2. Where have we been? Why have we succeeded or failed in achieving expected results?

This question was one focus of the Healthy People report. Infectious disease control, following public health measures which themselves depended upon recognition of disease causation by microorganisms, has had enormous impact on reduction on mortality in the population. Public health achieved spectacular results by active management. What other factors were responsible for these successes? The challenge of the health care for the last quarter of the 20th

century will be disability prevention and management. And what are the lessons of government and private disability programs of the past 85 years?

3. What future trends may change these results, positively and negatively?

This question has, of course, been of keen interest throughout this paper. A key factor in generating the projections of the work disabled population in 2000 is the aging of the U.S. population. What further implications may be drawn from demographic studies, what other trends must we consider to think about health and disability policy creatively? What are the forecasted impact of any innovative care strategies?

4. What are our strategies? How should we deploy our resources? What do we expect of each functional component of the NHDMS?

These are complex and unobvious questions. Addressing them properly requires at least four principles: a long-range perspective, assignment of risk, building incentives, and expectations of scientific research. With regard to risk, we need to examine how disability services and insurances currently assigns risk, i.e., responsibility, for ill health and protection from ill health, and how a rational system might re-assign responsibility. For example, if a person chooses to smoke, should they (or their employer) pay the same health premium as non-smokers? And how can re-assignment of risk build incentive structures? For example, requirements of some state federal worker's compensation laws that make mandatory restoration of earning capacity has increased availability of private sector vocational rehabilitation and creates employer interest in aiding disabled employees.

5. How will we monitor our strategies?

As noted earlier mortality is the current measure of overall success of the present health care system. It may be appropriate to introduce disability and quality of life indicators. How would such data be collected and reported?

Parenthetically, please note that this Commission proposal is fundamentally about fact-finding, and not a stalking horse for greater government involvement in health and disability care (or withdrawal, for that matter). And it is intended to focus carefully on the responsibilities of all affected parties -- individuals, employers, government, and markets.

Such a Commission would require likely at least three years. Its commissioners could be drawn from members of the Congress and Executive, representatives of the private sector (including major

employers with experience in disability management, insurance industry), and academic experts in the relevant research with support from a knowledgeable research staff.

Disability researchers have a unique expertise to contribute to the deliberations of this Commission. The concept of disability management, which may usefully inform systems thinking, is one example. Another asset is familiarity with the history of disability services.

There is ample precedent for the value and opportunity afforded by a Commission. The first use of formal social forecasting by the U.S. Government was in 1929. Shortly after his election as President, Herbert Hoover named a Presidential Research Commission on Social Trends financed by the Rockefeller Foundation. In its report, Recent Social Trends (1933), the Commission described changes in medicine, specifically the "rise of medical specialties, the divergence between research and general practice, and the consequences of geographic concentration [of medical personnel]; [this analysis] if heeded," according to the sociologist Daniel Bell, "...would have gone far to avert the present crisis in the delivery of health care" (151).

More recently, both the Surgeon's General's Report Healthy People in 1979 and the Global 2000 Report to the President in 1980 have stimulated national action and debate on key public policy issues. No less is expected from the this Commission.

Closing Remarks

A great deal of this paper has been concerned with history, i.e., events in time -- past, present, and future. In an earlier section, I spoke of a historian of the future, and his view of the late 20th century. I will close this paper with another prediction about the view from the future of the 20th century by the British historian Arnold Toynbee, a particularly appropriate comment on this date, which is the 10th anniversary since the withdrawal of the American presence in Viet Nam:

"The twentieth century will be remembered chiefly not as an age of political conflicts and technical inventions, but as an age in which human society dared think of the health of the whole human race as a practical objective."

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Table 1 United States Work Disabled Population: 1978 Estimated Numbers by Age and Severity of Work Disability (millions of persons)

Age Segment	Work Disabled	Not Work Disabled	Total Working Age U.S. Population
18-34	4.92	53.28	58.20
35-44	3.72	21.17	24.89
45-54	5.73	17.94	23.67
55-64	7.51	12.79	20.94
Total	21.87	105.18	127.05

Work Disabled Population by Severity of Work Disability (1)

Age Segment	Severely Disabled	Occupationally Disabled	Secondary Work Limitation
18-34	1.55	1.31	2.06
35-44	1.61	0.95	1.16
45-54	2.67	1.43	1.63
55-64	5.05	1.18	1.28
Total	8.92	4.87	6.13

Source: Lando, M.E., Cutler, R.R., Gamber, E. 1978 Survey of disability and work. Data book. Washington, D.C.: U.S. Government Printing office, November 1982, Table 1, p. 1.

Footnote: (1) see text for definitions of severity of work disability.

Table 2 United States Work Disabled Population: Year 2000 Projected Numbers by Age and Severity of Work Handicap (millions of persons)

Age Segment	Work Disabled	Not Work Disabled	Total Working Age U.S. Population
18-34	5.16	55.87	61.03
35-44	6.53	37.21	43.74
45-54	8.99	28.13	37.12
55-64	8.78	14.99	23.77
Total	29.46	136.20	165.66

Work Disabled Population by Severity of Work Disability (1)

Age Segment	Severely Disabled	Occupationally Disabled	Secondary Work Limitation
18-34	1.63	1.37	2.16
35-44	2.82	1.67	2.04
45-54	4.19	2.24	2.56
55-64	5.90	1.38	1.50
Total	14.54	6.66	8.26

Footnote: (1) see text for definitions of severity of work disability.

Table 3 Changes in the Numbers and Percent of Work Disabled Population by Age and Severity of Work Handicap, 1978 - 2000 (millions of persons)

Part A Changes in Numbers by Age Segment

Age Segment	Work Disabled Population 1978	2000	Population Changes Absolute	Percent
18-34	4.92	5.16	.24	4.9%
35-44	3.72	6.53	2.81	75.5
45-54	5.73	8.99	3.26	56.9
55-64	7.50	8.78	1.28	17.1
Total	21.87	29.46	7.59	34.7

Part B Changes in Numbers by Age and Severity of Work Handicap (1)

	Severely Disabled		Occupationally Disabled		Secondary Work Limitation	
Age	Number	Percent	Number	Percent	Number	Percent
18-34	0.08	5.2%	0.06	4.6%	0.10	4.6%
35-44	1.21	75.2	0.72	75.8	0.88	75.9
45-54	1.52	57.0	0.81	56.6	0.93	57.1
55-64	0.86	17.1	0.20	16.9	0.22	17.2
Total	3.67	33.8	1.79	36.8	2.13	34.7

Footnote: (1) see text for definitions of severity of work disability.

Table 4 Labor Force Status of Work Disabled Population: 1978 (millions of persons)

Labor Force Status	Work Disabled	Not Work Disabled	Total U.S. Working Age Population
In Labor Force	9.67	86.88	96.54
Employed	8.99	82.97	91.96
Unemployed	.67	3.90	4.58
Not In Labor Force	12.21	18.30	30.51
Never Employed	.91	1.64	2.54
Previously Employed	11.30	16.66	27.96
Total U.S. Population	21.87	105.18	127.05

Source: Lando, M.E. et al. 1978 Survey of disability and work. Data book. Table 77, p. 196.

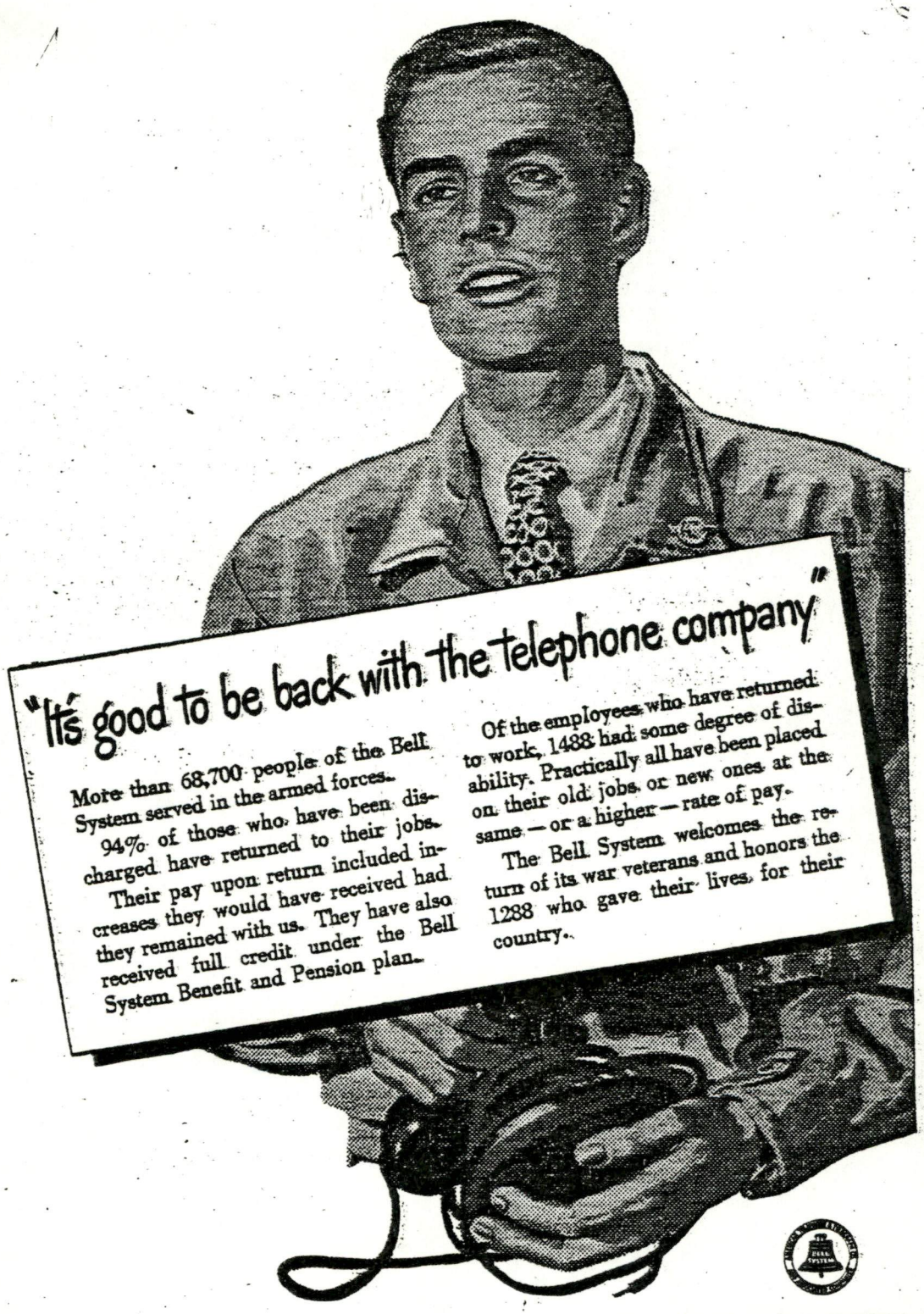
Table 5 Labor Force Status of Work Disabled and Non-Disabled Populations, projections for Year 2000 (millions of persons)

Labor Force Status	Work Disabled	Not Work Disabled	Total Working Age U.S. Population
In Labor Force	13.19	112.52	125.71
Employed	12.35	107.87	120.22
Unemployed	.84	4.65	5.49
Not in Labor Force	16.27	23.68	39.95
Total Population	29.46	136.20	165.66

Table 6 Changes in Labor Force Participation Rates of the Work Disabled Population, 1978-2000

Labor Force Status	Work Disabled Population 1978	2000	Changes in Numbers Absolute	Percent
In Labor Force	9.66	13.19	3.53	36.5%
Employed	8.99	12.35	3.36	37.5
Unemployed	0.67	0.84	0.17	25.4
Not in Labor Force	12.21	16.27	4.06	33.3
Total Population	21.87	29.46	7.59	34.7

Figure 1 Advertisement from Foreign Affairs, October 1946.



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Inventing a Future for Work Disabled Individuals: An American Perspective on the 21st Century

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Inventing a Future for Work Disabled Individuals: An American Perspective on the 21st Century

Summary

This paper describes applications of futures methods, that is, techniques to identify trends and predict the future, to strategic thinking for the employment of disabled persons in the United States between 1985 and the year 2000 and wider issues of national disability policy.

If present trends continue, the work disabled population in the United States will grow from 21.9 to 29.5 million persons from 1978 to 2000, a 35% increase against an overall working age population growth of 30.4%. The greatest growth will be among persons 35 to 54 years of age, prime working years. According to these projections, if no new employment initiatives are forthcoming, 17.1 million persons in the work disabled population (58.1%) can be expected to be without paid employment in 2000, because they are unemployed, have failed to enter the labor force, or (predominantly) have left the labor force.

To develop creative strategies to increase the labor force participation of disabled persons between 1985 and 2000, a key perspective is that the increasing prevalence and shifting age distribution of the work handicapped population occurs over a time frame. The younger members of the year 2000 workforce, i.e., persons 18 to 34 years, are today between the ages of 3 and 19 years. The largest group of year 2000 work handicapped (persons 35 to 54 years) are today between 20 and 39 years old.

Applied to the goal of increasing the labor force participation of disabled persons by the year 2000, this perspective suggests:

- a long-range attitude to devising, implementing, and evaluating employment-relevant goals strategies, and
- disaggregating the "work disabled population" into distinct "markets," or categories for employment-relevant strategies by age-defined service needs.

By this analysis, for example, The Education for All Handicapped Children Act (P.L. 94-142), enacted by the Congress in 1975, may be viewed as an important strategy for increasing employment opportunities among the younger age group. This strategy has the potential advantage of preparing disabled young people for careers, not merely jobs.

For persons moving into the age group 34 to 55 years between 1985 and 2000, employer and union-sponsored return-to-work programs (job retention) (RTW) for employees who develop health impairments are examined as one strategy to reduce the projected numbers of disabled

persons not working. Although RTW programs are presently few in number, of the 17.1 million work handicapped persons predicted to be unemployed or not in the labor force by the year 2000, forecasting suggests that between 21.3 and 42.5% might be employed if RTW programs were widely available.

RTW programs have other recommendations. RTW programs appear to offer a unique opportunity to recruit private sector involvement in vocational rehabilitation, and thus broadening the rehabilitation service base in the United States without expanding public sector activities. By enabling disabled employees to remain on the job, RTW bypasses the traditional vocational rehabilitation sequence of labor market exit, assessment, preparation, and placement. RTW also reduces or eliminates "work disincentives" (i.e., disability income replacement as a motive for labor force withdrawal) and the lining up of disabled workers at the end of the "labor queue" for hiring.

Central to any discussion of the future are the opportunities of science and technology. Rehabilitation science is discussed as a means of "inventing a future" for disabled persons; futures methods are employed as techniques to organize national rehabilitation research priorities.

Although focused on employment as a specific, pressing issue for disabled citizens, this research is properly placed within two larger issues:

- o development of a national health and disability policy, and
- o the emerging concept of a "national health and disability management system (NHDMS)."

Disability policy answers the question: What do we wish to accomplish between now and the year 2000 for both disabled citizens and those at risk for developing a disability? To be effective, key challenges to disability policy include formulating time-oriented, quantified goals, advocating disability rather than mortality as the national health standard, and ending the historical isolation of vocational rehabilitation and rehabilitation science from the larger human services and biomedical research establishments, i.e., the "national health and disability management system" (NHDMS). The concept of NHDMS is introduced in this paper as the system or total set of (presently uncoordinated) public and private sector activities designed to prevent or reduce the impact of health impairments and handicaps on individuals and society. The NHDMS is the natural boundary of any fully coherent analysis of health and disability policy.

To comprehensively examine and refashion the NHDMS, and to explore the potential of medical and assistive technologies on the future of disabled citizens, a **Presidential Research Commission on Health and Disability Strategies for the Year 2000 is proposed.**

Inventing a Future for Work Disabled Individuals: An American Perspective on the 21st Century

Preface

The World Rehabilitation Fund, which recently published Paul Cornes' The future of work for people with disabilities: A view from Great Britain, organized a conference in Chicago on 29-30 April 1985 to discuss his book. This paper was one of several invited presentations. The larger subject of the conference was the future of public policies designed to promote the employment of disabled people, and specifically the future of vocational rehabilitation services. Although federally-funded vocational rehabilitation has proven a durable program in the United States, given rapid demographic, social, and technological changes, the question arises as to how appropriate and successful these services will continue to be in the future, and what new employment strategies might be implemented to increase the number of working disabled people.

In his book, Cornes describes trends transforming labor markets (for example, new technologies) and possibly leading to major revisions of accepted concepts of the role of work in people's lives in the emerging "post-industrial societies" of Europe and the United States. His broad discussion of the "future of work" is the setting for comments on the history of public policies to promote the employment of disabled persons in Britain, and as the basis of challenges for revamping public vocational rehabilitation services and national employment policies that were developed to serve disabled persons seeking jobs in an "industrial society."

In this paper, I take a different tack to thinking about "the future of work for persons with disabilities." Where Cornes takes as his point of departure general description and speculative vignettes of "the future of work" (of which employment of the disabled is a special case), I take as mine the methodology of futures research, particularly quantitative forecasting. Futures methods are widely used in business and government to identify and predict important trends and set numerical goals, but to date, futures techniques have been little applied in health and disability policy formulation and research.

In part, the reason for my approach is that at best disability policymakers can only "react" to the particular changes Cornes examines; I am more interested in factors that can be directly managed by disability policy. I am also concerned with rehabilitation science which I believe to be seriously neglected. With Cornes, I agree that future thinking is meaningless unless tied to policy actions, and discuss the role of futures methods in constructing a rational disability policy for the United States. This paper may then properly be considered a forward to the larger task of fashioning a United States disability policy for the last quarter of the 20th century.

Although this paper was written for a diverse audience of vocational rehabilitation specialists, given its strong emphasis on the integration of vocational rehabilitation and employment policy with other health and human services, and detailed discussions of hypotheses and methodology for further research, it is intended to be of general interest to other health and disability policy researchers.

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Inventing a Future for Work Disabled Individuals: An American Perspective on the 21st Century

Introduction

In the Preface to his recent monograph The future of work for people with disabilities: A view from Great Britain Paul Cornes quotes this observation of Norman Acton regarding a fundamental weakness of current public policy thinking for the employment of persons with work handicaps: "We continue to plan for yesterday to overcome the deficits of a decade ago" (1).

In his work, Cornes extends this critique. He suggests that we must also consider the implications of significant macroeconomic changes currently underway in Britain, which are also occurring in the the United States (2), for example, changes in the availability and kinds of paid employment, to effectively plan public vocational rehabilitation services. The intent of the Cornes monograph may be summarized by this neat phrase from the French poet and essayist Paul Valery: "The trouble with our time is that the future is not what it used to be" (3).

Where Cornes speaks from Britain, the question arises as to the possibilities of work in the future for disabled individuals in the United States, and critically, how to think creatively about new strategies and public policies to promote employment of disabled citizens. Perhaps we plan for the past, as Norman Acton suggests, and are failing to anticipate the future, as Paul Cornes suggests, because the past, although unchangeable, is knowable, where the future, albeit changeable, is unknowable (4). If one does not have a sound basis or method to conduct thinking about the future, it is often difficult to proceed with a directed and confident manner. Therefore, it is on the methodology of strategic thinking, and specifically quantitative forecasting, that I wish to draw particular attention in this paper.

Since the beginning of the twentieth century, formal and disciplined methods for thinking about the future have been developed, and have received wide application in both the public and private sectors. Today there are perhaps 100 distinct techniques for future study (5), i.e., identifying trends and predicting the future. The diverse applications of futures methods have included modeling of the global ecosystem in the year 2000 (6), economic futures and strategy at the corporate, national, and international levels (7), American military preparedness (8), forecasting new technologies (9), long term care of the aged (10), and broad issues of employment and manpower (11); the results of such future studies have directly stimulated national policy debate and actions (12).

Remarkably, despite the wide attention given health and disability issues in the United States today, disability policy has been little explored or informed by future study. The small number of relevant papers that have appeared on this subject in the past 17 years (13) have largely focused on a very narrow conception of

disability services, either on federally-managed social insurance for disability income or the Rehabilitation Services Administration's (RSA) vocational rehabilitation program. Moreover, it does not appear that this activity has stimulated a community of scholars, inspired a research tradition, or actually figured in RSA program management (14).

The initial sections of this paper present several recent projections and forecasts about the United States work disabled population in the year 2000, and discuss their application to innovative strategic thinking about employment of disabled persons over the next 15 years.

These remarks together serve as a preface to the broader concerns of this paper -- which are, "inventing a future" for work disabled persons in the United States, rehabilitation science, developing an American disability policy, and a proposal for a Presidential Research Commission on Health and Disability Strategies for the 21st Century.

Two Forecasts about Work Disabled Persons in the Year 2000

A first step in thinking comprehensively about the paid employment of disabled citizens is to define the extent of the problem in the future. Projections of the work disabled population are recognized as essential in a 1973 General Accounting Office (GAO) evaluation of RSA's vocational rehabilitation program "to properly plan for the size and direction of the program and the resources needed...to reduce the universe of need and assess the program's total impact and its effects on specific groups" (15).

Projections of the work disabled population or "universe of need" for rehabilitation services provide a valuable illustration of quantitative forecasting methods, i.e., numerical predictions about the future, applied to strategic thinking about the employment of disabled persons (16). Several questions about the work disabled population in the next 15 years define this initial forecasting task:

> what is the size, age distribution, and severity of work handicaps in the work disabled population in the year 2000?

To answer these questions, we start with data on the work disabled and non-work disabled United States population from the 1978 Survey of Disability and Work (17) conducted by the Social Security Administration (SSA). As shown in Table 1, the total number of work handicapped persons in 1978 was 21.9 million (or 17.2% of the total U.S. working age population), of whom 4.9 million were 18 to 34 years old, 3.7 million 35 to 55 years, 5.7 million 45 to 54 years, and 7.5 million 55 to 64 years. The choice of this particular age breakdown follows the organization of the published SSA survey data, but these age categories have a ready correspondence to stages in a work career.

Table 1 also provides data on the numbers of individuals within these age groups divided into categories of severe, occupational, and secondary work limitations or handicaps (18).

Table 1 about here

To estimate the work disabled population in the year 2000, the percentage of work disabled persons in 1978 within each age category (which will be called "work disability prevalence rates" and abbreviated WDPR) are calculated from Table 1. The WDPR for the several age groups are: ages 18 to 34 years, 8.5%, 35 to 44 years, 15.0%, 45 to 54 years, 24.2%, and 55 to 64 years, 37.0%.

Each WDPR is then multiplied by the projection of the U.S. population in the year 2000 for the corresponding age category (19); these projections are shown in Table 2 in the far right column labeled "Total Working Age U.S. Population." For example, the work disabled population in the age group 18 to 34 years is calculated by multiplying the WDPR of 8.5% by the projected 61.0 million persons in this age segment, which yields an estimate of 5.2 million persons. Further applications of this procedure generate the remaining projections in Table 2, including breakdown by severity of work disability.

Table 2 about here

Table 3 presents an analysis of the data from Tables 1 and 2 and shows changes in the prevalence of work disability occurring in the 22 years between 1978 and the year 2000. The United States work disabled population is projected to grow from 21.9 million persons in 1978 to 29.5 million persons in 2000, an increase of almost 35%. The data indicate a modest increase, about 4.9%, in the numbers of work disabled individuals between the ages of 18 and 34, and dramatic increases in the numbers of work disabled between ages 35 and 54, 75.5% and 56.9% respectively, the prime working years. The projected growth of work disability among persons 55 to 64 years is 17.1%.

Table 3 about here

With regard to severity of work disability, comparisons of Tables 1 and 2 show the greatest numerical growth among severely disabled persons, an increase from 10.9 million persons in 1978 to 14.5 million in 2000 (3.7 million persons), a percentage increase of 33.8%. The category "secondary work limitation," although showing a smaller increase in numbers (2.1 million persons) has the largest percentage growth, 34.8%. Again, and as provided in Table 3, the greatest growth in all categories of work handicap severity is among persons 35 to 54 years of age.

What factors are responsible for this projected growth in the work disabled population in the United States? The primary underlying demographic force is the aging of the "baby boom" generation, i.e., persons born between 1946 and 1964. During this period, the birth rate increased dramatically, then decreased, creating a large cohort of persons who will mature together, a trend demonstrated by increases in the median United States population age.

In 1820, the median age of the population was 16.7 years, i.e., half the population was below this age and half above. By 1940 the median age had risen to 29.0 years. Between 1940 and the early 1980's, the median age was relatively constant between 28 and 30 years (20). Today (1985), the median age is 31.2 years (21), a historic high. By the year 2000, it is projected to be 36.3 years, and in the year 2050, 41.6 years (22). Increasing age is positively correlated with the likelihood of developing a health impairment (23), a necessary (although not sufficent) condition for work disability. A secondary factor is the decrease in mortality, or death rate, in the population.

The shifting age distribution is reflected in changes in the relative share of each age segment of the work disabled population. As may be calculated from Tables 1 and 2, both the age segments 18 to 34 and 55 to 64 years show relative declines in their share of the work disabled population between 1978 and 2000, -5.0% and -4.5% respectively. The age segments 35 to 44 and 45 to 54 years both show increases, +5.2% and +4.3%.

These analyses further suggest that growth of the work disabled population will continue vigorously after the year 2000. Using the projection methodology described above, a work disabled population of 34.1 million persons is predicted in the year 2010; the additional 12.2 million work disabled persons is a 55.8% increase over 1978.

The key concern of this paper is the future employment status of persons with work handicaps. Again, the future inquiry is usefully structured around a question:

> What is the projected labor force status of disabled persons in the year 2000?

Projections for the year 2000 of the labor force status of the work disabled population are generated by essentially the same procedures described for the work disabled population projections. Table 4 presents data on the overall labor force status of the U.S. population in 1978 (24). In this trend analysis, the percentage of individuals within each age and labor force joint category are calculated and these percentages are multiplied against population estimates for the year 2000. However, in this forecast, the data was then aggregated across age categories. The labor force status of disabled and not disabled persons for the year 2000 is shown in Table 5.

Table 4 about here

Table 5 about here

Table 6 presents an analysis of the changes in the labor force participation of individuals with work handicaps between 1978 and 2000. Of the 29.5 million work disabled persons in the year 2000, 13.19 million work disabled persons are expected to be in the labor force (a 36.5% increase from 1978), of whom 12.4 million are projected to be employed (+37.4%) and .8 million unemployed (+25.4%). However, the majority of the work disabled population, 16.3 million persons (+33.3%), will not be in the labor force at all.

Table 6 about here

In summary, if present trends continue, the work disabled population will grow from 21.9 million to 29.5 million persons between 1978 and 2000, a 35% increase compared to an overall growth in the U.S. working age population of 30.5%. The greatest increases will be among persons 35 to 54 years of age, prime working years. According to these projections, if no new employment initiatives are forthcoming, 17.1 million persons can be expected to be without paid employment in 2000, because they are unemployed, have failed to enter the labor force, or have withdrawn from the labor force.

Several observations may be drawn from these analyses. Close examination of the 1978 labor force status data of the work disabled population (Table 4) suggests a widespread misperception of the issues surrounding employment of disabled persons. Disabled people are not so much unemployed, i.e., not working but job ready, as is often contended (25), but rather have left the labor market altogether. As calculated from Table 4, 3.1% of work disabled population are unemployed versus 55.8% who do not regard themselves as in the labor force. Comparable figures for the not work disabled population are 3.7% and 17.4%. Of the work disabled population who are not in the labor force (12.2 million persons), only 7.5% have never been employed; 92.5% report previous employment. Further, despite the presence of work handicaps, 41.1% of the work disabled population are employed. The significance of these analyses for fashioning employment strategies for work disabled persons are discussed later in this paper.

Given the projected numbers of severely work disabled persons, these figures would appear to buttress federal policy concerns and emphasis on this group (26). A more compelling argument for federal focus on persons with severe work disabilities might develop from an

analysis of the labor force status by severity of work disability. Although not calculated here, this analysis could be readily accomplished using the same forecasting procedures.

Paraphrasing Scrooge's question to the "Ghost of Christmas Yet to Come" in Dickens' A Christmas Carol, we may ask: "Are these the forecasts of the things that Will be or are they forecasts of the things that May be, only?" Scrooge answers his question with these words: "Men's courses will foreshadow certain ends, to which, if persevered in, they must lead. But if the courses be departed from, the ends will change" (27). With a similar spirit, we turn now to the issues involved in thinking about responses to these forecasts.

Strategic Responses to the Forecasts: 1985 - 2000

Before discussing actual innovative strategies for employing work handicapped individuals between now and the year 2000, I begin with the assumption that paid employment will continue to be the most effective strategy for disabled persons to generate an adequate income. Despite the reported plethora of income replacement programs for work disabled individuals, including private disability income pension plans and state and federal programs (28), most data indicate that disabled individuals are far poorer than non-disabled individuals (29). For example, about 25.6% of individuals with severe work handicaps were at or below the poverty level in 1978. The comparable figure for non-disabled persons was 7.9% (30). As an indication of what poverty level means, the poverty threshold for one, non-farm person was defined as an income of $3,075 in 1978 (31).

Although the relationship between economic level and disability status is not apparently well-understood (32), it does appear that disabled individuals who are working earn roughly comparable wages to their non-disabled counterparts (33), suggesting the attractiveness of paid employment versus income replacement for providing income to disabled people. This data should also remind us of the intimate and linked relationship of vocational rehabilitation and income replacement strategies, and their differing consequences for the "economic independence" of disabled people (34).

What strategies might reduce the projected 17.1 million disabled persons without paid employment between now and the year 2000? How may futures analysis be used to structure our thinking to answer this question?

In thinking strategically about employment initiatives for disabled persons, a key perspective is that the increasing prevalence and shifting age distribution of the work handicapped population occurs over a time period. The younger members of the year 2000 workforce, that is, those who will be in the age range 18 to 34 years, are today, in 1985, between the ages of 3 and 19. The largest group of work handicapped in the year 2000, that is, individuals between 35 and 54, are today between the ages of 20 and 39.

This analysis reminds us that formulating, implementing, and evaluating strategies requires a long range perspective. This point also recommends that we need to think further about disaggregating the work disabled population, or more properly, the population at future risk for developing work handicaps, into distinct "markets," "segments," or categories for employment-related strategies, and that one approach to define such markets is by age-oriented service needs (35).

In this context, The Education for All Handicapped Children Act (36), enacted by Congress in 1975, can be meaningfully viewed as an employment strategy for the younger age group to the extent it prevents disabilities from leading to unemployment or underemployment. There is data now appearing (37) linking this law to an increasing number of handicapped young people entering the professions. And entering a profession, is, of course, not just getting a job but beginning a career (38).

However, the projections of the previous section indicate that the largest number of persons who will develop work disabilities by the year 2000 are likely in the workforce today. This finding suggests that there will be a major need for services to persons with established work histories who develop work handicaps at some point during their adult lives. This point is further corroborated by the earlier data that suggests about 92% of the present work disabled population has an employment history. Such individuals are the target of return-to-work programs (39).

Return-to-work (RTW) programs are defined here broadly to include all activities directly provided or coordinated by employer or union staff which have as their goal the successful job retention of an employee who develops a health problem that results in a work handicap. In practice, these activities range from a simple promise to hold an employee's job open until he or she is sufficiently recovered to return-to-work, to re-training for a new position within the company, and from ad hoc management responses to employee disability (40) to defined company policy.

RTW programs have become a subject of recent and increasing interest to both rehabilitation professionals (41) and business and union management (42). Because of this growing popularity and as background to a discussion of RTW as an employment strategy for disabled persons, I will comment on them here briefly.

Although at present RTW are actually few in number, return-to-work or job retention is not historically unknown to American businesses. For example, as anecdotal evidence, Figure 1 is an advertisement (43) that appeared in the October 1946 issue of Foreign Affairs magazine, one of the most influential and widely-read of the foreign policy journals in the United States. The heading is "It's good to be back with the telephone company" and it reports on the return of Bell Telephone Company employees from the armed services after World War II. Please note the fourth paragraph: "Of the

employees who have returned to work, 1488 had some degree of disability. Practically all have been placed on their old jobs or new ones at the same - or a higher - rate of pay."

Figure 1 about here

Although the capacity of business to keep disabled employees on the job has apparently existed all along (44), business until very recently generally did not exercise it. Some employers claim RTW programs dating to the 1940's, however, even these pioneering programs were only "formalized" (45) after federal legislation was enacted in the early 1970's that both prohibited employment discrimination of handicapped individuals and required affirmative action in hiring disabled workers by federal contractors. RTW may reflect another unrecorded aspect of the history of disability services in the United States (46).

However, current business interest in RTW programs may be a new phenomenon or a newly revived interest because of new social conditions. To the extent that the projection of increases of numbers of work disabled in the year 2000 is also a currently operating trend (47), large numbers of employees with health problems and work handicaps may be appearing for the first time. The resulting costs of health and disability income benefits, combined with management information that allows reliable measurement and forecasting of these costs by employers for the first time (48), make reasonable the development of keen employer interest where earlier lacking. Although RTW programs may be viewed as a cost containment strategy for disability income costs (49), most employers with exemplary RTW programs appear to approach RTW as an employee benefit (50).

The present literature on RTW is, however, broad, journalistic descriptions of a small number of frequently mentioned programs at the larger corporations. Popular examples include RTW programs at the Du Pont Company (51), the 3M Company (52), and the Sears Roebuck Company (53). Although little systematic documentation of program descriptions or efficacy has been undertaken until recently, RTW programs have several theoretical characteristics that suggest they may be a highly effective vocational rehabilitation tactic.

First, RTW may be timely rehabilitation. It is well-recognized that the shorter the interval between onset of a health impairment (beginning with contact from the first day of illness or injury) and rehabilitation, the greater the likelihood of a person returning to work (54).

Second, RTW placement strategies are appropriate. To the extent a person returns to the same job and work group, the least demands are made on his adjustment, a variable that appears to correlate with successful return-to-work (55). Finally, RTW appears efficent. RTW short-circuits the usual vocational rehabilitation cycle: labor market exit, assessment, preparation, and placement. By

enabling a disabled person to remain on the job, RTW reduces or eliminates work disincentives (i.e., disability income replacement as a motive for labor force withdrawal) (56) and the lining up of disabled people at the end of the labor queue for hiring (57).

RTW programs also appear to offer a unique opportunity to recruit private sector involvement in vocational rehabilitation, and thus broadening the rehabilitation service base in the United States without expanding public sector activities.

Proper research could document these hypotheses and illuminate the experience of employers and employees in companies with return-to-work philosophy. For example, given the belief that "attitudinal barriers" restrict both employment and larger social integration of disabled persons, are attitudes and behavior towards disabled persons any different in companies with RTW experience? We might hypothesize, for example, that both institutional and personal experience with disabled people accruing from RTW programs might substantially positive (or best, neutral) regard.

A further intent of research on RTW (apart from scholarly investigation) is to permit their ready and effective transfer to other employer settings. Detailed descriptions and demonstrations of program value have the potential to provide convincing evidence to companies to introduce RTW programs and reduce the institutional learning necessary to successfully adopt programs.

In this regard, RTW programs demonstrate a theory of new knowledge generation characteristic of clinical disciplines such as rehabilitation. In "clinical disciplines," including such apparently disparate fields (in terms of content) as medicine and education, much knowledge arises from field-generated clinical or practice innovations (58).

However, the essential weakness of clinical disciplines is that procedures and practice often spread and are adopted without proper evaluation of their efficacy. For example, little evaluation has been done until recently of the indications and benefits of such common surgical procedures as prostatectomy (removal of the prostate in men), cholecystectomy (removal of the gall bladder), and coronary artery bypass surgery. Indeed, contrary to much popular opinion, it appears that widespread utilization of many surgical procedures occurs less because of physician enthusiasm for their fees than physician belief that the procedure represents common or best practice. Such beliefs persist because of the absence of good data about the proper indications and effectiveness of a procedure (59).

Recognizing the need for rehabilitation practice evaluation, a system for capture, validation, and assisted utilization of such innovations is funded by the National Institute of Handicapped Research (NIHR). Entitled the "Regional Rehabilitation Exchange" (RRX), this system is potentially applicable to a wide range of content, e.g., from validation of physical therapy practices to low tech solutions for the daily living needs of disabled persons. Although the current vocational rehabilitation topics of the RRX are

relatively traditional (60), it was specifically intended in its original conceptualization that it be applied to workplace RTW programs (61).

Responding to the vocational rehabilitation potential of RTW programs, relevant formal research on RTW programs is now underway at Michigan State University (62), the Menninger Research and Training Center (63), and in Washington, D.C. (64). But this research also needs to be done at schools of business administration and public policy if it is to have a major impact on the training of future business management and policy analysts, who are, after all, major target groups to be influenced by this research.

Forecasting is also concerned with predicting the effects of programs or policies on a variable of interest. A key question about RTW programs thus reads: What might be the impact of employer and union-sponsored RTW programs on retaining employees who develop work handicaps as active participants in the labor force of the United States who might otherwise either become unemployed or stop working?

Davis, without presenting any rationale for his estimates, suggests that 450,000 employed people per year suffer a disabling health impairment that might benefit from rehabilitation services (65). Hester and Decelles (66), using two independent, well-described methodologies, find an annual incidence of worker disabilities of between 421,345 and 462,964 persons.

Calculating the actual impact of RTW on labor force participation depends on estimates of the success of workplace vocational rehabilitation. Although, as noted earlier, no actual data is available, private sector, for-profit rehabilitation services working with this client population report a 50% success rate (67); the in-house, RTW program of the Du Pont company claims an almost 100% job retention rate (68).

To the extent that timely rehabilitation reduces by half the number of persons who might otherwise leave working, a lower limit of the impact of return-to-work programs is approximately 225,000 disabled persons per year or 3.4 million persons over 15 years. If we assume 100% effectiveness of RTW programs, an upper limit of the impact return-to-work programs might be 450,000 persons per year, or 6.8 million persons in 15 years.

To assess the effect of RTW programs on the labor force status of disabled persons by the year 2000 (Table 5), the projected 16.3 million persons not in the labor force is reduced initially by an estimate of the number of work disabled persons without employment histories. In the 1978 SSA data this was 7.5% ; applied to year 2000 projections, this percentage equals 1.2 million disabled persons not in the labor force in 2000 and without work histories. Subtracted from 16.3 million, 15.1 million persons with work histories are projected to be absent from the labor force. To this we add .8 million, the number expected to be unemployed, to yield a final value of 15.9 million persons "eligible" for a RTW program.

Applying an estimated impact of RTW of between 3.4 and 6.8 million work handicapped persons between 1985 and 2000, the numbers of work handicapped persons unemployed or not in the labor force in 2000 would be reduced between 21.3 and 42.5% if RTW programs were widely available.

The projections and forecasts presented thus far are exploratory, that is, they consider trends projected from the present to the future. But it is also possible to begin with a conception of the future and study how conscious actions designed to affect present trends can create the future. In this regard, we will now examine ways to "invent the future."

Inventing the Future

The name of Scrooge from Dickens' A Christmas Carol is a popular metaphor for miserliness. This equation is curious because it misses the real drama of the story, the personal change Scrooge undertakes. Although the story opens with that characterization of Scrooge, after he reviews his past and the values which have directed it, and experiences a foreshadowing of his future, Scrooge becomes a protean man. As the earlier quote suggests, he becomes imbued with hope, and believes his personal future is not simply a fixed continuation of past trends, but amenable to his direction.

Today, given the acceleration of theoretical knowledge in the physical, biological, and behavioral sciences, a belief in the possibility of managing and directing the future of our social and physical context appears increasingly true and demonstrable. Futurists have a phrase that reflects the premise that the future does merely occur but is the consequence of human choices and actions. That phrase is "inventing the future" (69).

One practical expression of "inventing the future" is national policy-making. Policy-making establishes goals and sets priorities (70). And having established measurable goals, it is possible to directly chart progress. What is the present status of national policies relevant to employing disabled citizens?

We appear to currently have no comprehensive "national policy for disabled persons," or even a more limited employment and income policy, with visible and precise goals and objectives. The National Council for the Handicapped (NCH), charged by Congress with this responsibility, has taken a first step. In August 1983, the NCH submitted a statement to the President regarding a national policy for persons with disabilities listing 22 areas to be addressed (71). This statement is a mix of topics for goal and objective-setting, general operational principles, and broad intentions.

Policy intentions are also expressed in statements by public officals. The President, in remarks at a November 1983 White House ceremony for the signing of a proclamation creating the National

Decade of the Disabled, stated: "Today I am establishing a clear national goal. Let us increase the economic independence of every disabled American and let is begin today" (72).

Other elements of a de facto national policy of employment and income include the agendas of relevant agencies, e.g., the Rehabilitation Services Administration (73), and the various laws and regulations that have been passed by the Congress affecting disabled persons (74), and the products of various study groups (75).

What goals might be suggested for employment of disabled persons? David Symington, writing from a Canadian perspective, suggests a goal that he believes is "both achieveable and in keeping with the desires of handicapped people, government, and the public... a reduction in the unemployment level among employable disabled people to the national average by 1990" (76).

Should a similar goal be adopted as United States public policy, then the calculations of the previous section regarding the impact of return-to-work (RTW) programs assume immediate relevance. For example, if we take the year 2000 unemployment and labor force nonparticipation projections for non-disabled persons -- 20.8% (cf. Table 3) -- as a goal for disabled persons, we need a reduction of 37.3% in the projected labor force nonparticipation level of 58.1% among disabled persons in 2000 to meet the goal. RTW programs (as only one strategy) have the potential for having substantial impact or exceeding this goal.

Parenthetically, this sequence of activities -- establishing a goal and assessing the impact of various possible actions on meeting the goal -- is termed "normative forecasting."

In thinking further about goal-setting for national disability policy, specifically employment and income policy for disabled persons, the national public health goals of the United States are a highly relevant model. In 1979, the Surgeon General of the United States published his first report on health promotion and disease prevention (77). This report describes 100 years of decreasing mortality among the U.S. population, identified present threats to health that are preventable, and delineates 15 areas where specific, defined actions can be expected to make further, measurable gains in reducing mortality. The five major goals established in this report were in 1980 translated into specific and quantified objectives for national policy actions (78) and implementation plans (79).

Establishing both the broad national health goals and specific objectives was not an idle exercise. They have had continuing public policy attention. In a 22 March 1985 press statement that accompanied release of the report Health United States 1984 (80), Margaret Heckler, Secretary of the U.S. Department of Health and Human Services, describes a decrease in the rate of infant mortality:

> And next week, the National Center for Health Statistics will release provisional data for 1984, showing a further decrease in the infant mortality rate to 10.6 per thousand

> live births last year. This is the most up-to-the-minute national data available, and it represents continued improvement in the infant mortality rate --- 3 percent lower than the 1983 rate.
>
> More important, it shows we continue to move closer to our national goal of no more than 9 infant deaths per thousand live births by the year 1990 (81).

I wish to draw attention to two aspects of the Secretary's statement. First, she referred to a specific health objective and reaffirmed support of it as a national goal. Second, she reported data -- current data -- that monitors progress towards that goal.

Again, note the several steps involved in devising these national health goals and objectives: commissioning of a detailed study outlining achievable opportunities, development into objectives, translation into implementation plans, and the availability and use of current data to monitor progress towards the goals with regular public reports and discussion. The availability of current data is a critical problem for disability research and policy-making, and many studies, e.g., estimates of the size of the "disabled population," are based on data sets 5 or 10 years old (82).

Goals, however, develop from larger intentions. John Naisbett, a popular futurist writer, speaks of the concept of "strategic vision," which he defines as a "clear image of what you want to achieve, which then organizes and instructs every step towards the goal" (83) National disability policy answers this question: What do we wish to accomplish between 1985 and the year 2000 for both disabled citizens and those at risk for developing a disability? Addressing this question with quantified, time-oriented strategies appears to be one current challenge for those engaged in formulating and implementing a national disability policy.

Although critical to achieving practical accomplishments, goal-setting and normative forecasting is still a restrained use of the imagination. Although futurists eschew utopian schemes or unfounded optimism, in part, perhaps, a response to a perceived concern about the credibility of their field, this does not preclude imaginative thinking, as the phrase "inventing the future" itself suggests.

Peter Drucker has been quoted as saying: "Results are obtained by exploiting opportunities, not solving problems" (84). What are our opportunities? How might we best exploit them?

I want to place this discussion in the context of our "historical position" which I believe to be unprecedented in the history of mankind. Cornes makes reference to the impact of "science-based industries" (85) as a key factor in changing occupational patterns. But what are the larger consequences of science, and to what extent is science responsible for our present and accelerating discontinuity from the past? And if we define

rehabilitation as the physical or functional restoration of a disabling health impairment for independent living, what opportunities does science offer to reduce the impact of handicaps?

Let us consider the perspective of an historian in the 26th century, i.e., the year 2500 A.D., which is approximately 500 years from today, who is writing about the late 20th century. Although this perspective may seem impossibly distant, think about 500 years past -- the American continent had not yet regular European visitors, most of the world was governed by despots without any concept of citizen rights, many believed the universe geocentric, and our daily technologies were at best imaginal.

But still there are major continuities between the past and the present. The fundamentals of the human condition have not changed. People still fall in love today the same way, I expect, as in 2500 B.C.. For the 26th century historian, world history is divided into two periods, before the Year 2000 and after. It was at this breakpoint, for example, that studies in regional history --events in Europe isolated from events in Asia -- finally lost their meaning and coherence (86) -- and the beginning of a true "world civilization." But the critical difference occurring in human history is this, the basis of the great discontinuity: in the late twentieth century, the fundamental principles of biology, physics, and behavior began to be understood for the first time, and knowledge of these principles began to fundamentally transform the human condition.

For example, in 1953, Watson and Crick discovered the function of DNA in cell nuclei. It is useful to recall that as organisms we are a protein structure and proteins are coded off DNA. Even bones, which we may think as permanent and fixed in some way, are actually mineralized protein and undergo complete replacement of their mineral content every five years. In 1984, insect and small animal work has begun to demonstrate the feasibility of inserting genes into human DNA to correct genetic defects (87).

Having established this principle, it is thus possible today, for example, to conceive in a fairly detailed way of moving human consciousness from the protein structure called a body, which is the product of millions of years of adaptations to the specific ecological conditions of this planet, including gravity, temperature, and available nutrients, and creating either new biological structures to house it or moving our phenomenological selves to inorganic structures.

Indeed, the reason for this conference is evidence of the success and changes wrought by medicine. Spinal cord injury is one dramatic example. During the Battle of Trafalgar in 1805, Lord Nelson, who was wounded by a gunshot, called for the ship's surgeon: "Ah, Mr. Beatty! I have sent for you to say what I forgot to tell you before, that all power of motion and feeling below my chest are gone." Nelson had suffered a spinal cord lesion. The ship's surgeon replied: "My Lord, unhappily for the country, nothing can be done for you." Nelson died within a few hours (88).

Today, a twenty year old male "incomplete quad" approaches 82.3% of the life expectancy he would have had had he not suffered his injury. Indeed, current work on cord injury promises to eliminate the condition entirely, which affects 7,000 to 8,000 persons each year, most of them young people (89).

Several interesting observations have emerged from recent research about the pathophysiology of spinal cord lesions suggesting new opportunities for treatment. The damage to the cord often exceeds the actual trauma; the trauma appears to activate an enzymatic process that results in further neuron destruction.

And, despite earlier beliefs about the adult human nervous system, nerve re-generation in the spine after injury apparently can occur, however, this growth is undirected. Using the analogy of a old-fashioned telephone switchboard, all the wires (nerves) are pulled out (broken) then inserted (regrow) into the wrong connections. Indeed, recent experimental work in cats has found that small electrical voltages applied after a spinal cord lesion stimulates directed nerve growth, resulting in some restoration of functioning spinal nerve pathways (90).

As another example of the interim position of medical science, and of very current interest, consider the visible and compelling cases of "Baby Does." "Baby Doe" has become a label to identify infants born with profound congenital impairments. Such infants survive in many cases because of medical advances.

The point here is that increases in survival from acquired disabling health impairments, such as spinal cord injuries, and from congenital defects are the result of new knowledge. And I assert as a key premise that it is more knowledge, more good science, that will provide remedies, and indeed restoration, from disabling conditions.

What is the state of rehabilitation science, i.e., the physical or functional management and restoration of a disabling health impairment for independent living? Although the implications of a world profoundly changed by theoretical or basic science are exciting, as Maynard Keynes observed in a widely misunderstood remark, "In the long run we are all dead." Rehabilitation addresses today's needs. To rephrase the question, what is the quality and quantity, the rate of progress if you will, of technical and scientific achievements in rehabilitation research today directed to improve the quality of lives of disabled people? And, as the larger issue, how do we construct a federal rehabilitation science policy?

There is no simple answer to these questions, but a study of this subject is presently underway (91). Assessed as a ratio of the the amount of quality work being done to the number of important scientific questions, the funding levels and institutional structures of rehabilitation science, the productivity of rehabilitation researchers, the historical and continuing isolation of rehabilitation research from other health and human services research (92), the state of the field of rehabilitation research is not encouraging.

Science and technology are then themselves a means of inventing the future, by creating innovations to prevent disabling health impairments, functionally restore (either through assistive devices or prosthetic environments) a capacity, or actually restore (repair) the physical basis of a disabling impairment. However, futures techniques for identifying trends and predicting the future might usefully inform rehabilitation research priorities. Although a number of agendas for rehabilitation science (93) have been written, little attention has been directed to forecasting the impact of technological advances on the lives of the disabled and using these forecasts to establish research priorities and directions.

For example, the earlier discussion of spinal cord injury could be written in terms of a future scenario; "scenario" writing is a basic futures technique. The year is 1998 and an accident involving a small passenger car and a motorcyclist has occurred on a major highway. The motorcyclist had come up on the right side of the car as the driver began to move into that lane. Although the car went out of control, because the occupants had used their seatbelts and had selected an airbag option, no one was injured. The motorcyclist was not so lucky; he was thrown a considerable distance from his bike. Although he had the latest in helmet technology, which was computer-designed and used the latest in materials technology to maximally spread the impact throughout the helmet and protect the head, he suffered spinal cord damage.

Paramedics arriving on the scene immediately immobilized his head and and placed a portable device around the neck that allowed the regional SCI (spinal cord injury) center computer (200 miles away) to "visualize" and read the integrity of the cord through nuclear magnetic resonance technology (NMR). Fifteen percent of the cord was damaged, however, because of the enzymes released by the injury, a substantial remainder of the cord was in danger of destruction. Paramedics injected Cord Factor 4 which arrested the process of further damage and stabilized the patient for transport to the hospital. At the hospital, the cord was opened, extensive microsurgical repair was done of some main structures and a large number of microelectrodes were inserted to both promote and monitor the progress of healing through a process of directed nerve growth through electrical stimulation (NGES) under computer control. This process involves reciprocal stimulation in both cord directions to achieve appropriate reconnection of spinal neurons.

Six weeks later, although the patient was still hospitalized, he had regained control over major voluntary and involuntary functions. A nerve graft would probably not be needed. He was discharged a month later without any impairment except some slight stiffness that is expected to pass within 6 months.

How did these innovations come about? The car passengers had the advantage of air bag technology. The major obstacle to introduction of this technology was not product cost (although it was often portrayed that way in 1985) but the potential liability of the manufacturer if it did not work (94). With the passage of federal legislation redefining good-faith liability (based on informed

consent of product risks) and creating new sources of recovery for persons with disabilities resulting from product injury or failure, primarily through a manufacturer-funded Products Liability Trust Fund (PLTF) (actually set up in response to prevent future bankruptcies such as Manville), this technology had become widely available by 1990.

The spinal cord intervention was based on a 10-year program funded by the National Institute of Handicapped Research (NIHR) beginning in 1987 to aggressively manage spinal cord injuries to prevent them from becoming spinal cord impairments. NIHR scientists, in conjunction with a private biotechnology company, developed Cord Factor 4, a genetically engineered substance, which aggressively attaches to receptor sites on the enzyme responsible for neuron destruction. This enzyme was subsequently marketed by the biotechnology company in 1996.

The portable NMR was an advance over the early NMR technologies which required a small room; the very powerful magnets necessary for this device resulted from some defense research. Basic studies of the applicability of NMR to assessment of spinal cord damage was funded by NIHR. The regional SCI center was an outgrowth of a program initially funded through the Rehabilitation Services Administration (RSA) and later NIHR.

The basic studies on nerve growth regeneration were funded by the National Institute of Neurological and Communicative Disorders and Stroke (NINCDS), and actual clinical application was perfected by researchers funded by the Veteran's Administration (VA) and NIHR. Although the treatment for the patient was expensive, it was estimated that as he would not need special housing, attendant care, employment assistance, disability income, and other services, plus he would be a regular wage earner, the actual savings (lifetime projection) was several orders of magnitude above the costs. This evaluation gives new meaning to the concept of health and disability "cost containment." In fact, the duration of his hospital stay alone was about half that in 1985. And of course he could lead a unencumbered life.

Although this example is speculative, no biomedical intervention is suggested that is not based on current, known principles. However, the challenge of such applications is far from realized. This issue is addressed in the next and concluding section.

A Proposal for a Presidential Research Commission on Health and Disability Strategies for the 21st Century

To recapitulate, this paper applies several futures methods, i.e., techniques to identify trends and predict the future, to develop innovative strategies to promote paid employment for disabled persons and inform a wider national disability policy. Forecasting procedures were used to estimate the size and labor force status of the work disabled population in the year 2000. These forecasts define both a "universe of need" for employment assistance and a baseline to measure the effects of any proposed employment strategies on disabled

joblessness by 2000, e.g., return-to-work programs. Rehabilitation science is discussed as a means of "inventing a future" for disabled persons; futures methods are employed as techniques to organize national rehabilitation research priorities.

Please note that both the specific forecasts and the strategic thinking stimulated by them described in this paper are conservative examples of forecasting techniques and their power to explore the future of health and disability (95). Among possible lines of investigation, projections of the work disabled population and forecasts of the benefits of innovative employment strategies would be improved by use of more sophisticated modeling procedures.

For example, the projections of the work disabled population in the year 2000 are based on an underlying model that essentially estimates the number of persons unable to work because of a health impairment by applying work disability prevalence rates in 1978 to projections of the year 2000 population. This model is a "first-order model," and fundamentally based on correlations between population age and age-associated rates of work disability.

Although one advantage of this model is that it cuts the "Gordian Knot" that appears to frequently confront disability researchers as to what exactly disability and work disability are, and how they should be measured (96), this "first-order model" aggregates underlying component variables that are responsible for population change and the occurrence of health impairments and disabilities. A "second-order" or causal model based on variables that "create" work disability, would promote creative thinking about strategies that might directly influence such causal variables.

The prediction in this paper of a large increase in the number of disabled persons is based entirely on the aging of the population and does not consider the impact of medical and other technologies on the work disabled population. As hypotheses for further research, technology may increase survival of individuals from previously mortal conditions, albeit with disability, and increase the size of the work disabled population over predicted numbers. Alternatively, new technologies may restore or offset any disabling conditions, and thus work to decrease the size of the disabled population.

With regard to the labor force participation of disabled persons, no major changes in labor markets were included. Also, the precision of the various estimates could be readily improved by considering variables such as sex, race, education.

Future methods could also be used to think about the effects of other specific policy or program options. With regard to alternatives to the present state-federal vocational rehabilitation system, what would be the impact of closing down the state-federal program, either by moving to a voucher system or "privatizing" it?

With regard to government actions that could create markets for rehabilitation services, given that the development of private rehabilitation vendors ("insurance rehabilitation") has been largely

stimulated by compulsory worker's compensation rehabilitation laws in a small number of states (97), what if worker's compensation laws in every state had a compulsory rehabilitation provision (or if worker's compensation was federalized)?

Or in the realm of disability prevention, what if health insurance was re-designed, so that premiums could be used as incentives to reduce voluntary behaviors that increase the probability of disability due to chronic disease, e.g., smoking, failure to control blood pressure, consumption of saturated dietary fats (98), and trauma, e.g., greater failure to wear seat belts (99)?

And what are the opportunities of science to decrease (and perhaps increase) the impact of disability on individuals and society?

Through futures studies we might have asked the broadest questions of relevance to disability prevention and management: What may be done to reduce the numbers of persons expected to become disabled? How might this best be accomplished? How are services to be paid for, and how do government actions influence health and rehabilitation service markets? What new resources for disabled persons may be developed?

Although forecasting technology is capable of these issues, futures research of such magnitude requires substantial resources, a point discussed in later in this section.

In the previous section, the importance of quantified, time-oriented goals for disability policy and the need for new sources of data to monitor any movement towards goals is described. However, disability researchers and professionals face several other challenges in creating disability policy, and have unique, but largely ignored, insights to contribute to the vigorous debate on health services currently underway in the United States. In the remainder of this section, I will discuss three challenges to creating a national disability policy: increasing the body of relevant scholarship, visibility, and ending the isolation of disability research and services from the larger health research and human services establishments, through actions designed to "mainstream" disability issues.

A first challenge to disability policy is <u>increasing the body of relevant scholarship</u>. In part, this issue involves establishing the important questions disability policy research wishes to address and its methodological perspectives. For example, the issue of the economic status of disabled persons was raised earlier with regard to the significance of paid employment. Research on poverty in the United States, a matter of present, close examination by persons from all positions in the political universe (100), rarely appears to study or consider the disabled poor. Further, as discussed earlier, the causal relation of "disability" to "poverty" is not apparently well-formulated.

As another example, consider "work disincentives" (i.e., high disability income replacement reduces worker motivation to work) which are a key preoccupation of much research concerned with determinants of "successful" rehabilitation outcomes (101). Work disincentive research is largely correlational and has neglected actual studies of disabled worker behavior. As implied in the earlier discussion of RTW programs, work disincentives may reflect structural defects in rehabilitation service delivery and the simple lack of rehabilitation services (compounded by high costs and low insurance coverage for such services) rather than reflect a misuse of disability income insurance.

Further, much of the discussion of RTW programs is based on assumptions, i.e., theory, and could provide a rich basis for detailed research. The corporate workplace is an excellent site for such research, and also provides an opportunity for longitudinal research, a key lack in rehabilitation investigations.

As to methodological approaches for disability research, an emphasis of this paper is, of course, on the importance and value of future study to structure our thinking in strategically creative ways.

A related challenge to disability policy is then to develop innovative strategies to manage health impairments and handicaps. Employer and union-sponsored workplace-based return-to-work (RTW) programs are a visible and useful example of an innovative vocational rehabilitation tactic, but are only one example.

A second challenge to disability policy is visibility, that is, to establish effective disability management as the standard of health care success in the United States. But to create this perception, we need to move beyond current measures of population health status are based on mortality and neglect morbidity. Indeed, as the upper limits of the conventional human life span are approached as population life expectancy, indicators such as "life expectancy without disability" and physical mobility and independence, as measures of quality of health, appear critically needed (102). The percent of the U.S. population (all ages) reporting any activity limitation increased from 11.7% in 1969-70 to 14.6% in 1979, and a limitation in a major activity from 9.1% in 1969-70 to 10.9% in 1979. By a disability standard, one would be hard pressed to claim improvement in the health of the U.S. population (103). Forecasting could be used to project disability rates as death rates (104) are now projected.

Evaluations of new health technologies should also include disability outcome criteria. For example, the need for research to compare alternate procedures to treat coronary artery disease, i.e., coronary bypass surgery, percutaneous transluminal angioplasty, and medical management, has been recently raised (105). This issue again reflects the weakness of practice innovations in clinical disciplines discussed earlier. One evaluative criterion might be the differential probability of return-to-work from each of these approaches. This point is emphasized by recent data from the Metropolitan life

insurance company. In a recent study, Metropolitan Life found that of 147 employees who underwent bypass surgery between 1974 and 1978, only 9 were still actively employed at the end of 1983 (106).

Another potential indicator for the social impact of disability is suggested by the "total dependency ratio," a measure of the financial burden that must be borne by workers for persons outside the working age ranged and used by the Social Security Administration. It is defined as the ratio of the total number of persons under age 20 and over age 65 to the number of persons 20 to 64 years (107). By analogy, a "work disabled dependency ratio" is defined here as the number of work disabled persons 18 to 64 years who are unemployed or not in the labor force to the remainder of the total population (employed work disabled persons plus non-work disabled persons). In 1978, the work disabled dependency ratio was 7.9, and by 2000, this ratio rises to 11.4. Another form of dependency ratio measures family burden for aged family members, a measure that might be usefully extended to work disabled persons and their families.

A third challenge to disability policy studies is to end the historical isolation of disability and rehabilitation from the larger human services and biomedical science establishments. This challenge follows from a personal perception of the state-federal vocational rehabilitation program administered by the Rehabilitation Services Administration (RSA) as an invisible giant. A one billion dollar a year program, one of the oldest federally-funded social welfare programs, a rich source of historical experience, a potential exemplar of state-federal cooperation, an important national resource, and who outside the field itself ever reads of it? How many persons in the domestic policy establishment in the United States are knowledgeable about it?

In the most visible journals of public commentary of our nation -- for example, The New Republic, Commentary, The Public Interest, The Washington Monthly, The New York Review of Books, Policy Review, the New Yorker -- articles rarely appears on this program, despite regular discussion of other disability services, particularly federally-managed insurance for disability income. Go into any book store and one can collect armfuls of books on health and health policy, and on relatively modest programs such as Head Start, and broad discussions of social welfare policy from every ideological perspective and find with no mention of the state-federal program.

Even within the federal government there is virtually no historical research on this program. The U.S. Air Force has 214 historians, the Department of State 22, the Department of Agriculture 16, the Department of the Interior 110, and the National Aeronautics and Space Administration (NASA) 12. No governmental historian is involved with RSA. Such work is critical to document institutional memory to learn from the past (108).

Indeed, the cause of this "invisibility" in the isolation of rehabilitation and disability generally from the human service and science establishments appears to be homologous with the cause of the unrealized potential of rehabilitation science alluded to earlier (109).

These several challenges to disability policy studies -- creating measurable, time-oriented goals, increasing scholarship, creating visibility, and ending the isolation of disability research and services from the larger human services and biomedical research establishments -- can be properly appreciated only within the context of the wider array of health and disability issues in the United States.

Health and disability issues are a jig saw puzzle in the United States today. It is a jig saw puzzle that has arrived in a brown paper bag, so we are denied even the benefit of the full picture we are trying to assemble. Policymakers and researchers in the United States have begun to lay out the pieces of this jig saw puzzle. However, most discussions appear to be limited to individual pieces, i.e., specific insurances and programs, without reference to the natural boundaries of the subject, or to quantifying such relations as health research to cost containment (110), vocational rehabilitation to disability income insurance, and health promotion as an alternative to need for all services.

Proposed solutions to health and disability cost issues seem to resemble squeezing on a balloon. Squeeze it in the middle and the ends expand. For example, companies with disability income benefit plans are moving to require employees to file for Social Security Disability benefits, and these benefits assume first dollar against an overall percentage of income replacement (111). Of course, this merely transfers the costs of disability income replacement from companies or their insurers to taxpayers, and may have the impact of reducing employer incentives for the return to work for their employees.

One reason for this puzzle may be that current services are disconnected from the the original rationales for providing many health and disability benefits. For example, a substantial portion of health and disability services and insurances in the United States are funded by employers as fringe benefits.

Business-supplied health and disability benefits grew largely out of a compromise during World War II to freeze wages but provide increased employee compensation through fringe benefits (112). This approach may have worked for 40 years, but the inadequacy of such benefits, both in terms of the real coverage they supply employees and the numbers of persons excluded from them (113), yet who must support them indirectly through an increased tax burden (114), and the costs of these benefits to business (115), argue for a re-examination of rationale and design of the business-funded benefits system. These remarks should not be read as suggesting a withdrawal of business from supplying such benefits, rather the argument here is for a careful re-thinking of their purposes and effects, and their social equity.

However, the larger reasons for the current state of affairs may be that both the scope of our endeavors and the real possibilities of health and disability care are without precedent in human history. The advances in genetic research and the longevity of persons with spinal cord injury described earlier are concrete illustrations of this point.

Yet health and disability services have a common set of goals, and the time has come to put the implicit system together formally by articulating these goals. The concept of the "national health and disability management system" (NHDMS) is introduced here as the system or total set of (largely uncoordinated) public and private sector activities designed to prevent or reduce the impact of health impairments and society (116).

Components of the NHDMS include, for example, relevant employer fringe benefits and assistance programs, including health and disability income insurances and such direct services as health promotion and job retention, occupational injury and disease programs, including worker's compensation and risk regulation (117), the state-federal vocational rehabilitation program, private sector insurance rehabilitation, federal and state-managed social insurance programs, federal laws affirming the civil rights of the disabled, and health and rehabilitation research and technology development.

The concept of disability management underlies the NHDMS. It is a concept that originated in the corporate context and refers to the recognition and identification, risk assessment, prevention, early intervention, and rehabilitation of disabling conditions (118). The NHDMS is an application of the same concepts to the total set of insurances, services, and other activities provided from all sources on the national scale.

The NHDMS fundamentally stresses active management of the causes and consequences of disabling conditions, rather that mere passive insurance or service delivery after they have occurred. Principles of analysis and revision of the NHDMS should be based on building incentive structures from appropriate allocation of risk and costs to the various parties affected by disability: individuals and families, employers, unions, "markets," and government.

To mainstream disability research and services and refashion the national health and disability management system, it appears timely and appropriate to put the system together by articulating these goals further, creating formal mathematical models for forecasting purposes, establishing data collection programs to monitor them, and exploring innovative solutions.

In this regard, the establishment of Presidential Research Commission on Health and Disability Strategies for the 21st Century is proposed here. A Presidential Commission implies an initiative from the White House; the same intent could be realized by a national commission authorized by the Congress, or a major study group within

the federal government such as generated the Global 2000 Report to the President, or a funded outside group such as who wrote Healthy People, which served to establish our present national health goals.

I envision many charges to this Commission, including:

1. modeling the health, disability, and economic support system, that is, putting together the jig saw puzzle of our national disability management system,

2. defining goals for public rehabilitation and disability policy,

3. defining data needs and moving from a mortality-based public health statistics approach as is current in the United States to one that also measures handicap, and

4. examining the role of research in reducing the need for health services, that is, cost containment through reduced need for service rather than through simply reducing service utilization.

Such a Commission would require likely at least three years. Its commissioners could be drawn from members of the Congress and Executive, representatives of the private sector (including major employers with experience in disability management, insurance industry, and academic experts in the relevant research, with support from a sophisticated research staff.

Disability researchers have a unique expertise to contribute to the deliberations of this Commission. The operating strategy of the NHDMS as described above bears close resemblance to rehabilitation's philosophy of care, that is, comprehensive care involving physical and behavioral treatments, continuity of care over acute, episodic interventions, the importance of early interventions, and health goals placed among wider social welfare goals. Ironically, it is this approach, so very current in concepts of "holistic medicine," that was unappreciated historically by the larger medical community, and was a factor in rehabilitation's isolation from the biomedical clinical and research communities (119).

A familiarity with the history of disability income support might have predicted the rapid growth in the 1970's of federally-managed social insurance for disability income. The private disability income insurance market was bankrupted in the 1930's by the depression; similarly, the rapid growth of disability income claimants to Social Security appears closely related to economic conditions (120).

There is ample precedent for the value and opportunity afforded by a Commission. The first use of formal social forecasting by the U.S. Government was in 1929. Shortly after his election as President, Herbert Hoover named a Presidential Research Commission on Social Trends financed by the Rockefeller Foundation. In its report, Recent Social Trends (1933), the Commission described changes in

medicine, specifically the "rise of medical specialties, the divergence between research and general practice, and the consequences of geographic concentration [of medical personnel]; [this analysis] if heeded," according to the sociologist Daniel Bell, "...would have gone far to avert the present crisis in the delivery of health care" (121).

More recently, both the Surgeon's General's Report Healthy People in 1979 and the Global 2000 Report to the President in 1980 have stimulated national action and debate on key public policy issues. No less is expected from the this Commission.

Closing Remarks

If these remarks seem unduly ambitious, I would like to close this paper with another prediction about the view from the future of the 20th century by the British historian Arnold Toynbee, a particularly appropriate comment on this the 10th anniversary since the withdrawal of the American presence in Viet Nam:

"The twentieth century will be remembered chiefly not as an age of political conflicts and technical inventions, but as an age in which human society dared think of the health of the whole human race as a practical objective."

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Table 1 United States Work Disabled Population: 1978 Estimated Numbers by Age and Severity of Work Disability (millions of persons)

Age Segment	Work Disabled	Not Work Disabled	Total Working Age U.S. Population
18-34	4.92	53.28	58.20
35-44	3.72	21.17	24.89
45-54	5.73	17.94	23.67
55-64	7.51	12.79	20.94
Total	21.87	105.18	127.05

Work Disabled Population by Severity of Work Disability (1)

Age Segment	Severely Disabled	Occupationally Disabled	Secondary Work Limitation
18-34	1.55	1.31	2.06
35-44	1.61	0.95	1.16
45-54	2.67	1.43	1.63
55-64	5.05	1.18	1.28
Total	8.92	4.87	6.13

Source: Lando, M.E., Cutler, R.R., Gamber, E. 1978 Survey of disability and work. Data book. Washington, D.C.: U.S. Government Printing office, November 1982, Table 1, p. 1.

Footnote: (1) For definitions of severity of work disability categories, see Reference 17.

Table 2 United States Work Disabled Population: Year 2000 Projected Numbers by Age and Severity of Work Handicap (millions of persons)

Age Segment	Work Disabled	Not Work Disabled	Total Working Age U.S. Population
18-34	5.16	55.87	61.03
35-44	6.53	37.21	43.74
45-54	8.99	28.13	37.12
55-64	8.78	14.99	23.77
Total	29.46	136.20	165.66

Work Disabled Population by Severity of Work Disability (1)

Age Segment	Severely Disabled	Occupationally Disabled	Secondary Work Limitation
18-34	1.63	1.37	2.16
35-44	2.82	1.67	2.04
45-54	4.19	2.24	2.56
55-64	5.90	1.38	1.50
Total	14.54	6.66	8.26

Footnote: (1) For definitions of severity of work disability, see Reference 17.

Table 3 Changes in the Numbers and Percent of Work Disabled Population by Age and Severity of Work Handicap, 1978 - 2000 (millions of persons)

Part A Changes in Numbers by Age Segment

Age Segment	Work Disabled Population 1978	2000	Population Changes Absolute	Percent
18-34	4.92	5.16	.24	4.9%
35-44	3.72	6.53	2.81	75.5
45-54	5.73	8.99	3.26	56.9
55-64	7.50	8.78	1.28	17.1
Total	21.87	29.46	7.59	34.7

Part B Changes in Numbers by Age and Severity of Work Handicap (1)

	Severely Disabled		Occupationally Disabled		Secondary Work Limitation	
Age	Number	Percent	Number	Percent	Number	Percent
18-34	0.08	5.2%	0.06	4.6%	0.10	4.6%
35-44	1.21	75.2	0.72	75.8	0.88	75.9
45-54	1.52	57.0	0.81	56.6	0.93	57.1
55-64	0.86	17.1	0.20	16.9	0.22	17.2
Total	3.67	33.8	1.79	36.8	2.13	34.7

Footnote: (1) For definitions of severity of work disability, see Reference 17.

Table 4 Labor Force Status of Work Disabled Population: 1978 (millions of persons)

Labor Force Status	Work Disabled	Not Work Disabled	Total U.S. Working Age Population
In Labor Force	9.67	86.88	96.54
Employed	8.99	82.97	91.96
Unemployed	.67	3.90	4.58
Not In Labor Force	12.21	18.30	30.51
Never Employed	.91	1.64	2.54
Previously Employed	11.30	16.66	27.96
Total U.S. Population	21.87	105.18	127.05

Source: Lando, M.E. et al. 1978 Survey of disability and work. Data book. Table 77, p. 196.

Table 5 Labor Force Status of Work Disabled and Non-Disabled Populations, projections for Year 2000 (millions of persons)

Labor Force Status	Work Disabled	Not Work Disabled	Total Working Age U.S. Population
In Labor Force	13.19	112.52	125.71
Employed	12.35	107.87	120.22
Unemployed	.84	4.65	5.49
Not in Labor Force	16.27	23.68	39.95
Total Population	29.46	136.20	165.66

Table 6 Changes in Labor Force Participation Rates of the Work Disabled Population, 1978-2000

Labor Force Status	Work Disabled Population 1978	2000	Changes in Numbers Absolute	Percent
In Labor Force	9.66	13.19	3.53	36.5%
Employed	8.99	12.35	3.36	37.5
Unemployed	0.67	0.84	0.17	25.4
Not in Labor Force	12.21	16.27	4.06	33.3
Total Population	21.87	29.46	7.59	34.7

Inventing a Future for Work Disabled Individuals: Long Range Planning for United States Public Policy

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Inventing a Future for Work Disabled Individuals: Long Range Planning for United States Public Policy

Summary

This paper demonstrates applications of forecasting and other futures methodologies to long range planning (1985 - 2000) for the paid employment of persons with work handicaps through public and private sector strategies in the United States.

Although focused on employment, this research is properly placed within two larger issues:

- o development of a national disability policy, and
- o the emerging concept of a "national disability management system" (NDMS).

A national disability policy answers the question: What do we wish to accomplish between 1985 and 2000 for both disabled citizens and those at risk for developing a disability? Current defacto national disability policy is defined as the sum of policy statement, programs, and other relevant activities. Unlike current United States public health policy, current disability policy does not appear linked to specific goals, quantified, time-oriented objectives and implementation plans. Other structural considerations in developing a policy include articulation of general principles (e.g., independent living, life expectancy without disability), measurement approaches, and use of forecasts to stimulate thinking about new opportunities.

To be effective, disability policy must be linked to the "national disability management system" (NDMS). The NDMS refers to the total set of (largely uncoordinated) public and private sector insurance and program activities designed to prevent and reduce the impact of health impairments and handicaps on individuals and society.

Components of the NDMS include, for example, relevant employer fringe benefits and assistance programs, occupational injury and disease policy, including worker's compensation and risk regulation, the state-federal vocational rehabilitation program, insurance rehabilitation, federal and state social insurance health and disability income programs, federal laws affirming the rights of the disabled, and health and rehabilitation research and technology development. Each component of this system developed in response to specific historical conditions and opportunities. Lack of coordination among these components, inadequate coverage, rapidly changing conditions, new opportunities, and issues of equity suggest comprehensive re-examination of its various purposes and structure.

To bring coherence to this NDMS, a Presidential Research Commission on Health and Disability Strategies for the 21st Century is

proposed. Among the tasks proposed for this Commission are sophisticated forecasting and simulation of the national disability management system, organization of the historical experience of the components, delineation of new data measures, and rationalization of current activities. Two informing principles of Commission activities would be:

- o to preserve the diversity of current programs, recognizing that specific rather than universal solutions are most likely to meet the needs of population segments, and
- o re-definition of the current components according to incentive structures and assignation of risk at each level: individual, employer, union, government, and market.

One example of changes that recommend a Commission are forecasts or predictions about the number and demography of the work handicapped population in the year 2000. These forecasts reflect the the aging of the U.S. population. The American population is maturing rapidly; the current median population age is 31.2 years, and is expected to rise to 37.2 years by the year 2000. Given that increasing age is associated with increased liklihood of health impairments, the American population appears to be at accelerating risk for disability and handicap.

These forecasts project:

- o a 30% increase in the total number of work handicapped individuals by the year 2000,
- o a modest decline (-2.4%) in the numbers of young persons with work handicaps (ages 18-34), and
- o dramatic increases (58.9%) in the numbers of work disabled persons between ages 35 and 54.

These forecasts were used to predict changes in the labor force status of disabled persons between 1978 and 2000. Results indicate:

- o relatively constant rates of unemployment and labor force nonparticipation in 1978 and 2000, 6.9% vs. 6.4% and 55.8% vs. 55.5%, respectively; however,
- o a 21% increase in the actual number unemployed, and
- o an 11% increase in the number not in the labor force.

In developing public policy responses to these forecasts, we begin with two premises:

- o it is assumed that paid employment will continue to be the most effective strategy for disabled persons to generate an adequate income. This assumption underlies the importance of vocational preparation and rehabilitation

in achieving economic independence for disabled citizens.

- o the increasing prevalence and shifting age distribution of the work handicapped population occurs within a time frame. The younger members of the year 2000 workforce, i.e., persons 18-34 years are today between 3 and 19. The largest group of year 2000 work handicapped (35-54) are today between 20 and 39.

  The point here is social programs effects occur within a time frame and that evaluations of program success need consider the time frame of expected impact.

Applied to a goal of increasing labor force participation rates of disabled persons, this analysis suggests the importance of disaggregating the "work disabled population" into distinct "markets" "segments," or categories for employment related services.

In this context, The Education for All Handicapped Children Act (P.L. 94-142), enacted by Congress in 1975, may be viewed as an employment strategy for the younger age group. This strategy has the additional advantage of preparing disabled young people for careers, not merely jobs.

For persons moving into the age group 34 to 55 between 1985 and 2000, employer and union-sponsored return-to-work programs (job retention) for employees who develop health impairments are described as one strategy to reduce the forecasted rates of unemployment and labor force withdrawal. Forecasts of the impact of return-to-work programs indicate that of the 15.2 million work handicapped Americans predicted to be unemployed or have withdrawn from the labor force by the year 2000, 19.8 to 39.6% of these individuals might remain employed if such programs were widely available. Return-to-work programs also appear to have the opportunity to increase private sector involvement in "vocational rehabilitation" service provision.

Greater scope, precision, and specificity in the forecasts would be acheived by use of more sophisticated forecasting procedures, including other known significant variables not entered into these calculations.

It is emphasized, however, that these forecasts are estimates of a population "at risk;" actual numbers of work handicapped persons and their employment status in the year 2000 will reflect both the effectiveness of planned and unplanned public and private interventions, and unforeseen circumstances, e.g., medical advances. The primary function of these forecasts in this paper is to demonstrate the utility of such procedures in directing precise thinking about disability issues and argue for additional studies.

Inventing a Future for Work Disabled Individuals: Long Range Planning for United States Public Policy

In the Preface to his monograph The Future of Work for People with Disabilities: A View from Britain Paul Cornes (1) quotes this observation of Norman Acton regarding a fundamental weakness of public policy strategies for the employment of persons with work handicaps: "We continue to plan for yesterday to overcome the deficits of a decade ago" (2). In his work, Cornes extends this critique. He suggests that we must also consider the implications of significant macroeconomic changes currently underway in Britain (3), which are also occurring in the the United States (4), for example, changes in the availability and kinds of paid employment, to effectively plan public vocational rehabilitation services. The intent of the Cornes monograph may be summarized by this neat phrase from the French poet and essayist Paul Valery: "The trouble with our time is that the future is not what it used to be" (5).

Perhaps we plan for the past, as Norman Acton suggests, and are failing to anticipate the future, as Paul Cornes suggests, because the past, although unchangeable, is knowable, where the future, albeit changeable, is unknowable (6). If one does not have a sound basis or method for conducting long range planning, it is often difficult to proceed with a directed and confident manner.

The Cornes monograph is remarkable for its strong sense of historical presence -- for example, he places his analysis of the role of work in people's lives in an historical continuum, from the citizens of Roman and other pre-industrial societies, to the behavioral adaptations required of individuals by early industrial society, to alternate scenarios of the emerging "post-industrial" society. His monograph also has significant heuristic value, and presents a richness of hypotheses about the future that may be susceptible to empirical investigation.

In this paper, I wish to proceed in a similar spirit -- to place our thinking in an historical context and to present hypotheses for further research. However, where Cornes speaks from Britain, the question arises as to the possibilities of the future of work and employment for disabled individuals in the United States, and critically, how to generate, test, and decide the validity of any hypotheses about the future, and policy and program options they may suggest.

Since the beginning of the twentieth century, formal and disciplined methods for thinking about the future have been developed, and have received wide application. Today there are perhaps 100 distinct techniques for future study. It is on the methodology of future studies, and specifically the possibilities and results of quantitative forecasting, that I wish to draw particular attention in this paper (7). In the initial sections, I will present several forecasts from my own work relevant to long range planning of

employment services for work handicapped individuals in the United States, and discuss their implications for vocational service delivery in this country in the next 15 years.

These remarks together will serve as a preface to the key concerns of this paper -- which is, "inventing a future" for work disabled individuals in the United States, and a proposal for a Presidential Research Commission on Health and Disability Strategies for the 21st Century.

Two Forecasts about Work Disabled Persons in the Year 2000

Forecasting seeks to establish visible trends and predict what will happen in the future. Modern forecasting, in both methods and attitude, was established in the early 1900's by the sociologist S. Collum Gilfillan. Gifillan delineated the key elements of quantitative forecasting: the need for a sound data base, the use of historical trend extrapolation as a key prediction methodology, and the ongoing monitoring and correction of projected trends. He rejected wishful and utopian thinking and unfounded optimism in future studies, and emphasized the of use of logical, publicly described and reproducible methods in making forecasts (8).

To demonstrate the application of historical trend analysis applied to public policy planning for the paid employment of disabled individuals, we begin with several questions: what will be the numbers of individuals with work handicaps in the year 2000, their ages, and the severity of their work handicaps? The forecasts generated to answer these questions are intended as both an illustration of the value of future studies to the field of physical disability planning (9) and as an example of the promise of further forecasting applications to disability policy research.

To answer these questions (10), we begin with data from the 1978 Survey of Disability and Work (11) conducted by the Social Security Administration and shown in Table 1. This table provides figures on the numbers of work disabled between the ages of 18 and 64 in 1978 divided into four age groups. It also provides data on the numbers of individuals within these age groups divided into categories of severe, occupational, and secondary work limitations or handicaps (12).

Table 1 about here

To forecast estimates of the number of work disabled persons in the United States in the year 2000, we extrapolate from the 1978 survey data using the increasing age of the American population as the key predictor variable, or variable we believe most powerful in predicting changes in the numbers of disabled persons. The median age of the American population in 1820 was 17 years, and by 1940 it had risen to 29 years. Between 1940 and the early 1980's, the median population age was relatively constant between 28 and 30 years (13).

Today (1985), the median age of the United States population is approximately 31.2 years (14), and by the year 2000 it is expected to be 37.2 years (15). Longevity is also increasing, from a life expectancy of 47.3 in 1900, to 68.2 in 1950, to 74.7 today (16).

Several factors appear to be responsible for these projected demographic shifts. First, fluctuations in the fertility of the American population between the late 1940's and the present have long-term consequences for the age of the population. Between the end of World War II and the early 1960's, there was an increase in the number of children born, the so-called "baby boom." This increase began to decline in the early 1960's. For example, the birth rate in 1955 was 25.0 live births per 1000 population; by 1976 it had declined to 14.6 live births per 1000, and in 1981 it was 15.8 live births per thousand (17).

One can visualize the baby boom generation as a ripple across time that will not be completely dampened until about the year 2040. The "baby boom" generation (individuals born between the late 1940's and early 1960's) is now maturing, and this change is coupled with a declining fertility or birthrate of the American population.

With medical advances there has been a reduction in mortality and a concomitant increase in longevity. For example, in 1950 the death rate was 841.5 deaths per 100,000 resident population (age adjusted); by 1983 the rate had declined to 549.6 deaths per 100,000 population (18). One estimate suggests that medical advances saved about 8 million lives between 1944 and 1967 (19).

Increasing age is positively correlated with likelihood of health impairments (20); a health impairment is a necessary condition for the development of a disability and handicap (21). The American population appears to be rapidly moving into the high risk age categories for development of chronic disorders and disabling health impairments. Age is also associated with other variables important to vocational planning, including employment probability (22).

Actual calculation of the future numbers of work handicapped persons proceeds from projections of the age distribution of the U.S. population in the year 2000. This distribution is shown in Table 2 in the far right column labeled "Total Population" (23) within the same age categories of the 1978 survey data. To generate the numbers of work disabled, we calculate from Table 1 the percentage of disabled persons within each age category in 1978 and multiply these percentages by the number of persons in the corresponding age category in the year 2000.

For example, in 1978, the 4.92 million work disabled in the age group 18-34 years comprise about 8.5% of the total United States population in this age group. Multiplying 8.5% by the projected population of 56.68 million in this age group in the year 2000 yields an estimate of 4.80 million work disabled between the ages of 18 and 34 in the year 2000. Further applications of this procedure yields the remaining estimates in Table 2, including the breakdown by disability status.

Table 2 about here

Table 3 presents an analysis of the data from Tables 1 and 2 and shows changes in the prevalence of work disability occurring in the 22 years between 1978 and the year 2000. This analysis predicts an almost 30% increase in the total number of work disabled persons between 1978 and the year 2000, or 6.4 million additional people with work handicaps. The model indicates a modest decline, about 2.4%, in the numbers of work disabled individuals between the ages of 18 and 34, and dramatic increases in the numbers of work disabled between ages 35 and 54, the prime working years.

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As also shown in Table 3, on a percentage basis, the increase in work disabled in the age group 35-54 is roughly comparable within all three categories of disability status. However, in absolute numbers, the 2.44 million with severe work handicaps are almost equal the 2.98 million individuals in the combined categories of occupational and secondary work handicaps.

The key question of this paper is the future employment status of individuals with work handicaps. In Table 4, we present data on the labor force status of this population in 1978 (24). As may be calculated from Table 4, in 1978 the unemployment rate of disabled individuals is almost 7%, as compared to 4.5% for non-disabled individuals. The percentage of work disabled individuals who consider themselves not in the labor force is 55.8%, versus 17.4% of the non-disabled population, a difference of 38.4%.

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Forecasts for the year 2000 of the labor force status of disabled and non-disabled individuals were generated by essentially the same procedures described for the earlier projections. In this case, the percentage of individuals within each age and labor force joint category were calculated and these percentages were multiplied against population estimates for the year 2000. However, in this forecast, the data was then aggregated across age categories. The labor force status of disabled and not disabled individuals for the year 2000 is shown in Table 5.

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In Table 6, we present changes in the labor force participation of individuals with work handicaps between 1978 and the

year 2000. Overall, we expect a 30% increase in the prevalence of individuals with work handicaps in the labor force, and a 21% increase in the number unemployed. In addition, there is a more modest but still significant 11% increase in the number of work disabled individuals expected to not be in the labor force (25).

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We may also calculate from Table 6 data the unemployment and labor force participation rates of work disabled persons in 2000. In the year 2000 the unemployment rate of work handicapped persons is expected to be 6.4%, versus 6.9% in 1978. The percent of disabled individuals outside the labor force also remains relatively constant, 55.5% in the year 2000 versus 55.8% in 1978. Although this may be intuitively surprising, the reason for this appears to be the substantial drop in unemployment in the 1978 Survey data between the age group 18-34 and the age group 35-44. In 1978, where the unemployment rate of disabled persons 18-34 is 12.5% and (for comparison) non-disabled individuals 6.3%, unemployment drops to 4.1% for work handicapped and less than 1% for non-disabled persons between ages 35 and 44 (26).

These forecasts should be regarded as preliminary. Greater scope, precision, and specificity might have been achieved in our predictions by more sophisticated applications of forecasting procedures.

This forecasting demonstration utilized demographic factors, e.g., population age changes driven by fluctuations in the fertility rate, to predict the labor force participation of handicapped persons in the year 2000. We have not examined expected changes in a number of other key variables that determine the occurrence of work handicaps in the population or the labor force status of work handicapped individuals (who are, let me stress, a subgroup of all working age persons, and subject to all variables that effect their employment). These variables include the macroeconomic factors suggested by Cornes (27), specifically the impact of technological change on occupational patterns and labor demand between now and the year 2000, other determinants of employability, e.g., population education levels, projected rates of morbidity and mortality, other important demographic variables, e.g., sex and race, and public and private sector initatives designed to address employment of work handicapped persons.

In addition, our forecasting has been based on empirical relationships among key variables rather than a simulation of the actual system or a defined causal model (28).

We may still ask of these forecasts a slightly reworded version of the question that Scrooge asked of the "Ghost of Christmas Yet to Come" in Dickens' A Christmas Carol: "Are these the forecasts of the things that Will be or are they forecasts of the things that May be, only?" Scrooge answers his own question with these words:

"Men's courses will foreshadow certain ends, to which, if persevered in, they must lead. But if the courses be departed from, the ends will change" (29). With a similar spirit, we turn now to the issues involved in thinking about possible responses to these forecasts.

Responses to the Forecasts: 1985 - 2000

In addressing employment opportunities for work handicapped individuals between now and the year 2000, we begin with the position that the significance of paid employment lies with the assumption that it will continue to be the most effective strategy for disabled persons to generate an adequate income. Despite the reported plethora of income replacement programs (30) for work disabled individuals, including private disability pension plans and state and federal programs (31), most data indicate that disabled individuals are far poorer than non-disabled individuals (32). For example, about 25.6% of individuals with severe work handicaps were at or below the poverty level in 1978. The comparable figure for non-disabled persons was 7.9% (33). As an indication of what poverty level means, the poverty threshold for one, non-farm person was defined as an income of $3,075 in 1978 (34).

Although the relationship between economic level and disability status is not apparently well-understood (35), it does appear that disabled individuals who are working earn roughly comparable wages to their non-disabled counterparts (36), suggesting the attractiveness of paid employment versus income replacement for providing income to disabled people. This data should also remind us of the intimate and linked relationship of vocational rehabilitation and income replacement strategies, and their differing consequences for the "economic independence" of disabled people (37).

Cornes in his monograph presents scenarios in which paid employment is either less available to disabled people or other approaches to income provision are developed, including the concept of a "social wage" or wages for work not now currently compensated (38). Futures methods are available that would allow systematic examination of the social and economic impact of widespread non-participation in paid employment, including creative strategies to manage time and income (39).

How then might we use these forecasts or any other forecasts generated by futures methodologies to structure our thinking about public policy strategies for the employment of persons with work handicaps for the next 15 years (1985-2000)?

The designated time frame of 15 years again reminds us that both the social forces underlying change and the impact of any actions designed to address those changes occur over time. As implied by the forecasts, the increasing prevalence and shifting age distribution of the work handicapped population occurs over a time period. This point was also demonstrated earlier with the longitudinal implications of fluctuations in the fertility of the population. The younger members of the year 2000 workforce, that is, those who will be in the age

range 18 to 34 years, are today, in 1985, between the ages of 3 and 19. The largest group of work handicapped in the year 2000, that is, individuals between 35 and 54, are today between the ages of 20 and 39.

The point to be drawn from this perspective is that we need to think further about disaggregating the work disabled population, or more properly, the population at future risk for developing work handicaps, into distinct "markets," "segments," or categories for employment-related services. An initial way to define such markets is by age and service needs (40). The Education for All Handicapped Children Act (41), enacted by Congress in 1975, can be meaningfully viewed as an employment strategy for the younger age group. There is data now appearing (42) linking this law to an increasing number of handicapped young people entering the professions. And entering a profession, is, of course, not just getting a job but beginning a career (43).

However, these forecasts indicate that the largest number of persons who will develop work disabilities by the year 2000 are likely in the workforce today. This finding suggests that there will be a major need for services to persons with established work histories who develop work handicaps at some point during their adult lives (44). Such individuals are the target of return-to-work programs.

We define return-to-work (RTW) programs broadly to include all activities directly provided or coordinated by employer or union staff which have as their goal the successful job retention of employees who develop a health problem that results in a work handicap. In practice, these activities range from a simple promise to hold an employee's job open until he or she is sufficiently recovered to return-to-work, to re-training for a new position within the company, and from ad hoc management responses to employee disability (45) to defined company policy.

RTW programs have become a subject of increasing interest to both rehabilitation professionals (46) and business and union management (47). RTW programs appear to offer unique opportunities for broadening the rehabilitation service base in the United States without expanding significantly public sector activities, to increase work participation rates of disabled individuals, and address the needs of the future. Because of their apparent growing popularity to rehabilitation researchers, I would like to examine here briefly three questions from the universe of all possible research questions (48) into return-to-work programs:

1. Why might employers be interested in RTW programs for their employees?

2. What reasons suggest the efficacy of RTW programs?

3. What is the potential impact of RTW programs for increasing labor force participation rates of disabled persons by the year 2000?

First, to understand employer motivation and experience with RTW, good historical research is needed. Some reports claim that certain employers have had RTW programs since the 1940's; however, even these pioneering programs were only "formalized" (49) after federal legislation was enacted in the early 1970's that both prohibited employment discrimination of handicapped individuals and required affirmative action in hiring disabled workers by federal contractors.

Proper research could document these claims and illuminate the experience of employers and employees in compnaies with return-to-work philosophy. For example, given the belief that "attitudinal barriers" restrict both employment and larger social integration of disabled persons, are atttiudes towards disabled persons any different in companies with RTW experience? We might hypothesize, for example, that both institutional and personal experience with disabled people accruing from RTW programs might substantially affect attitudinal barriers.

However, I believe the capacity of business to respond to return-to-work has existed all along (50), however business generally has not exercised it. As evidence, I draw your attention to Figure 1.

Figure 1 about here

Figure 1 is an advertisement (51) that appeared in the October 1946 issue of Foreign Affairs magazine, one of the most influential and widely-read of the foreign policy journals in the United States. The heading is "It's good to be back with the telephone company" and it reports on the return of Bell Telephone Company employees from the armed services after World War II. Please note the fourth paragraph: "Of the employees who have returned to work, 1488 had some degree of disability. Practically all have been placed on their old jobs or new ones at the same - or a higher - rate of pay."

Somehow between 1946 and 1985 the possibilities of return to work of persons with disabilities seem to have been "forgotten." How might this have happened? If we look at the history of two other social movements in the United States in the past 25 years, civil rights for minorities and the woman's movement, we find in both cases that movements with similar goals had occurred before. In the case of civil rights, the first civil rights movement occurred during Reconstruction after the Civil War; the first woman's movement began in the nineteenth century and ended around World War II. Having failed to become established and institutionalized, the early history of both movements was largely "forgotten" until their eventual success. Perhaps disability has a similar unrecorded history (52).

However, it may be that current business interest is a new phenomenon or a newly revived interest because of new social conditions. To the extent that the projection of increases of numbers of work disabled in the year 2000 is also a currently operating trend, it may be that large numbers of employees with health problems and

work handicaps are appearing or becoming visible for the first time (53).

Businesses incur costs from sick and disabled employees. Costs of disability to employers include: losses in their "human investment," e.g., training and experience, the costs of replacing the disabled employee, and the direct costs of health and disability employee benefits (whether self-insured or premium by insurance). The former kinds of costs are not usually reported on a corporate balance sheet under current accounting practices, and fall within the realm of human resources cost accounting (54).

The costs of health insurance benefits for employees to business is a matter of wide public discussion, and the correlary topic of disability income benefits has promise of increasing employer attention (55). Regarding medical costs, corporate health care expenses as a percentage of profits has risen from 8% in 1960, to about 28% today, and is expected to rise to 30% by 1990 (56).

To address these increasing health costs, businesses are seeking cost containment through various strategies. Figure 2 lists the relative savings available through current health care cost containment strategies (57).

Figure 2 about here

RTW may be viewed as a cost containment strategy for disability income costs. Spitz (58) provides an example of the cost savings available through insurance rehabilitation of a worker's compensation liability. A 33 year old employee suffered a knee injury complicated by obesity. With a remaining life expectancy of 42 years (age 75 years) and a $242/month disability income award, his employer is faced with a total bill of $121,968 ($242/month X 12 months/year X 42 years). The present net value (i.e., the amount a company would have to set aside or reserve today to cover this amount) is $26,145 (assuming a 12% interest rate earned on this amount). The cost of rehabilitation in this case was $726. Thus, the net present value savings or true savings is $26,145 (necessary reserves less rehabilitation cost), or a cost-benefit ratio of 36:1. In a consecutive series of 159 worker's compensation cases, the overall ratio was 18:1.

Another approach to understanding the savings of rehabilitation is in terms of sales that need to be generated in order to meet a disability income claim. In the example above, a company would need to generate $447,850 in sales to generate a $26,145 reserve (assuming a net return on sales of 6%).

The Spitz example is illuminating for several other reasons. First, the implied incentive structure for business to engage rehabilitation is perhaps weaker than Spitz suggests. Most companies are not self-insured for worker's compensation costs or apparently risk rated for their premiums. Second, an assumption of a lifetime

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To address these increasing health costs, businesses are seeking cost containment through various strategies. Figure 2 lists the relative savings available through current health care cost containment strategies (57).

Figure 2 about here

RTW may be viewed as a cost containment strategy for disability income costs. Spitz (58) provides an example of the cost savings available through insurance rehabilitation of a worker's compensation liability. A 33 year old employee suffered a knee injury complicated by obesity. With a remaining life expectancy of 42 years (age 75 years) and a $242/month disability income award, his employer is faced with a total bill of $121,968 ($242/month X 12 months/year X 42 years). The present net value (i.e., the amount a company would have to set aside or reserve today to cover this amount) is $26,145 (assuming a 12% interest rate earned on this amount). The cost of rehabilitation in this case was $726. Thus, the net present value savings or true savings is $26,145 (necessary reserves less rehabilitation cost), or a cost-benefit ratio of 36:1. In a consecutive series of 159 worker's compensation cases, the overall ratio was 18:1.

Another approach to understanding the savings of rehabilitation is in terms of sales that need to be generated in order to meet a disability income claim. In the example above, a company would need to generate $447,850 in sales to generate a $26,145 reserve (assuming a net return on sales of 6%).

The Spitz example is illuminating for several other reasons. First, the implied incentive structure for business to engage rehabilitation is perhaps weaker than Spitz suggests. Most companies are not self-insured for worker's compensation costs or apparently risk rated for their premiums. Second, an assumption of a lifetime

benefit is not likely to be generally true, thus overstating the cost of the injury. The actual structure of most worker's compensation programs. Actually, the example might be more generally instructive of disability income benefits. Third, some of the costs are offset as a tax deduction.

There is currently no comparable survey information on the types (cf. Figure 2), prevalence, and relative savings of containment strategies for disability income costs, including rehabilitation (59). We note, however, that presently only about 30% of a 1984 Coopers & Lybrand survey of 317 employers (covering 673,250 employees with $864.8 million in paid claims) presently use any form of cost containment for health benefit expenses (60), suggesting an even lower percentage are focused on disability income claims costs.

A key element in corporate health and disability income cost containment are new data processing capability. Advances in data processing capacity allow businesses to reliably measure, internally allocate, and forecast these costs for the first time (61). Management information -Coopers & Lybrand- also WBGH committee-

Risk management is a business function concerned with preventing and minimizing the impact of "losses." Risk management is a recent evolution of the insurance function within businesses. It promotes an active strategy for reducing the liklihood of losses rather than just passively insuring against losses. Business as research site.

Regarding employer motivation for engaging in RTW programs, another hypothesis that has intrigued researchers from the rehabilitation community is that they reflect new management approaches or "corporate cultures" (62) that "appreciate" employees.

For example, the book In Search of Excellence (63) has been cited by rehabilitation professionals (64) as evidence of such a human resources approach (65). This book examined 62 companies selected by several criteria of financial performance, and found that one commonality was a keen and genuine interest in employee welfare.

This book, however, does not qualify as solid research and has more in common with an inspirational tract than science or critical thinking. This is not meant as a summary disparagement of this book. It is thoughtful, accessible, and popular, and undoubtedly has the potential for impact and influence on managerial thinking. However, it would be inappropriate for the vocational rehabilitation research community to derive its understanding of business from such literature or accept it as a standard for quality research. Indeed, if these "excellent" companies are in fact excellent to their employees, a useful study would be their response to employee disability (66).

Parenthetically, if "corporate cultures" are changing, and this may be true, it is likely driven by larger social trends. It may be driven, for example, by new employee style and expectations. Individuals in the early and mid stages of their careers, say between ages 32 and 45, were raised on the civil rights movement, went to

colleges in greater numbers than earlier generations, and have no virtually universal personal experience of military life as does earlier generations of this century. Their experience of war is Viet Nam.

As a consequence of these and other differences in formative experiences, a possible "generation gap" between junior and senior management is discussed in a recent article in the New York Times. Many of today's senior executives served in the armed forces during World War II, and, to quote the recent Times article (67), they "learned that survival, let alone effectiveness, depended on strong leadership, a clear chain of command, decisiveness, clear direction for the rank and file, in other words, a top down, hierarchy organization in which top-level strategy was developed in secret."

"Today's young managers do not see much that is laudable about carrying through a task given them by others. They recall as most effective those situations in which they felt themselves to be participants, even partners. And they wish to be dealt with as non-conforming individuals, rather than as members of a group."

However, as mentioned above, "corporate culture" actually derives its significance as one potential explanatory variable for understanding corporate performance (however defined). The larger issue is the place of human resources management, of which return-to-work programs are one component, in a company's overall strategy for achieving success or "competitive advantage" in its markets. The key question in assessing the feasibility of any corporate strategy with regard to human resources is: "Is the strategy feasible based on the skills and motivation of people?" For this reason, good human resources management stresses the importance of people at each level (57). Indeed, businesses with exemplary return-to-work programs appear to regard return-to-work as a "employee benefit," i.e., a form of compensation, rather than attempting to justify their programs on the basis of "cost-benefit" analyses (58).

The second question about RTW programs inquires about their efficacy, or reasons to beleive they may be effective. Presently such about RTW vocational rehabilitation is not available. The present literature on return-to-work programs is broad, journalistic descriptions of a small number of frequently mentioned business and union programs at the larger corporations. Popular examples include the RTW programs at the Du Pont Company (68), the 3M Company (69), and the Sears Roebuck Company (70). No survey work comparable to Conference Board --Alcohol-- longitudinal --

Despite this lack of information, several reasons and suggestive data to believe such programs have a theoretical value: timeliness, least adjustment, appropriateness; -- structural theory -- relation to work disincentives -- relative importance of theory and experiment.

short circuits preparation/placement/cycle/

Our third question about RTW programs is their potential

impact or effects on the prevalent unemployment and labor force withdrawal of disabled persons. Forecasting is also concerned with predicting the impact of programs or policies on a variable of interest. What then might be the impact of employer and union return-to-work programs on retaining employees who develop health impairments as active participants in the labor force of the United States who might otherwise either become unemployed or stop working?

Indications that return-to-work (job retention) programs might significantly reduce both unemployment and labor force withdrawal of persons who develop disabilities may be found in data from the Social Security Administration (SSA) 1978 Work and Disability Survey.

We begin with the data presented earlier in Table 4 indicating that of the estimated disabled worker population of 21.9 million, approximately 9.0 million persons are working and 12.9 million are not (61). We thus refine our question by asking of the 12.9 disabled persons either unemployed or not currently in the labor force, how many might have been successfully assisted by employer or union sponsored return-to-work vocational rehabilitation?

We immediately exclude disabled persons without work histories as not appropriate for return-to-work programs, that is, the .9 million persons listed in Table 4 as never having been employed. This leaves 12 million disabled persons not working but with an employment history. How many were actually employed at disability onset and thus candidates for job retention programs?

Of the 21.5 million work disabled persons identified by this survey, 14.6 million were employed at disability onset (67.9%). Of the 14.6 million persons employed at the onset of their disability, 11.7 million continued working and 2.9 million stopped working (62). The SSA published survey data does not indicate the reason why the 2.9 million persons stopped working, but given the contiguity with disability onset, this appears a very likely explanation. We suggest this number as a lower limit for candidates of return to work programs.

By the time of the Survey, however, approximately 9.0 million disabled persons (41.9%) were currently employed (63), for a total reduction of 5.7 million persons from the maximum reported employment level of the work disabled population. This data set again does not provide indications of the reasons why individuals left the labor force, but we may accept as an number upper limit on return-to-work caondiates.

What conclusions may we draw from this data? First, there appear to be a remarkable number of people who remain in the labor force after disability onset, even despite severe disabilities. How are they able to do this? Given that return-to-work programs are not widepread, most of these job retention occurred outside formal programs. Examination of these "job retention" successes might supply some answers as to how this is achieved.

Second, these rough calculations suggest that between 2.9 and

5.7 million disabled persons meet the single criteria we established for eligibility for a job retention program: employment at disability onset. However, the key issue is the actual number who would have benefited had a return-to-work program been available, or the impact on employment and labor force participation by disabled persons. This calculation depends on our estimate of the success rate of workplace vocational rehabilitation. Private, for-profit rehabilitation services working with this client population report a 50% rate of rehabilitation success (64); the in-house return-to-work program of the Du Pont Company (65) claims an almost 100% rate. Thus, as a lower limit we suggest that perhaps 1.45 million disabled individuals would have remained employed (50% of 2.9 million), and as an upper limit 5.7 million (100% of 5.7 million). Thus, return-to-work programs might have reduced by between 12.1 and 47.5% the unemployment and labor force withdrawal of disabled persons reported in the 1978 Social Security work and disability survey.

But we are concerned with the future. What is the projected impact of employer and union-sponsored return-to-work programs on the forecasted rates of unemployment and labor force withdrawal of disabled persons in the year 2000?

Other investigators have suggested annual numbers of employees who develop work handicaps who might profitably benefit from return-to-work vocational rehabilitation services. Davis, without presenting any rationale for his estimates, suggests that 450,000 employed people who suffer a disabling health impairment might benefit from rehabilitation services (66). Hester and Decelles (67), using two independent, well-described methodologies found an annual incidence of worker disabilities of between 421,345 - 462,964 persons.

To the extent that timely rehabilitation reduces by half the number of persons who might otherwise leave working, a conservative estimate of the impact of return-to-work programs is 200,000 disabled persons per year. Over 15 years this would be 3 million persons. If we assume 100% effectiveness of return-to-work, an upper limit might of the impact return-to-work programs might be 450,000 persons per year, or 6 million persons in 15 years.

To calculate the effect of these projection on the labor force status of disabled persons in the year 2000 (Table 5), we reduce our estimate of 16.5 million disabled persons unemployed or not in the labor force by an estimate the number without work histories. In the 1978 SSA data this was 7.5% ; applied to year 2000 projections, this percentage indicates 1.2 million disabled persons without work histories. Subtracted, leaving 14.48 million persons projected to be absent from the labor force. To this we add .67, the number expected to be unemployed, to yield a final value of 15.15.

Thus, of the 15.2 million work handicapped persons in the year 2000 projected to be either unemployed or out of the labor force altogether, perhaps this number might be reduced from 19.8 to 39.6% by job retention programs.

Although both the estimates of the current numbers of disabled

persons who might have benefited from return-to-work programs and forecasts of those who might yet benefit if programs were more widely available are intriguing, I wish to emphasize these estimates are presented with significant reservations, and should not be cited as solid or definitive.

For example, the data on labor status at survey data and at disability onset are not strictly comparable in that they do necessarily refer to the same individuals; undoubtedly disabled individuals move in and out of the labor force as do other people. This concern, however, could be readily addressed by longitudinal prospective studies of the employment behavior of disabled persons.

We also do not actually know the actual success rates of return-to-work programs. The estimate of a 50% success rate used above was derived from data of private, for-profit rehabilitation services presented in articles in magazines written to sell their products to corporate risk managers. The data was not developed or audited by independent investigators. The Du Pont Company estimate of a100% success rate for their job retention is strictly anecdotal; as discussed below, actual evaluation of this kind apparently has not been done. However, given our intention of establishing a potential range (in the mathematical sense) of impact, a 100% success rate is certainly an theoretical upper limit for any endeavor.

As with our earlier projections, these forecasts could be significantly refined by inclusion of other demographic variables, e.g., age, sex, and race factors. But the key interest here is less with the specific accuracy of these particular estimates than as an illustration of the kind of research that needs to be done to think precisely about the impact of return-to-work programs, and the impact of employment strategies for disabled people generally.

This discussion is intended to emphasize the need for a good, heuristic theory of job retention to guide our research and data collection into the operation and potential impact of return-to-work programs. Other questions about RTW that define the larger agenda or universe include: relation of RTW programs with other employee assistance programs, relation to operating units, careers ladders to workplace rehab counselors, potential of RTW to address attitudinal issues.

Responding to the vocational rehabilitation potential of such programs, relevant formal research is now underway at Michigan State University (71), the Menninger Research and Training Center (72), and in Washington, D.C. (73). But I suggest that until this research is also done at Schools of Business Administration and Public Policy, it will not begin to have a major impact the training of future business management, which is, after all, a major target group to be influenced by this research.

As a final comment on return-to-work or job retention program research, we note that a further intent of such research (apart from scholarly investigation) is to permit their ready and effective transfer to other employer settings. Detailed descriptions and

demonstrations of program value have the potential to provide convincing evidence to companies to introduce RTW programs and reduce the institutional learning necessary to successfully adopt programs.

Return-to-work programs demonstrate a theory of new knowledge generation in rehabilitation. In some fields, particularly in basic research, new knowledge (broadly defined) results largely from laboratory-based investigations following formal hypotheses and protocols. Yet in many of the "clinical disciplines," including such apparently disparate fields (in terms of content) as medicine and education, much knowledge arises from field-generated clinical or practice innovations (74).

However, the essential weakness of clinical disciplines is that procedures and practice often spread and are adopted without proper evaluation of their efficacy. For example, little evaluation has been done until recently of the indications and benefits of such common surgical procedures as prostatectomy (removal of the prostate in men) and cholecystectomy (removal of the gall bladder). Indeed, contrary to much popular opinion, it appears that widespread utilization of many surgical procedures occurs less because of physician enthusiasm for their fees than physician belief that the procedure represents common or best practice. Such beliefs may persist because of the absence of good data about the proper indications and effectiveness of a procedure (75).

Rehabilitiation is a clinical discipline (**). As such, rehabilitation practice innovations often appear to arise in the field. If such innovations are properly validated and promoted, they might have widepread benefit. A system of knowledge capture, validation, and assisted utilization was created for education in 1974 entitled the "National Diffusion Network" (NDN) (76). The NDN model was recently adapted to rehabilitation (77). It has been funded by the National Institute of Handicapped Research (NIHR) as the "Regional Rehabilitation Exchange" (RRX). Essentially the RRX is a process and applicable to a wide range of content, e.g., from validation of physical therapy practices to low tech solutions for the daily living needs of disabled persons. Although the current vocational rehabilitation topics of the RRX are relatively traditional (78), it was specifically intended in the adaptation to rehabilitation that it be applied to workplace return-to-work programs (79).

In closing on the subjects of the specific forecasts presented in this paper and the responses stimulated by them, please note that both are very conservative applications of the techniques and range of futures methodologies and their power to explore the future.

Through exploratory forecasting we might have asked other questions of close relevance to these issues:

- What may be done to reduce the numbers of persons expected to become disabled?

- How might this best be accomplished?

- How shall services for disabled persons be paid for?
- What new resources for disabled persons may be developed?

We may also think about the impact of other specific policy or program options. With regard to alternatives to the present state-federal vocational rehabilitation system, what would be the impact of closing down the state-federal program, either by moving to a voucher system or "privatizing" it? In conversations with rehabilitation professionals, I hear the concern that such an approach would lead to a two-tier rehabilitation system -- private services for individuals with money to pay for them or who are not severely disabled and public services for the the "marginal" person or person with severe handicaps. I suspect that this has actually already happened, except that it has not yet been well documented (&&).

Given the development of private rehabilitation vendors ("insurance rehabilitation") stimulated in part by compulsory worker's compensation rehabilitation laws in some states (82), what if worker's compensation law in every state had a compulsory rehabilitation provision (or if worker's compensation was federalized)? What if health insurance was re-designed, and its premiums linked to the numbers of health risk behaviors a person voluntarily engages in, e.g., smoking, failure to control blood pressure, consumption of saturated dietary fats (83), or greater national emphasis on such relatively simple behaviors as wearing seat belts (84)?

We note that forecasting technology is capable of considering such factors and policies, but a forecasting effort of that magnitude would require substantial resources, a point we return to later in this paper.

It is useful to note the benefits of quantitative forecasting. It improves the precision of our thinking, it imposes rigor, and the logic used to generate the forecasts is accessible and open to inspection allowing meaningful debate. Because the results follow from either an implicit or explicit model, they may lead to counter-intuitive predictions and create new insights. They are flexible and treat a range of options within the variables identified. They are instructive (85).

However, we do not lack cognizance of the limitations of forecasting, and long-range planning generally. Specific forecasts are limited by the techniques used to generate them, knowledge of key relevant variables and current theoretical understandings of the relations among them, the validity and completeness of available data, and the adequacy of available resources (86). However, these limitations are subject to research and resources, they are not limitations imposed by some impenetrable mystery. Another boundary to planning is that it requires some focus on a direction. Sometimes direction is not obvious, and in such periods, creative "drift" is the only satisfactory approach (87).

The forecasts presented thus far are exploratory, that is, they consider trends projected from the present on the state of the

future. But it is also possible to begin with concrete future goals and objectives, and examine how conscious actions designed to affect present trends could meet those goals. This approach is termed "normative forecasting." In this regard, we will now examine ways to "invent the future."

Inventing the Future

The name of Scrooge from Dickens' A Christmas Carol has become a popular metaphor for miserliness. This equation is curious because it misses the real drama of the story, the personal change Scrooge undertakes. Although the story opens with that characterization of Scrooge, after he reviews his past and the values which have directed it, and experiences a foreshadowing of his future, Scrooge becomes a protean man. As the earlier quote suggests, he becomes imbued with hope, and believes his future is not simply a fixed continuation of past trends, but amenable to his direction.

Of course, from a scientific point of view, the story is unsatisfactory. The techniques of behavior change -- ghostly visitations and time travel -- are not susceptible to replication and further research, and no long-term follow-up data on the persistence of treatment effects was presented.

Today, for us and our social and physical context, given the acceleration of theoretical knowledge in the physical, biological, and behavioral sciences, Scrooge's belief in the possibility of managing and directing the future appears increasingly true and demonstrable. Futurists have a phrase that reflects the premise that the future does merely occur but is the consequence of human choices and actions. That phrase is "inventing the future" (88).

Where our earlier projections were examples of exploratory forecasting, another approach to future planning and a direct expression of "inventing the future" is "normative forecasting." Normative forecasting involves establishing measurable goals and objectives, and researchers in normative forecasting have developed methods for assessing the probability of actions and policies achieving established goals over time.

In thinking about normative forecasting for national disability policy, specifically employment and income policy for disabled persons, we begin with a highly relevant model -- the national public health goals of the United States. In 1979, the Surgeon General of the United States published his first report on health promotion and disease prevention (91). This report described 100 years of decreasing mortality among the U.S. population, identified present threats to health that were preventable, and delineated 15 areas where specific, defined actions could be expected to make further, measurable gains in reducing mortality. The five major goals established in this report were in 1980 translated into specific and quantified objectives for national policy actions (92) and implementation plans.

Establishing both the broad national health goals and specific objectives was not an idle exercise. They have had public policy consequences. In a 22 March 1985 press statement that accompanied release of the report Health United States 1984 (93), Margaret Heckler, Secretary of the U.S. Department of Health and Human Services, described a decrease in the rate of infant mortality:

> And next week, the National Center for Health Statistics will release provisional data for 1984, showing a further decrease in the infant mortality rate to 10.6 per thousand live births last year. This is the most up-to-the-minute national data available, and it represents continued improvement in the infant mortality rate --- 3 percent lower than the 1983 rate.
>
> More important, it shows we continue to move closer to our national goal of no more than 9 infant deaths per thousand live births by the year 1990 (94).

I wish to draw attention to two aspects of the Secretary's statement. First, she referred to a specific health objective and reaffirmed support of it as a national goal. Second, she reported data -- current data -- that monitors progress towards that goal.

Other areas of national goals and objectives for 1990 include:--all have direct implications for reducing occurrence of health impairments and disability.

Parenthetically, we note the several formal or public steps involved in devising these national health goals and objectives: commissioning of a detailed study (Healthy People), development into objectives (Promoting Health/Preventing Disease), translation into implementation plans (PHS Implementation plans), and the availability of current data to monitor progress towards the goals with regular public reports and discussion (Health 1984). Undoubtedly, a further aspect was behind-the scenes.

We appear to have no comprehensive "national policy for disabled persons" or even a more limited employment and income policy with goals and objectives of comparable visibility and precision (95). The National Council for the Handicapped (NCH), charged by Congress with this responsibility, has taken a first step (zz). In August 1983, the NCH submitted a statement to the President regarding a national policy for persons with disabilities (96).

This NCH statement lists 22 areas of a national policy for persons with disabilities. The NCH document suggests that these areas must be considered together and are fundamentally indivisible. These areas appear to be a mix of topics for goal and objective setting (e.g., education, employment), general principles, etc. The close association with national health policy is indicated by area 13: prevention. The NCH statement, however, provides no background data.

Regarding employment and income policy for disabled persons, the NCH statement reads:

other sections relevant to employment.

critique/in context of RTW

positive comments about NCH statement

An another source of national policy for employment of disabled persons, in remarks at a November 1983 White House ceremony to sign a proclamation designating the National Decade of the Disabled, the President stated: "Today I am establishing a clear national goal. Let us increase the economic independence of every disabled American and let us begin today" (hh).

Other elements of a de facto national policy of employment and income would include the agendas of relevant agencies, e.g., the Rehabilitation Services Administration (zz), and the various laws and regulations that have been passed by the Congress affecting disabled persons. In the area of employment, two objectives include:

historical background/Berkowitz/White House Conference/ comprehensive needs study (Urban Institute)/

Criticisms. Have we been sufficently imaginative? But we we lack several aspects to make policy meaningful. We lack very specific goals with quanitified objectives. Indeed, in disability research and policy-making, we frequently find ourselves arguing over the number of disabled using data sets years out of date (97).

What goals might be suggested for employment of disabled persons? David Symington, writing from a Canadian perspective, suggests two quantified goals that he believes are "both achieveable and in keeping with the desires of handicapped people, government, and the public." These goals are:

> "1. A 30% reduction in the need for institutionalized care beds by 1990
>
> 2. A reduction in the unemployment level among employable disabled people to the national average by 1990" (98).

Although critical to achieving practical accomplishments, normative forecasting is still a restrained use of the imagination. Although futurists eschew utopian schemes or unfounded optimism, in part, perhaps, a response to a perceived concern about the credibility of their field, this does not preclude imaginative thinking, as the phrase "inventing the future" itself suggests.

role of science and technology

How is the future invented? John Naisbett, a popular futurist writer, speaks of the concept of "strategic vision," which he defines as a "clear image of what you want to achieve, which then organizes and instructs every step towards the goal" (89). Peter Drucker has been quoted as saying: "Results are obtained by exploiting

opportunities, not solving problems" (90).

What is our strategic vision for the employment of persons with work handicaps, and how is it informed by a comprehensive national policy for persons with disabilities? What are our opportunities? How can we best exploit them? Opportunities in rehab.

Cornes makes reference to the impact of "science-based industries" (99) as a key factor in changing occupational patterns.

I want to place our discussion of opportunities in the context of our "historical position" which I believe to be unprecedented in the history of mankind. But what are the larger consequences of science, and to what extent is science responsible for our present and an accelerating discontinuity from the past? And if we define rehabilitation as the physical or functional restoration of a disabling health impairment for independent living, what opportunities does science offer to reduce the impact of handicaps?

Let us consider the perspective of an historian in the 26th century, i.e., the year 2500 A.D., which is approximately 500 years from today, who is writing about the late 20th century. Although this perspective may seem impossibly distant, and for forecasting purposes it is or if our measure of time is the current length of the human life span, it surely is. Yet, think about 500 years past -- the American continent had not yet regular European visitors, most of the world was governed by despots and without examples of democracies, many believed the universe geocentric, and many of our daily technologies were at best imaginal (100).

But still there are major continuities between the past and the present. The fundamentals of the human condition have not changed. People still fall in love today the same way, I expect, as in 2500 B.C.. For the 26th century historian, world history is divided into two periods, before the Year 2000 and after. It was at this breakpoint, for example, that studies in regional history --events in Europe isolated from events in Asia -- finally lost their meaning and coherence (101). But the critical difference occurring in human history is this, the basis of the great discontinuity: in the late twentieth century, the fundamental principles of biology, physics, and behavior began to be understood for the first time, and knowledge of these principles began to fundamentally transform the human condition.

For example, in 1952, Watson and Crick discovered the function of DNA in cell nuclei. In 1984, insect and small animal work has begun to demonstrate the feasibility of inserting genes into human DNA to correct genetic defects (102). It is useful to recall that as organisms we are a protein structure and proteins are coded off DNA. Even bones, which we may think of as permanent and fixed in some way, are actually mineralized protein and undergo complete replacement of their mineral content every 5 years.

It is today possible, for example, to conceive in a fairly detailed way of moving human consciousness from the protein structure

called a body, which is the product of millions of years of adaptations to the specific ecological conditions of this planet, including gravity, temperature, and available nutrients, and creating either new biological structures to house it or moving our phenomenological selves to inorganic structures.

Indeed, the reason for this conference is evidence of the success and changes wrought by medicine. In the recent history of disability in the United States, we may discern three cardinal events. First, the emergence of rehabilitation as a distinct set of activities and activated by the needs of impaired veterans returning from World War I and accelerated by World War II. Second, the civil rights movement for the disabled and the articulation of the concept of independent living in the late 1960's and early 1970's. Third, the needs of rising numbers of disabled people with either congenital or acquired disorders surviving previously mortal conditions because of improvements in medical care.

Spinal cord injury is one dramatic example. During the Battle of Trafalgar in 1805, Lord Nelson, who was wounded by a gunshot, called for the ship's surgeon: "Ah, Mr. Beatty! I have sent for you to say what I forgot to tell you before, that all power of motion and feeling below my chest are gone." Nelson had suffered a spinal cord lesion. The ship's surgeon replied: "My Lord, unhappily for the country, nothing can be done for you." Nelson died within a few hours (103). Today, a twenty year old male "incomplete quad" may approach 82.3% of the life expectancy he would have had had he not suffered his injury (104).

Indeed, current work on nerve regeneration in spinal cord lesions promises to eliminate the condition entirely, a condtion that affects 100,000 new persons each year, most of them young people. Several interesting observations have emerged from recent research about the pathophysiology of spinal cord lesions and opporuntities for treatment. The damage to the cord often exceeds the actual trauma; the trauma appears to activate an enzymatic process that results in further neuron destruction. Second, despite earlier beliefs about the adult human nervous system, regrowth apparently can occur, however, this growth is undirected. Using the simple analogy of a .. Indeed, recent experimental work in cats has found that small electrical voltages applied after a spinal cord lesion stimulates directed nerve growth, resulting in some restoration of functioning nerve pathways.

As another example, and of very current interest, consider the visible and compelling cases of "Baby Does." "Baby Doe" has become a label to identify infants born with profound congenital impairments. Such infants survive in many cases because of medical advances.

Parenthetically, the actual numbers of such impaired individuals being born and surviving is unclear. In the past 25 years, the number of newborns with diagnosed physical and mental disabilities has doubled. In actual numbers, approximately 4% of newborns, or 140,000 babies will be born this year with physical abnormalities, mental retardation, or other learning problems, as compared with about 2% of newborns, or 70,000 such infants, in the

late 1950's (105).

The meaning of this apparent increase is presently unclear. Data from the Center for Disease Control (CDC) Birth Defects Branch (106) suggests, for example, spina bifida has declined in the past 10 years; in 1974, 6.0 cases per 10,000 total births were reported versus 4.8 cases per 10,000 births in 1983. Some other conditions monitored have show modest increases.

Many of these conditions may be the result of better and earlier diagnoses, indeed it would be remarkable given the pace of medical knowledge since the 1950's if improvements in infant medicine has not occurred. Other changes may be due to statistical collection procedures. But some unknown percentage reflect improvements in saving the lives of very vulnerable infants (107). In any case, forecasting would appear to have a great deal to offer in service planning and allocating priorities to this segment of disabled persons.

The point here is that increases in survival from acquired disabling health impairments, such as spinal cord injuries, and from congential defects is the result of new knowledge. And we assert as a key premise that it is more knowledge, more good science, that will provide remedies, and indeed restoration, from such conditions.

What is the state of science in rehabilitation? Although the implications of a world profoundly changed by theoretical or basic science are exciting, as Maynard Keynes observed in a widely misunderstood remark, "In the long run we are all dead" (108). Rehabilitation addresses today's needs. In this context, rehabilitation may be defined as the physical or functional management and restoration of a disabling health impairment for independent living.

What is the quality and quantity, the rate of progress if you will, of technical and scientific achievements in rehabilitation research <u>today</u> directed to improve the quality of lives of disabled people? There is no simple answer to this question, but I am presently undertaking a study of this subject (109). Assessed as a ratio of the important scientfic questions to the amount of quality work being done, the state of the field of rehabilitation research provides considerable opportunity for knowledge advances.

How do we construct a federal rehabilitation science policy, which is, of course, a special case of any larger federal science policy? This is matter of increasing national interest. House Committee on Science and Technology

As one measure of national effort in rehabilitation research, consider the budget of the National Institute of Handicapped Research (NIHR), which is today about 39 million dollars (FY 1985 appropriation and FY 1986 request). In terms of purchasing power, the budget of this agency (although actually created by the Congress in 1978, it is functionally continuous with its predecessor agency, the Division of Research of the Rehabilitation Services Administration) has declined

by more than 50% between 1969 and 1981 (110). Although NIHR is only one program among all federal research endeavors to assist disabled citizens (111), it has a unique charge: it is the lead federal agency for rehabilitation research (112).

By comparison, the appropriation of the National Institutes of Health (NIH) in 1983 was 4.0 billion, and has shown substantial growth every year (113). I take no exception here to the funding of NIH; I believe its contribution to knowledge growth in basic biomedical science and the lives of American citizens, including disabled persons, to be readily demonstrable. But I suggest here is that there are substantial research opportunities with immediate impact on the lives of our disabled citizens that are grossly undeveloped, and funding is one reason (114).

Contributions of rehabilitation medicine

In the foregoing discussion of the opportunities to improve the lives of disabled people, we have implied advances will flow from science (115). In part, this is true. But social inventions (116) are at least of equal importance in improving the lives of all people, including handicapped people.

As an example of a "social invention," consider the U.S. Constitution. It is a social invention; it is neither a technological nor a scientific achievement. Although often seen as a sequel to earlier developments in English law, its "Bill of Rights," for example, is actually historically unique (117). Our constitution importantly structures human conduct in this country. Together with case law derived from its interpretation, the Constitution defines the rights and responsibilities, the parameters of social conduct if you will, of United States citizens and the function of our government and its limits.

In a similar way, the disability laws (118) passed since the 1960's, the concepts and practices of return to work programs, the idea of independent living as a goal for disabled individuals, and other key elements of health care delivery are not simply technical matters, but how people think about, organize, and design systems for directing human behavior to certain ends, that is, they are social inventions. -- RTW programs -- no special technology --

A matter of interest among rehabilitation professionals is the relative contribution of professionals and disabled persons themselves to improving their "lot." One approach to this discussion is that the contributions are different.

How to -- lessons of deinstitutionalization-- policy and programs -- research -- how to organize --

A Proposal for a Presidential Research Commission on Health and Disability Strategies for the 21st Century

We have now spoken of the potential of forecasting methods to

introduce precision and stimulate our thinking about future alternatives, of a lack of quantified national goals for disability policy, and of concerns about the state of scientific research in rehabilitation in the United States. How are we to address these issues?

Cornes concludes his monograph with these words:

> to maintain an effective voice in the corridors of power, to obtain the resources needed to secure its own future, vocational rehabilitation will need to make a much more substantial investment in policy studies and the human and material resources necessary to press it own claims in a changing economic, social and political climate" (119).

Consider the following observations.

I often think of the state-federal vocational rehabilitation program (120) in the United States as an invisible giant. A one billion dollar a year program, one of the oldest federally-funded social welfare programs, a potential exemplar of state-federal cooperation, an important national resource, and who outside the field itself ever reads of it? How many persons in the domestic policy establishment in the United States are knowledgeable about it?

In the key public policy journals of this nation (121) -- for example, The New Republic, Commentary, The Public Interest, The Washington Monthly, The New York Review of Books, Policy Review, the New Yorker -- I have yet to see an article on this program in the past year. Go into any book store and one can collect armfuls of books on health and health policy, on relatively modest programs such as Head Start, and broad discussions of social welfare policy from every ideological perspective and find with no mention of the state-federal program.

The state-federal vocational rehabilitation program, however, is only a small component of the larger set of health and disability services provided in the United States. And all such services taken together in the United States are a jig saw puzzle. It is a jig saw puzzle that has arrived in a brown paper bag, so we are denied even the benefit of the full picture we are trying to assemble. Two reasons for this circumstance, I believe, are that both the scope of our endeavors and the real possibilities of health and disability care are without precedent in human history (122).

Another reason for this puzzle is that the original rationales for providing many of these benefits has become refashioned (123). For example, a substantial portion of health and disability services and insurances in the United States are funded by employers as fringe benefits (124). Employer and union-provided health and disability benefits, although beginning in the nineteenth century, grew vigorously during World War II as a compromise between business, labor, and government to freeze wages but provide increased compensation through fringe benefits (125). Although the compensation rationale for these benefits is still visible (126), it is a popular

activity of business theorists to seek a greater purpose for them (127). This is, of course, what we have ourselves done earlier in discussing return-to-work programs as a means to sharpen the competitive edge of business performance.

Business-supplied health and disability may have worked for 40 years, but both the inadequacy of such benefits, in terms of the real coverage they supply employees and the numbers of persons excluded from them (128), yet who must support them indirectly through an increased tax burden (129), and the costs of these benefits to business (130), argue for a re-examination of rationale and design of the business-funded benefits system. These remarks should not be read as suggesting a withdrawal of business from supplying such benefits, rather the argument here is for a careful re-thinking of their purposes and effects, and their social equity.

In large measure, policymakers and researchers have begun to lay out the pieces of the health and disability jig saw puzzle in the United States, which include an understanding of scope of the behavior of income support programs, vocational rehabilitation as an alternative to income replacement, the potential for preventive health, the efficacy of health care delivered in non-traditional settings, the need for data collection systems that measure handicaps rather than mortality, and the potential of health and rehabilitation research.

These various programs, although apparently disparate, and others of common purpose, may be given coherence through the concept of a national disability management system. The concept of "disability management" was originally developed (131) in the business context and is closely allied to our discussion of risk management. Around most goals, this system appears to have a parallel public and private sector programmatic components.

For example, we may place our earlier discussion of return to work programs in the larger context of a "national vocational rehabilitation" service system (132); which is a subsystem of the entire disability management system. If we define vocational rehabilitation as any set of organized activities with the goal of maintaining or re-establishing the position of an individual with an established work history in the labor force, we have three components to the national vocational rehabilitation service system, one public sector and two public sector. The largest component is the public state-federal program, the second component is the private, for-profit rehabilitation services, and the third, although perhaps smallest and presently least well-organized (which is no disparagement of its potential), is employer and union return-to-work programs.

Indeed it has been the lack of a coherent conceptual structure that often make proposed solutions to disability problems seem to resemble squeezing on a balloon. Squeeze it in the middle and the ends expand. For example, companies with disability income benefit plans are moving to require employees to file for Social Security Disability benefits, and these benefits assume first dollar against an overall percentage of income replacement (131). Of course, this

merely transfers the costs of disability income replacement from companies or their insurers to taxpayers, and may have the impact of reducing employer interest in return to work.

Given the concept of a national disability management system based on the common goals of health and disability services, it appears timely and appropriate to put the system together by articulating these goals, creating formal mathematical models of their operation, establishing data collection programs to monitor them, and exploring innovative solutions.

In this regard, I would like to propose the establishment of a Presidential Research Commission on Health and Disability Strategies for the 21st Century. A Presidential Commission implies an initiative from the White House; the same intent could be realized by a national commission authorized by the Congress, or a major study group within the federal government such as generated the Global 2000 Report to the President, or a funded outside group such as who wrote Healthy People, which served to establish our present national health goals.

I envision many charges to this Commission, including:

1. modelling the health, disability, and economic support system, that is, putting together the jig saw puzzle of our national disability management system,

2. defining goals for public rehabilitation and disability policy,

3. defining the data needs and moving from a mortality-based public health statistics approach as is current in the United States to one that also measures handicap, and

4. examining the role of research in reducing the need for health services, that is, cost containment through reduced need for service rather than through simply reducing service utilization.

Such a Commission would require likely at least three years. Its commissioners would be drawn from members of the Congress and Executive, representatives of the private sector (including major employers with experience in disability management, insurance industry, and academic experts in the relevant research, with support from a sophisticated research staff.

There is ample precedent for the value and opportunity afforded by this strategy. The first use of formal social forecasting by the U.S. Government was in 1929. Shortly after his election as President, Herbert Hoover named a Presidential Research Commission on Social Trends financed by the Rockefeller Foundation. In its final report, the Committee concluded that the depression and its persistance were due to unbalanced rates of social change in the 1920's. Specifically, growth in production of goods exceeded growth in national purchasing capacity and large corporations grew faster than labor unions.

More recently, both the Surgeon's General's Report Healthy People in 1979 and the Global 2000 Report to the President in 1980 have stimulated national action and debate on key public policy issues. We would expect no less from the Commission we propose.

Closing Remarks

The challenge is... social consensus ...

If these remarks seem unduly ambitious, I would like to close this paper with another prediction about the view from the future of the 20th century by the British historian Arnold Toynbee, a particularly appropriate comment on this the 10th anniversary since the withdrawal of the American presence in Viet Nam:

"The twentieth century will be remembered chiefly not as an age of political conflicts and technical inventions, but as an age in which human society dared think of the health of the whole human race as a practical objective" (132).

References and Notes

(1) Cornes, P. The future of work for people with work disabilities: A view from Britain. New York: World Rehabilitation Fund, 1984.

(2) Cornes, P., op. cit., p. 7.

(3) The issue of stimulating employment is, of course, a key interest of both the American and British governments; for a statement of the current British approaches to this issue see the recent British Government White Paper The Challenge for the Nation issued March 1985.

(4) For an early discussion of these changes and their social implications for the United States, see Bell, D. The coming of post-industrial society: A venture in social forecasting. New York: Basic Books, 1973 (reprinted 1976 with new foreword).

(5) Quoted in Cetron, M.. O'Toole, T. Encounters with the future: A forecast of life in the 21st Century. New York: McGraw-Hill, 1982.

(6) This observation was inspired by similar remarks in: Congressional Research Service. Long range planning. Prepared for the Subcommittee on the Environment and the Atmosphere of the House Committee on Science and Technology. Washington, D.C.: U.S. Government Printing Office, May 1976, p. 382.

(7) For reviews of the history and concepts of future studies, and representative applications: Barney, G. The global 2000 report to the President The Technical Report Volume 2 . Washington, D.C.: U.S. Government Printing Office, 1980, particularly Appendix A "Lesson from the past"; Congressional Research Service, op. cit.; Cornish, E. The study of the future: An introduction to the art and science of understanding and shaping tomorrow's world. Washington, D.C.: World Future Society, 1977; Hencley, S.P., Yates, J.R. (eds.) Futurism in education: Methodologies. Berkeley, CA: McCutcham Publishing Company, 1979; Office of Technology Assessment, U.S. Congress. Global models, world futures, and public policy: A critique. Washington, D.C.: U.S. Government Printing Office, 1982.

(8) Congressional Research Service, op. cit.

(9) For other forecasting studies of relevance to the field of disability, see: Gellman, W. Projections in the field of physical disability. Rehabilitation literature, 1974, 35, 2-9; Gutowski, M., Harder, P., Koshel, J., Muzzio, T. Changing patterns in rehabilitation manpower, Washington, D.C.: Urban Institute, July 1981; Committee on Ways and Means, U.S. House of Representatives. Background material and data on major programs within the jurisdiction of the Committee on Ways and Means. Washington, D.C.: U.S. Government Printing Office, February 8, 1983; Selby, P. Health in 1980-1990. New York: S. Karger,

1974; Levis,A., Louvet, A.C., Heise, K., Levis, I.S. Worknet: Modeling compensation and rehabilitation systems for the disabled population. Annual progress report August 1984. Topeka, KS: The Menninger Research and Training Center, The Menninger Foundation, 1984; Hester, E.J., Decelles, P.G. The disability system: A dynamic analysis. Topeka, KS: Menninger Research and Training Center, The Menninger Foundation, February 1985; Hammerman, S., Maikowski, S. (eds.) The economics of disability: International perspectives. New York: Rehabilitation International, March 1981.

For some perspectives on the future of mental health care, particularly the issue of financing mechanisms: Westlake, R.J. (ed.) Shaping the future of mental health care. Cambridge, MA: Ballinger Publishing Company, 1976.

(10) The original conceptual and methodological development of these projections and discussion of their relation to the wider issue of disability management may be found in: Vachon, R.A. The future of disability: Epidemiology and corporate resources. Research Fellowship application submitted to the National Institute of Handicapped Research, U.S. Department of Education, June 1983.

(11) Lando, M.E., Cutler, R.R., Gamber, E. 1978 Survey of disability and work. Washington, D.C.: U.S. Government Printing Office, November 1982, Table 1, p. 1.

The Social Security data base was chosen because of the availability in a single format of a large body of information characterizing the disabled population. This data base, as with other available data bases, it not without its problems. For alternative data bases and the issue of correspondence among them, see Haber,L., McNeil, J. Methodological questions in the estimation of disability prevalence. Unpublished paper, U.S. Bureau of the Census, September 1983.

(12) Self-applied disability status definitions used in the 1978 Survey of disability and work (from Lando et al., op. cit., p. 435): severely disabled: unable to work altogeter or unable to work regularly; occupationally disabled: able to work regularly but not at the same work as before onset of disability or unable to work full time; secondary work limitation: able to work full time, regularly, and at the same kind of work but with limitation in the kind or amount of work they can perform; persons with reported limitations in keeping house but not in income-producing work are reported in this group.

(13) Rhine, S. America's aging population: Issues facing business and society. New York: The Conference Board, Inc., 1980.

(14) Associated Press. Half U.S. population is over 31 years old. Washington Post, 11 April 1985, p. A8.

(15) Bureau of the Census, U.S. Department of Commerce. Projection of the population of the United States: 1977 to 2050. Series P-25, No. 704. Washington, D.C.: U.S. Government Printing Office, July 1977.

(16) National Center for Health Statistics. Health United States 1984. DHHS Pub. No. (PHS) 85-1232. Public Health Service. Washington. U.S. Government Printing Office, December 1984., Table 11, p. 53.

(17) National Center for Health Statistics, op. cit., Table 2, p. 43.

(18) National Center for Health Statistics, op. cit., Table 10, p. 51.

(19) Lives saved.

(20) Documentation of the association between age and probability of disability is largely derived from independent data sets collected by three Federal government agencies: Bureau of the Census (U.S. Department of Commerce), Social Security Administration, and National Center for Health Statistics (latter two components of U.S. Department of Health and Human Services).

For presentation of the age-disability status relationship using data from one or more of these sources, see: DeJong, G., Lifchez, R. Physical disability and public policy. Scientific American, 1983, 248, 40-49; Czajka, J. Digest of data on persons with disabilities. June 1984. Available from the National Institute of Handicapped Research, U.S. Department of Education, 400 Mayland Avenue, S.W., Mail Stop 2305, Washington, D.C. 20202; Bowe, F. Demography and disability: A chartbook for rehabilitation. Fayetteville, AR: Arkansas Rehabilitation and Research Center, University of Arkansas, 1983; Hester, E., Decelles, P., op. cit.

(21) Established terminology in disability research distinguishes between impairment, disability, and handicap. In our usage in this paper, we use work disability and handicap interchangeably.

(22) Note for example in the Lando et al., op. cit., data (Table 80, pp. 200-201) that unemployment drops among the non-disabled from 6.3% in the age group 18-34 to less than 1% in the age category 34-44 years.

At the other end of the age spectrum, ill health and disability are the chief reason for men over age 35 not participating in the labor force. See Rhine, op. cit.

(23) Bureau of the Census, op. cit.

(24) Lando et al., op. cit., Table 78, p. 197.

(25) It would also be possible to divide the category "not in the labor force" into two sub-categories with important planning implications. The two categories are: those who left the labor force and those who were never in it. Although not reported in the Lando et al., op. cit., compendium of data from the 1978 survey, it appears

that this categorization should be accessible from the original data set.

(26) Lando et al., op. cit., Table 80, pp. 200-201.

(27) Cornes, op. cit.

(28) Levis et al., op. cit.

(29) Dickens, C. A Christmas carol. New York: Signet, New American Library, 1984 (original publication 1843), pp. 127-128.

(30) We prefer the term "income replacement" to "income transfer" because it more closely reflects...

(31) Berkowitz, M., Johnson, W., Murphy, E. Public policy toward disability. New York: Praeger Publishers, 1976.

(32) Lando et al., op. cit.; Bowe, F. Demography and disability: A chartbook for rehabilitation. Fayetteville, AR: Arkansas Rehabilitation Research and Training Center, University of Arkansas, undated.

(33) Lando et al., op. cit., Table 157, p. 405-406.

(34) Lando et al., p. 436.

(35) DeJong, G., Lifchez, R., op. cit.

(36) Bowe, op. cit.

(37) If we define rehabilitation in general as the physical or functional restoration of a disabling health impairment or its consequences to enable independent living, vocational rehabilitation may be seen as the restoration of the ability to work and lead an independent economic life.

The essential problem, it appears, with providing money to disabled persons not working (or anyone else for that matter) through income replacement (income transfer) programs is that they simply do not appear to provide enough income for most recipients to live decently, and it is unlikely that they ever will.

Judging the adequacy of disability income programs by percentage of income replacement is not appropriate. Joseph Califano in his memoirs on his tenure as U.S. Secretary of Health, Education, and Welfare (Governing America. New York: Simon and Schuster, 1981) reflects this misconception. In the paragraphs preceding the following excerpt, Califano is discussing the growth of the Social Security disability program from 1965 to 1978 (from 1.5 to 13 billion dollars in annual costs), and the reasons for this growth. Califano states: "How did this happen? There were a variety of causes. The benefits were rich for many Americans: 6 percent of those receiving disability insurance, particularly younger workers, got more money than they had earned on the job; another 14 percent got 80 percent or

more of their pre-disability earnings plus medical benefits." (p. 385).

What Califano does not consider is the actual median benefit level, which is the the more meaningfully statistic. It tells us nothing that 20% of Social Security beneficiaries (and let us keep in mind to receive these benefits one must be judged chronically disabled) are receiving income replacement at or exceeding their pre-disability income levels unless we know what those levels are. Indeed, if Califano is correct that it is younger workers who most frequently through Social Security disability benefits exceed their pre-disability incomes, we are likely not talking about a great deal of money per person (whatever the aggregate costs of the program) given that these are these are probably the least well paid workers to begin with.

Indeed, the average monthly benefit in 1982 for the 2.6 million disabled worker beneficiaries was approximately $441, for their 366,000 eligible dependent spouses $129, and for their 1.0 million depedent children $128. The 299,000 new disabled worker awardees in 1982 received benefits of about $444 per month, their 78,000 dependent spouses $120 per month, and their 265,000 dependent children $126 per month (source: Committee on Ways and Means, U.S. House of Representatives. Background material and data on major programs within the jurisdiction of the Committee on Ways and Means. Washington, D.C.: U.S. Government Printing Office, February 8, 1983.

Employment at least provides the appearance of opportunity for a better income through the possibilities of career advances or movement to another job. Once within an income replacement program, what does a person do if he or she is dissatisfied with the level of income support? It is on this point that the independent living concept becomes relevant. Independent living means restoration of the usual risks (and opportunities) associated with life. It is not intended to provide guarantees. DeJong in a recent monograph (DeJong, G. Economics and independent living. Lawrence, KS: Research and Training Center on Independent Living, University of Kansas, 1985) argues economic independence is myth for everyone. This is quite possibly true, but his position appears to miss the essential point that it is not "independence" in an absolute sense that the concept of independent living refers to, but a fixed dependence to any single set of circumstances over which an individual has no control or little opportunity for control.

(38) Cornes' discussion of a "social wage" (Cornes, op. cit., pp. 28-29, 54-55; DeJong, op. cit. also discusses this point) for work now not currently compensated appears to be a special case of the larger issue of income distribution where current arrangements for "paid employment" are no longer the mechanism or standard for cash distribution. Although this may appear to be primarily an issue for individuals in that they require money in our society to eat and meet other needs (except perhaps for the very small number of persons who live as subsistance farmers and barter for items tney do not produce themselves), it is also a larger issue for the economy in that if people do not have sufficent income to purchase good and services, in

other langauge, to create "demand," this has unfortunate economic consequences. Please note the findings of the 1929 Presidential Research Commission discussed towards the end of this paper. We leave these problems to our economist colleagues, but as a provocative aside, does not our defense program (both in terms of its goods and the distribution of its production nationwide, whatever the very real need it may serve) appear to be a very large employment program?

For another discussion of the issue of distribution, see Leontief, W.W.

(39) A largely unexplored population for studying work and use of time in the absence of economic need is persons born with large independent incomes.

(40) For another approach to stratifying the disabled worker market, see Hester, E. Disability management: Pathways. In G. Faimon (ed.) New directions in disability management: A national perspective. Research utilization conference. September 18, 1984. Topeka, KS: Menninger Foundation, December 1984.

(41) United States Commission on Civil Rights. Accomodating the spectrum of individual abilities. September 1983.

(42) Johnson, S. Disabled in professions grow. New York Times, 18 July 1978, pp. A1, A10.

(43) I am indebted to Jay Rochlin (a Human Resources Manager at ATT presently on loan to the President's Commission on the Employment of the Handicapped) for creating my awareness of the distinction between a "job" and a "career," and its implications for our expectations about the employment of disabled people.

(44) probability of mortality versus morbidity; cf. 20, Commissioner's Table.

(45) Sapolsky, H.M., Altman, D., Greene, R., Moore, J.D. Corporate attitudes towards health care costs. Milbank memorial fund quarterly, 1981, 59, 561-585.

(46) Reynolds, D., Vachon, R.A. NIHR research priorities plan: Issues and recommendations for knowledge dissemination and utilization, New York: ICD - International Center for Disability, May 1980; Berkowitz, M. Forestalling disincentive to return to work. Business and health, 1985, 2, 30-32; Galvin, D. Health promotion, disability management, and rehabilitation at the workplace. The interconnector, 1983, 6, 1-13; Galvin, D. Employer-based disability management and rehabilitation programs. Submitted for publication to Annual review of rehabilitation. Vol. V.; Hood, L.E., Downs, J.D. Return-to-work: A literature review. Topeka, KS: Menninger Research and Training Center, Menninger Foundation, February 1985.

(47) Schwartz, G. The impending crisis. Business and health, 1984, 1, 25-28; DuChemin, R. Unions initiate training, placement programs. The interconnector, 1984, 7, 5; report of a conference on

this subject may be found in the v. 7, No. 1 (1984) of The interconnector, a newsletter published by the University Center for Rehabilitation, Michigan State University, East Lansing, MI, USA: Pati, G.C., Adkins, J.I., Morrison, G. Managing and employing the handicapped: The untapped potential. Lake Forest, IL: Brace and Park, 1981; Hull, J.B. When a major illness befalls a key employee, entire firm can suffer. Wall Street Journal, 6 October 1983, pp. 1, 14.

(48) In addition to the above references, return to work programs are the subject of a detailed monograph outlining both a theory and a proposed research plan: Vachon, R.A. The future of work for persons with work handicaps: Employer and union sponsored return to work programs, In preparation.

(49) Pati et al., op. cit.

(50) This advertisement is, of course, qualified as anecdotal evidence. We note two other pieces of anecodtal data that reflect on the proposition stated here. First, a remark made during a Fall 1974 conference for corporate staff charged with implementation of affirmative action programs; one participant noted after dissussion of specific procedures at the worksite for accomodating disabled workers: "If you have a big enough population or extensive unit in which work can be redistributed, you can accomodate almost any handicap (in Akabas, S., Cook, P. Affirmative action - A tool for linking rehabilitation and the business community. Journal of rehabilitation, May-June 1976, p. 22).

There also appears to be substantial anecdotal evidence of the employment of previously marginal handicapped workers during periods of high labor demand, e.g., mentally retarded in Minnesota factories during World War II (D. Fenderson, personal communication, 1984). Formal study of such evidence might be instructive as to the real historical successes of employing handicapped persons.

(51) This advertisement appeared in Foreign Affairs, October 1946, 25, no page number.

(52) For example, see: Berkowitz, E. Growth of the U.S. social welfare system in the post-World War II era: The UMW, rehabilitation, and the federal government. In P. Uselding (ed.) Research in economic history: A research annual. Vol. 5. Greenwich, CN: JAI Press, 1980.

(53) Colvez, A., Blanchet, M. Disability trends in the United States population 1966-1976: Analysis of reported causes. American journal of public health, 1981, 71, 464-471.

(54) Flamholtz, E.

(55) Schwartz, op. cit.; disability benefits were also subject of a recent conference: (ICD)

(56) R.L. Roberts. Presentation before a "Health Care Conference for the Media" sponsored by the Health Insurance

Association of America, 18 October 1984.

(57) Sher, T. Piecing together the health care cost control puzzle takes sound planning. Risk management, April 1984, 40-45.

(58) Spitz, L. Winning at cost containment in rehabilitation. Risk management, July 1983, 46-48.

(59) Hart, S. Taking up the LTD cost containment challenge. Risk management, April 1983, 86-92; Akabas, S., Donovan, R. Cost containment and cost benefit analyses in employee counseling programs: An annotated bibilogaphy, photocopy, 1982. Available from: Industrial Social Welfare Center, Columbia University School of Social Work, New York, New York 10025.

(60) Coopers & Lybrand. Employee medical plan costs: A comparative study. Annual Report 1984. Available from Harry D. Spring, Coopers & Lybrand, 1999 Bryan Street, Suite 3000, Dallas, TX 75201.

(61) Rowland, M. Risk management enters the computer age. Institutional investor, December 1983, 257-261.

(51) Definition of corporate culture

(52) Peters, J., Waterman, J. In search of excellence. New York: Harper and Row, 1982.

(53) For a seminal statement of human resources management and productivity, note Douglas McGregor (The human side of enterprise. New York: McGraw-Hill, 1960):

"Without in the least minimizing the importance of the work that has been done to improve the selection of people with managerial potential, I have come to the conviction that some of our most important problems lie elsewhere. Even if we possessed methods enabling us to do a perfect job of selecting young men with the capacity to become top executives, the practical gain for industry would be negligible under today's conditions. The reason is that we have not learned enough about the utilization of talent, about the creation of an organizational climate conducive to human growth. The blunt fact is that we are a long way from realizing the potential represented by human resources we now recruit into industry. We have much to accomplish with respect to utilization before further improvements in selection will become important" (p. vi).

(54) For example, Jeffers, J. Public sector perspectives. In G. Faimon (ed.), op. cit.; Galvin, D., op. cit.

During the academic year 1984-1985, I was located at Columbia University and regularly attended presentations by Chief Executive Officers (CEO's) of major corporations at the Business School. These men spoke on many subjects: how money was made in their businesses (which is not obvious in many cases), business financing, the impact of emerging technology on their markets, rumors in their markets and

how they made money on them (including stock trading in their personal accounts), the art and science of acquiring other companies and avoid being acquired (e.g., by keeping stock price high), how to talk to stock market analysts, and related subjects.

Of course these talks perhaps had a recruitment purpose and were geared to the interests of their audiences, but I never heard any mention of human resources strategy (except when that was the explicit purpose of the discussion) or other topics relevant to this paper, such as the costs of health insurance, or any questions from their audiences on these subjects. Which is not to say it is not an issue or a concern to these CEO's, undoubtedly, if the trade and general press is accurate, it is. What I find amazing it that the CEO's would have time to think about these issues. Several points may be drawn from this experience. First, the importance of institutionalizing these issues. Second, the transcription of these talks would be a very interesting book, and perhaps more meaningful and representative of business than a lot of the more visible literature currently available. In any case, I recommend a similar experience to any researcher interested in business operation who lacks a formal background or experience on this subject.

(55) However, we do note that some companies that appear on the Peters and Waterman, op. cit., list do have reported interest in employee disability, e.g., Du Pont.

(56) Mills, D. Quinn. Bridging the corporate generation gap. New York Times, 7 April 1985, F3.

(57) Rich, J. (Partner, McKinsey & Co.) Presentation before Human Resources Group, Columbia Business School, 22 March 1984.

(58) Donald Koerner, Xerox Corpporation, personal communication, March 1985; Jack Mason, Burlington Northern Railroads, personal communication, April 1985.

(59) When did "doing good" get a bad name? Expound on Akabas and Cook.

(60) Vachon, R.A., op. cit.

(61) Lando et al., op. cit., Table 77, p. 196

(62) Lando et al., op. cit., Table 114, p. 295.

(63) Lando et al., op. cit., Table 77, p. 196.

(64) for profit from WC

(65) Kleinfield, N.R. Putting the disabled to work. New York Times, 12 April 1984, D1-D2.

(66) Davis

(67) Hester

(68) Kleinfield, op. cit.

(69) Ashton, P. Rehabilitation in a major corporate setting. Journal of rehabilitation, 1979, 45, 26-29; Wickersham, J.F. Disability management key to cost savings at 3M. Business and health, December 1983, 26-29.

(70) Pati et al., op. cit.

(71) Galvin, D. Personal communication, 1985.

(72) Faimon, G., Hester, E., Downs, J. Vocational rehabilitation research and training center in preventing disability dependence. Topeka, KS: Menninger Foundation, August 1984; Faimon, G. (ed.), op. cit.

(73) In Washington, D.C. disability management is a key interest of the Washington Business Group oh Health and the National Institute of Handicapped Research NIHR; see also Vachon, R.A. The Workplace and the future of the disabled employee: Employer and union-sponsored return-to-work programs, in preparation.

(74) Vachon, R.A. Report to the National Institute of Handicapped Research. Research manpower development policy and programs: Issues, options, and recommendations. Unpublished paper, 16 April 1985.

(75) Bunker, J.P. When doctors disagree. The New York review of books, 1985, 32, 7-12.

(**) Properly speaking, rehabilitation is not a single discipline, but an interdisciplinary community of common scientific interests. Disciplines involved include: psychology (particularly the rapidly emerging field of behavioral medicine), various medical specialties, including orthopedic surgery and rehabilitation medicine, engineering, and economics. For further discussion of this subject, see Vachon, op. cit., 1985.

(76) Stanford Research Institute. Evaluation of the National Diffusion Network: Final report. Menlo Park, CA, 1977.

(77) Reynolds and Vachon, op. cit.

(78) current RRX projects

(79) Original interest by Reynolds and Vachon in return-to-work was stimulated..

American social contract

(80) Cornes, op. cit., cf. pp. 17-29.

(81) see also Noble, J. Employment policy for handicapped persons weights difficult issues of economics and equity. The

interconnector, 1984, 7, 1-4.

(&&) An important paper that I suggest needs to be written is: What are the important questions in vocational rehabilitation?

(82) Workman, E.L. Vocational rehabilitation in the private, for-profit sector. In E. Pan, T. Backer, and C. Vash (eds.) Annual review of rehabilitation Vol. 3. New York: Springer Publishing Company, 1983.

(83) Stokes, J. Why not rate health and life insurance premiums by risks? New England journal of medicine, 1983, 308, 393-395; Insurance parley gets smoker plan. New York Times, 11 December 1984.

(84) Effective 1 January 1985, New York State automobile drivers and passengers are required by law to use seat belts. Informal state surveys indicate that rate of seat belt use since the law took effect increased from about 16% of front seat drivers and passengers before legislation to about 60% by March 1985. Automobile accident mortality dropped 27% in the same time period. Data from Berger, J. Deaths drop 27% with State's seat-belt law. New York Times, 1 May 1985, pp. A1, B2.

(85) Office of Technology Assessment, op. cit.

(86) Office of Technology Assessment, op. cit.

(87) limits of planning: economists appear to phrase this in terms of planning versus market strategies; Jane Jacobs

(88) see Cornish, E. (ed.) 1999 The world of tomorrow. Washington, D.C.: World Future Society, 1978.

(89) Naisbett, J. Megatrends. New York: Warner Books, 1984.

(90) Joseph, E. An introduction to studying the future. In S. Hencley and J. Yates (ed.), op. cit.

(91) Public Health Service, U.S. Department of Health, Education, and Welfare. Healthy People. Washington, D.C.: U.S. Government Printing Office, 1979.

(92) Public Health Service, U.S. Department of Health and Human Services. Promoting health Preventing disease. Objectives for the Nation. Washington, D.C.: U.S. Government Printing Office, Fall 1980.; Public Health Service, U.S. Department of Health and Human Services. Public health service implementation plans for attaining the objectives for the nation. Public health reports, 1983, supplement.

(93) Public Health Service, Department of Health and Human Services. Health United States 1984. Washington, D.C.: U.S. Government Printing Office, December 1984.

(94) Statement by Margaret M. Heckler Secretary of Health and

Human Service, HHS News, 22 March 1985.

(zz) Reference to NCH legislation; report due to Congress by February 1986.

(95) Even where there are broad goals, eg., State-federal, often in conflict. Comprehensive Needs study

(96) National Council on the Handicapped. National policy for persons with disabilities. 29 August 1983.

(97) note efforts of interagency committee on the handicapped, subcommittee on demographics; haber paper; Washington Bus Grp Health

(98) Symington, D. The goals of rehabilitation. Arch phys med rehabil, 1984, 65, 427-430.

(99) Cornes, op. cit., e.g., p. 9.

(100) For an interesting discussion of world change, see Barraclough, G. Turning points in world history. London: Thames and Hudson, 1979.

(101) Some might believe this happened earlier, perhaps with the major European expansions in the early 19th century. Leotief, gloabl modeling

(102) Anderson, W.F. Prospects for human gene therapy. Science, 1984, 26, 401-409.

(103) Thomas, J.P. Introduction. In J. Young, P. Burns, A. Bowen, R. McCutchen. Spinal cord injury statistics. Phoenix, AZ: Good Samaritan Medical Center, 1982, pp. 1-10.

(104) Life expectancy data from Young, J., Northup, N. Statistical information pertaining to some of the most commonly asked questions about SCI. National Spinal Cord Injury Center, Good Samaritan Hospital, Phoenix, AZ, August 1979.

(105) Lyons, R.D. Physical and mental disabilities in newborns doubled in 25 years. New York Times, July 18, 1983, pp.1, 10.

(106) CDC data

(107) explanation

(108) Keynes

(109) Rehabilitation science will be a case study in: Vachon, R.A. Accessing the universe of all possible knowledge: Issues for a federal science policy, In preparation; see also Vachon, R.A. Report to the National Institute of Handicapped Research. Research manpower development policy and programs: Issues, options, and recommendations. 16 April 1985.

(110) The question asked here is: What is the role of money in scientific research? Or somewhat more precisely, what is the role of money in making a research area attractive to scientists? I suggest two key factors in attracting scientists to a research area are intellectually exciting questions and resources, e.g., money. See Vachon, op. cit., In preparation, and Vachon, op. cit., 1985.

For data regarding the NIHR budget and its decline, see Fuhrer, M. Medical rehabilitation research: Distortions, deflections, and detractions. Arch phys med rehabil, 1982, 63, 49-54.

(111) National Institute of Handicapped Research, U.S. Department of Education. 1983 Annual Report Interagency Committee on Handicapped Research. Photocopy, 1983.

(112) Background and description of the National Institute of Handicapped Research's (NIHR) charter may be found in: the enabling report to the creation of NIHR (nn), legislation creating the Institute (P.L. 95-602 enacted 6 November 1978) and subsequent amendments (P.L. 98-221, 22 February 1984), and its regulations (National Institute of Handicapped Research;Statement of Organization, Functions, and Delegations of Authority, Federal Register, 26 April 1979, 44, 24820-24823).

Also note that the legislation creating NIHR provided an authorization of appropriation of 100 million dollars for FY 1981, which may be viewed as the original funding growth expectations for the Institute (J. Duncan, personal communication, 1985).

(113) Information regarding the NIH budget is from: National Institutes of Health. 1984 NIH Almanac. NIH Pub No. 84-5. Bethesda, MD: Division of Public Information, National Institutes of Health, September 1984.

(114) Both the lack of national disability goals and the need for more rehabilitation science may perhaps be traced to the early and continued isolation of rehabilitation from the larger public health practice and research in the United States. A revealing case study of this situation is the position of the specialty of rehabiliation medicine. See Berkowitz, E. The federal government and the emergence of rehabilitation medicine. The historian, 1981, 43, 530-545; Vachon, op. cit.

(115) I recognize that the values expressed here, both explicitly and implicitly, about the benefits and importance of science and, by extension, federal funding of scientific research, are not a matter of universal consensus in the United States. Such apparently diverse cogitators as the New York Times , persons who have some ready solace, often derived from religious convictions, that however unhappy the world may appear, this unhappiness serves a purpose, and persons who view, although this is said with full recognition of its caricature, science as a clanking Frankenstein crushing beneath it the simple, wonderful things of nature seem to share a common core of doubt about the utility and priority of science funding.

In the case of the New York Times,

As an expression of a not dissimilar sentiment from religious motivation, consider the recent

I do not wish to suggest that criticism or reservations about science or technology is without merit. This is a very interesting and important subject on which a great deal of work needs to be done , and deserves more thoughful attention that can be given here. Yet, as a behavioral psychologist, I suggest that as an interesting study of the "true regard" for science, or at least that part of science relevant here, we examine utilization of modern medical services by such individuals as defined above and conduct a study of their behavior when ill. Do they seek the very best medical care, and express any frustration when a physician points out that our knowledge is not yet sufficent to deal definitively with their physical or psychological complaints?

Gibson succiently expresses one aspect of this debate: "If you think medical research is expensive, try disease" (p. 1817); Gibson, W.C. The cost of not doing medical research. Journal of the American Medical Association, 1980, 244, 1817-1819.

For discussions of the relationship between new knowledge and its funding, see Bush, V.; NSF proceedings; Vachon, 1985.

(116) Conger, D.S. Social inventions. In E. Cornish (ed.), op. cit., 139-148.

(117) Bill of Rights

(118) For a compendium of relevant laws, see U.S. Civil Rights Commission, op. cit.; DeJong et al., op. cit.

Fenderson (Rehabilitation research: A shifting paradigm. Paper Presented before Division 22, Annual Meeting of the American Psychological Association, 1984) discusses the absence of rehabilitation professionals in the disability rights movement. From the perspective of "social inventions" this appears reasonable.

(119) Cornes, op. cit., pp. 57-58.

(120) cite legislation

(121) Without undue pedantry, we define as a key "policy journal" those magazines in which extended, thoughtful, and widely read concepts, data, and discussion are presented to the constitutency both likely to be influenced by such material and in a position to act on it: employees of the Executive Branch and the Congress and persons in comparable positions in state government, as well as the larger community of interest located in universities and private research centers. As always, the definition of a key policy journal is an empirical question, and quite likely research has been done that would both ..

(122) Did people get scared by the success of the Social Security disability benefit system? costs of the health system; Bunker article on utilization of surgical procedures

(123) For current surveys of employer benefits, see: Conference Board.; benefits as compensation; percentage of health insurance paid by gov't and business

(124) history of fringe benefits

(125) Compensation is one theory of fringe benefits. Others are see: Allen, D. Of course, how they are treated in the real world is something else, see note 128.

(126) Reich (1983) discusses provision of social services (as both programs and insurance) at the worksite, and estimates that 20% of the "national product" of such services are delivered by business to their employees. These services are not currently taxed and are thus tax-free compensation.

(127) The adequacy of health insurance coverage of the United States population is examined by: Farley, P.J. Who are the underinsured? Paper presented at the annual meeting of the American Public Health Association, Anaheim, CA, 13 November 1984 and is available from the author who is located at the National Center for Health Services Research, U.S. Department of Health and Human Services, Washington, D.C.

(128) Treasury proposals to tax fringe benefits

(129) history of concept; disability management system.

(130) We define vocational rehabilitation here as maintaining or re-establishing an individual in the labor force as opposed to vocational preparation which involves individuals without significant work histories. The practical value of this distinction may be considered in terms of the earlier discussion of disaggregating individuals with work handicaps into appropriate service "markets."

Original presentation of the concept of a national vocational delivery service system was in remarks entitled "The future of disability: Forecasts and the workplace" presented to the First Switzer Fellowship Conference of the National Institute of Handicapped Research, Washington, D.C., 18-19 Septemeber 1984.

(131) Hart, op. cit.

(132) Toynbee source.

(133) Acknowledgements. I would like to thank George Engstrom of the National Institute of Handicapped Research (NIHR) for his remarks on earlier drafts of this conference presentation, and conference participants for their responses, particularly Donald Galvin (Michigan State University), Jack Mason (Burlington Northern

Railroads), David Vandergoot (Vanderbilt University), and Carolyn Vash (vv). Appreciation is expressed to James Garrett and Diane Woods for the invitation to speak at this World Rehabilitation Fund conference.

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This paper is dedicated to Stanley F. Yolles, M.D. who taught me that possibilities are most limited by our imaginations and courage.

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Date: 13 May 1985.

Table 1 Numbers of Work Disabled Persons Aged 18-64 by Disability Status: 1978 (millions of persons)

Year 1978 (est.) (1)

Age	All Disabled	Not Disabled	Total Population
18-34	4.92	53.28	58.20
35-44	3.72	21.17	24.89
45-54	5.73	17.94	23.67
55-64	7.51	12.79	20.94
Total	21.87	105.18	127.05

Work Disabled by Disability Status (2)

Age	Severe	Occupational	Secondary
18-34	1.55	1.31	2.06
35-44	1.61	.95	1.16
45-54	2.67	1.43	1.63
55-64	5.05	1.18	1.28
Total	8.92	4.87	6.13

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(1) see Reference (7).
(2) for definitions of disability status see Reference (8)

Table 2 Numbers of Work Disabled Persons Aged 18-64 by Disability Status: Projections for Year 2000. (millions of persons)

Year 2000 (projected)

Age	All Disabled	Not Disabled	Total Population
18-34	4.80	51.88	56.68
35-44	6.18	35.16	41.34
45-54	8.69	27.19	35.88
55-64	8.60	14.66	23.26
Total	28.27	128.89	157.16

Work Disabled by Disability Status (2)

Age	Severe	Occupational	Secondary
18-34	1.51	1.28	2.01
35-44	2.67	1.58	1.93
45-54	4.05	2.17	2.47
55-64	5.78	1.35	1.47
Total	14.02	6.38	7.89

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(1) For definitions of disability status see Reference (8).

Table 3 Changes in the Numbers and Percent of Work Disabled Persons by Age Groupings, Years 1978 - 2000 (millions of persons)

Age	Numbers Disabled 1978	2000	Absolute change	Percent change
18-34	4.92	4.80	-0.12	-2.4%
35-44	3.72	6.18	2.46	66.1
45-54	5.73	8.69	2.96	51.7
55-64	7.51	8.60	1.09	14.5
Total	21.87	28.27	6.40	29.3

Work Disabled by Disability Status (1)

	Severe		Occupational		Secondary	
Age	Number	Percent Change	Number	Percent Change	Number	Percent Change
18-34	-0.04	-2.6	-0.03	-2.3%	-.05	-2.4%
35-44	1.06	65.9	.63	66.3	.77	66.4
45-54	1.38	51.7	.74	51.7	.84	51.5
55-64	.65	12.9	.17	14.4	.19	14.8
Total	5.10	57.2	1.51	31.0	1.76	28.7

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(1) For disability status definitions see Reference (8).

Table 4 Labor Force Status of Work Disabled and Non-disabled Persons, 1978 (millions of persons)

Year 1978 (1)

Labor Force Status	Disabled	Not Disabled	Total Population
In Labor Force	9.67	86.88	96.54
Employed	8.99	82.97	91.96
Unemployed	.67	3.90	4.58
Not In Labor Force	12.21	18.30	30.51
Never Employed	.91	1.64	2.54
Previously Employed	11.30	16.66	27.96
Total Population	21.87	105.18	127.05

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(1) See Reference (11).

Table 5 Labor Force Status of Work Disabled and Non-Disabled Persons, projections for Year 2000 (millions of persons)

Year 2000

Labor Force Status	Disabled	Not Disabled	Total Population
In Labor Force	12.59	106.40	118.99
Employed	11.78	102.06	113.84
Unemployed	.81	4.37	5.18
Not in Labor Force	15.68	22.49	38.17
Total population	28.27	128.89	157.16

Table 6 Changes in Labor Force Participation Rates of Work Disabled Individuals, Years 1978-2000

Labor Force Status	(millions of persons) 1978	2000	Absolute Change	Percent Change
In Labor Force	9.67	12.59	2.92	30.2%
Employed	8.99	11.78	2.79	31.0
Unemployed	.67	.81	.14	20.9
Not in Labor Force	12.21	15.68	1.28	10.5
Total	21.87	28.27	6.40	29.3

Figure 1 Advertisement from Foreign Affairs, October 1946.

Figure 2 Savings Available by Cost-Containment Procedures