WORK PARTICIPATION AMONG PEOPLE WITH DISABILITIES: DOES THE TYPE OF DISABILITY INFLUENCE THE OUTCOME?

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Abstract

This paper describes the methodology and results of a quantitative study of the extent to which work participation is affected by type and severity of disability. The study is based on data from two Statistics New Zealand surveys: the 2001 New Zealand Disability Survey and the 2001 Household Labour Force Survey. A regression-based procedure is used to estimate for people with disability what their employment outcomes would have been in the absence of disability (assuming that other characteristics such as age, gender, ethnicity, qualifications, etc., are unchanged). This provides a counterfactual to the descriptive results on employment, thus permitting assessment of the effect of each type of disability on employment. The results show that those with disabilities have a greatly diminished likelihood of full-time employment. However, the effect is much smaller when the outcome examined is any degree of employment, and shows some variation according to the type of disability. The overall likelihood of employment diminishes sharply with the severity of disability. The authors suggest that there may be greater potential than has been appreciated to raise the level of full-time employment among people with disabilities. The challenge is to develop policies that counter tendencies in the job market to marginalise people with disabilities.

INTRODUCTION

Throughout the world, the proportion of working-age people who receive social assistance related to ill health or disability has been increasing steadily. In many countries these groups now constitute the majority of welfare recipients, with disability benefit costs being higher than unemployment benefit costs in 19 out of 20 OECD countries (OECD 2003).

The situation is no different in New Zealand, where significant growth has occurred over the past three decades in the number of people in receipt of social assistance related to ill health or disability (Wilson et al. 2004). In 1973 there were 8,000 people receiving a Sickness Benefit (SB) and 9,000 people receiving an Invalids Benefit (IB). During the past 10 years the number of people receiving SB has increased from approximately 29,000 in June 1993 to 40,000 in June 2003. The number receiving IB has almost doubled over this same 10-year period, from approximately 35,000 to 69,000. These figures do not include monetary assistance to people whose disabilities are a result of accidents; for these people, coverage is provided by the New Zealand Accident Compensation Corporation (ACC).[1]

The study has been carried out to assist implementation of the New Zealand Disability Strategy (Ministry of Social Development 2003), which is designed to remove barriers to social participation arising from disability.

In this context, it is relevant to add a comment on language usage relating to disability. In the present paper, people with limitations or impairments (as indicated by their responses to Statistics New Zealand's Disability Survey, described in a later section) are referred to as "people with disabilities". This usage follows that of many scholarly writers on disability (e.g. Wilkins 2003, Scott 2003, Yelin and Trupin 2003). However, the usage differs from that of the New Zealand Disability Strategy, which draws a basic distinction between impairment and disability. To quote from the Strategy document: "Disability is not something individuals have. What individuals have are impairments" (2003:3). The Strategy is developed around the notion that disability reflects a social process of disablement that occurs through "the interaction between the person with the impairment and the environment" (p.3).

The Strategy uses the term "disabled people" (p.4), with the specific meaning of people whose lives are restricted because they encounter barriers as a consequence of their impairments. The information from the Disability Survey does not enable an examination to be made of the extent to which respondents with impairments are "disabled people" in that particular sense, because the Survey does not include data on whether the respondents' recorded impairments affect their lives in ways that constitute disablement. In terms of the language of the Disability Strategy, the present paper does not relate to "disabled people" but rather to "impaired people", presenting results on "types of impairment", "severity of impairment", "impact of impairment", and so on. Consideration was given to using such terminology, but after reflection it

1 At 3 April 2004 there were 15,583 claimants aged 16–64 years in receipt of weekly compensation of 26 weeks or more duration. This scheme pays up to 80% of the wages of those who have accidents. This information was made available to the Ministry of Social Development (MSD) as part of the ACC–MSD joint research programme.

was decided that to do so could distance the research from the literature to which it relates and prove more of a barrier than an aid to the easy communication of its findings. The authors nonetheless endorse the utility of distinguishing impairments from the socially determined consequences of the impairments.

This paper is centrally concerned with examining the extent to which having a disability affects the likelihood of being in employment, taking account of non-disability factors (age, ethnicity, qualification, etc.) that also affect employment. This has required some quite elaborate statistical procedures, which are presented here only in a condensed overview. A comprehensive account of the procedures is given in the fuller report *Disability and Work Participation in New Zealand* (Jensen et al. 2005), which will be published on the Ministry of Social Development's website in 2005. That report also includes an analysis of the extent to which people with disabilities have an elevated likelihood of being in receipt of an income-tested social security benefit.

RESEARCH QUESTIONS AND APPROACH

The starting point for the current study was the widely documented disparity in labour market outcomes for those with disabilities compared to those without. Some examples of relevant studies from the international literature are those by Berthoud (2003a, 2003b), Burchardt (2003), Hogelund and Pedersen (2001), ISSA (2002), OECD (2000, 2003), Scott (2003), Wilkins (2003), and Yelin and Trupin (2003). A brief overview of this literature is given in Jensen et al. (2005).

In New Zealand this disparity is particularly pronounced in the case of full-time employment outcomes, as shown in Table 1.

Table 1 Comparative Labour Market Outcomes for the Disability and Non-Disability Populations Aged 18–64 Years

	Disability Population	Non-disability Population
Any employment	58%	77%
Full-time employment	29%	65%

The analysis in this paper is both descriptive and explanatory, aiming to understand employment outcomes for people with disabilities and how better outcomes might be achieved. While the analysis aims to be explanatory, it is acknowledged that some of the relationships are complex, and some of this complexity may not be fully captured. The analysis has involved:

- undertaking a descriptive analysis of the relationship between disability and labour market outcomes
- fitting formal models of the relationship between disability and labour market outcomes
- profiling the different types of disability subpopulations and their differing labour market outcomes.

The study has several applications. Firstly, it will provide information that will facilitate the design of interventions to increase employment for those with disabilities. Secondly, it will analyse how the disability/employment relationship varies according to the type of disability. Interventions will therefore be able to be tailored to align them more closely with the needs of the different disability subpopulations, rather than adopting a "one-size-fits-all" approach. Thirdly, the study will identify both disability-related and independent factors that may be inferred as influencing the relationship between disability and employment. This will enable us to better understand the factors that influence employment outcomes for this group. Strengthening interventions that facilitate employment for people with disabilities has the consequence of reducing reliance on benefit by those people.

The research seeks to answer the following questions:

- Are people with disabilities more disadvantaged in the labour market, when other individual characteristics are controlled for?
- What is the relationship between type of disability, severity of disability, and employment?
- What is the relationship between demographic variables (such as age, education and age of onset of disability) and labour market outcomes? For example, are those with an older age of onset of disability at less risk of poor outcomes than those for whom disability occurs at a younger age?

DATA SOURCES AND VARIABLES USED

The New Zealand Disability Survey 2001

The Disability Survey was conducted by Statistics New Zealand in conjunction with the 2001 Census (which included two questions on whether people had activity limitations). A stratified sample of 38,508 census respondents was drawn for the Disability Survey, which achieved a response rate of 73.4%. This left 3,367 working-age people with disabilities, who provide the basis for the results reported here.

Because the present analysis is concerned with the effect of disability on employment, it uses data on only working-age people (defined for present purposes as those aged 18–64 years). Children under 18 years and those over 65 were therefore excluded. This left 3,367 working-age people with disabilities, who provide the basis for the results reported here.

Although the majority of interviews were conducted by phone, where phone contact could not be made the address was visited and a face-to-face interview was conducted. Where appropriate, someone other than the nominated respondent answered questions on their behalf (e.g. a family member). If requested, interpreters were arranged to translate questions, including into sign language.

Respondents in the Disability Survey were asked questions about 23 specific impairments and limitations. The questions were introduced with the statement "I am going to ask you some questions about long-term difficulties that some people have doing things" (with "long-term" defined as lasting or expected to last six months or more). An example of such a question is "Can you cut your own food, for example, meat or fruit: easily, with difficulty or not at all?" The questions on specific impairments were followed by a general question that asked whether the respondent had any other type(s) of limitation (not specified) that made it difficult or impossible "to do everyday things that people of your age can usually do". For those whose responses identified them as having limitations, further questions were asked on disability-related assistance being received and unmet assistance needs. The questionnaire also collected some demographic information, which was supplemented by information from the respondent's Census records, incorporated into the Survey database through linkage of the two sets of data.

For the purposes of the Disability Survey respondents are classified as having a disability if they report any "limitation in activity resulting from a long-term condition or health problem, lasting or expected to last six months or more and not completely eliminated by an assistive device" (www.stats.govt.nz). It is worth noting that not all those classified by this procedure as being "disabled" would necessarily consider themselves to be so.

This approach to defining disability is similar to that used in Australia in the 1998 Survey of Disability, Ageing and Carers, although the list of screening questions differed. The approach is compatible with the World Health Organisation definition of disability: "any restriction or lack [resulting from an impairment] of ability to perform an activity in a manner or within the range considered normal for a human being".

The Household Labour Force Survey 2001

This report compares the employment outcomes for the disability population with employment outcomes for people without disabilities. To do this, a data source on employment outcomes for the general population was used. The Household Labour Force Survey (HLFS), which is conducted annually by Statistics New Zealand, collects information on employment and a range of demographic variables including age, gender, ethnicity, qualifications and family type. Data on 21,298 HLFS respondents were used for the analysis.

Variables Used to Measure Disability

The Disability Survey contained an extensive range of questions that provide a large amount of detailed information about the respondents' disabilities. These questions include the ones about the 23 specified impairments, referred to earlier, and a number of supplementary questions. To analyse the effect of disability on employment using the intended analysis design, it was necessary for the many detailed aspects of disability included in the survey to be condensed into a compact set of disability types. With this purpose in mind, 31 variables were specified as potentially able to contribute to the specification of such a typology.

Some of these variables were tripartite, relating to whether the respondent was able to carry out a specified activity easily (scored as 0), with difficulty, because of a long-term condition (scored as 1), or not at all, because of a long-term condition (scored as 2). Others were binary (such as whether the person needed support from others because of an intellectual disability, scored as 0 for "no" and 1 for "yes").

Exploratory analysis of the properties of the 31 variables led to some being excluded as unsuitable for various reasons, resulting in a reduced set of 22, which was then used to specify the typology. The 22 measurement items are set out below in the section "Specification of a Compact Set of Disability Types".

Control Variables Used in Estimating Impact of Disability

To be able to assess the likely impact of disability on employment, it was necessary to identify a set of demographic variables common to both the Disability Survey and the HLFS that were appropriate in controlling for factors other than disability that are associated with employment. Exploratory analysis led to six control variables being selected: educational qualifications, age, gender, ethnicity, social marital status and parenting status.

Outcome Variables

Examination of the information on employment in the Disability Survey and the HLFS led to the specification of two binary outcome variables related to employment:

- whether the respondent had any level of employment (either part-time or full-time), specified as a binary dummy variable whose values correspond to "yes" or "no"
- whether the respondent was in full-time employment (defined for the purposes of the study as more than 30 hours per week).

A third binary outcome variable, relating to whether the respondent was in receipt of an income-tested social security benefit, was also specified. However, it is not further described here because the analysis carried out using that variable is not described in this paper.

SPECIFICATION OF A COMPACT SET OF DISABILITY TYPES

The task of examining the effect of disability on employment could not feasibly be undertaken by trying to determine the separate effect of each of the many specific limitations distinguished in the Disability Survey. The first stage of analysis thus involved seeking to develop a compact classification that could provide a useful basis for subsequent analysis of employment. Statistics New Zealand had already predefined some composite categories, such as "agility disability" and "sensory disability", but it was decided that a post-survey classification of the types of limitation experienced could provide more useful groupings for analytical purposes. It was decided to ascertain whether the body of data lent itself to the development of a statistically well-specified classification based on a natural grouping of the limitation variables.

As noted in the previous section, 31 potential measurement items were specified and then reduced to a set of 22 on the basis of exploratory analysis that examined their suitability for a typology analysis.

The pattern of statistical association between the items was then examined, using – in the first instance – the Pearson product-moment correlation coefficient. The matrix of correlations is shown in Table 2, with values above 0.3 highlighted. The key to the items precedes the matrix.

Because the interview questions are in various forms, the measurement items (as indicated earlier) are a mix of tripartite and binary items. Furthermore, they are found to have substantially differing distributions/base rates. The measurement items thus constitute an untidy set for a conventional correlational analysis, and an issue arises as to the robustness of the Pearson coefficient to establish the pattern of associations. This issue was examined by generating and comparing matrices based on three other measures of statistical association; namely, Fischer's Exact Test, Chi Square and Phi/Phi-Max. All of these measures showed essentially the same pattern of associations, indicating that the structure revealed was robust to the measure of association used.

The items were initially grouped by inspection of the matrices for the different measures of association. This led to the conclusion that the items could be grouped either into six sets, with two of these showing a moderate degree of association, or into five sets, which was the grouping produced if the two associated sets were combined into one.

As a second stage, the matrix of Pearson coefficients was factor analysed. The factor analysis gave a six-factor solution, which matched the six-way grouping identified by inspection. That grouping was adopted as the disability typology for use in subsequent analysis.

Table 2 Correlation Matrix (Weighted) – Limitation Items

	q3a	q4a	q7a	q8a	q10a	q11a	q12a	q13a	q14a	q15a	q16a	q17a	q18a	q19a	q20a	q21	q6a	q23a	q24a	q25a	q27a	q28a
q3a	1.0																					
q4a	0.6	1.0																				
q7a	0.0	0.0	1.0																			
q8a	0.0	0.0	0.5	1.0																		
q10a	0.0	–0.1	0.0	0.0	1.0																	
q11a	0.0	–0.1	0.0	0.1	0.6	1.0																
q12a	0.0	–0.1	0.1	0.1	0.5	0.5	1.0															
q13a	0.0	0.0	0.1	0.1	0.4	0.4	0.4	1.0														
q14a	–0.1	0.0	0.0	0.0	0.5	0.4	0.4	0.4	1.0													
q15a	0.0	–0.1	0.1	0.0	0.4	0.4	0.4	0.4	0.5	1.0												
q16a	0.0	–0.1	0.1	0.1	0.3	0.4	0.4	0.4	0.3	0.4	1.0											
q17a	0.0	0.0	0.1	0.1	0.4	0.4	0.4	0.3	0.4	0.5	0.5	1.0										
q18a	0.0	–0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.4	0.3	1.0									
q19a	0.0	–0.1	0.0	0.0	0.2	0.3	0.4	0.2	0.3	0.3	0.4	0.3	0.4	1.0								
q20a	0.0	0.0	0.1	0.1	0.2	0.3	0.3	0.3	0.2	0.3	0.5	0.4	0.5	0.3	1.0							
q21	0.0	0.0	0.1	0.1	0.3	0.3	0.4	0.5	0.4	0.4	0.5	0.4	0.3	0.4	0.4	1.0						
q6a	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	1.0					
q23a	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.3	1.0				
q24a	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.4	1.0			
q25a	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.2	0.1	0.3	0.4	0.3	1.0		
q27a	0.0	–0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3	1.0	
q28a	0.0	–0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.3	0.3	0.2	0.6	1.0

Key to Table 2
(question numbers refer directly to the Disability Survey questionnaire)

q3a Hearing a conversation with one person
q4a Hearing a conversation with three people
q7a Seeing newspaper print
q8a Seeing a face across a room
q10a Walking 350 metres
q11a Walking up and down stairs
q12a Carrying 5 kilos while walking 10 metres
q13a Moving between rooms
q14a Standing for 20 minutes
q15a Bending down and picking something up off the floor
q16a Dressing and undressing yourself
q17a Cutting your own toenails
q18a Grasping or handling things like scissors or pliers
q19a Reaching in any direction
q20a Cutting own food
q21 Getting in and out of bed by yourself
q6a Difficulty in speaking and being understood
q23a Learning
q24a Remembering
q25a Needing support from others for intellectual disability
q27a Difficulty doing normal age-specific activities
q28a Difficulty communicating or socialising with others

On the basis of the grouping, respondent values on the six sets of items were combined to give scores on six composite disability variables. The grouping is shown in the following table.

Table 3 The Six Disability Types

Type	Measurement Items
Vision disability (partial or total blindness)	q7a, q8a
Hearing disability (partial or total deafness)	q3a, q4a
Restricted mobility (mobility and strength limitations)	q10a–q15a
Restricted coordination/dexterity (dexterity and agility limitations)	q16a–q20a, q21
Learning/memory disability (learning and memory problems, need for support from others, difficulty in speaking, intellectual)	q23a–q25a, q6a
Psychological/psychiatric disability (long-term emotional, psychiatric or psychological condition, difficulty with communicating, socialising, everyday things)	q27a, q28a

In addition to those having one or more of the particular limitations included in the Disability Survey, there was a residual group of 9% of the respondents who had only an "other" type of limitation, not otherwise specified. As those respondents could not be characterised by means of the six disability types, and there was no way of ascertaining the extent to which they had common characteristics, they were excluded from further analysis.

Scoring the Disability Types for Severity

The final stage of developing the typology was specifying a procedure for giving each respondent a score on each type of disability. A respondent's score on a disability type was obtained by adding together the respondent's values on the items making up the disability type. The score thus reflects the number and extent of the respondent's limitations of that type.

The score is interpreted as a measure of the degree of disability that the respondent has in the designated disability category, and is referred to as a severity score. A score of 0 indicates that the respondent does not have that type of disability.

Inspection of the severity scores showed that results could conveniently be presented by means of five severity categories, corresponding to scores of 0, 1, 2, 3, and 4 or more. This standard format has been used for all disability types except for psychological/psychiatric disabilities, which has a range of only 0 to 2 because the score is generated from only two items, both binary.

Prevalence of the Six Types of Disability

As shown in Table 4, physical disabilities were the most common types of disabilities experienced, with 50% of respondents indicating that they had restricted mobility and 30% having restricted coordination/dexterity. The least common type of disability was vision disability at just 9%. The categories are not mutually exclusive and therefore do not add up to 100%, as some people have disabilities of more than one type.

Table 4 Prevalence of Different Disability Types among the Disability Population Aged 18–64 Years

Type of disability*	Percentage
Vision disability	9%
Hearing disability	29%
Restricted mobility	50%
Restricted coordination/dexterity	30%
Learning/memory disability	23%
Psychological/psychiatric disability	20%
Other disability**	25%

* The categories are not mutually exclusive as a person can have more than one type of disability.

** As previously stated, the analysis excludes respondents whose only disability was in the "other" category. The 25% appearing in the "other" category of the table are respondents who had some other disability in addition to one or more of the specified types.

ASSESSING THE IMPACT OF DISABILITY[2] ON EMPLOYMENT

Obtaining Counterfactuals

To assess the impact of disability, it is necessary to be able to estimate for various groups of people with disabilities the outcomes that would be expected to have occurred if they had not had disabilities (but were the same in other respects). An estimate of this type is commonly referred to as a "counterfactual".

By comparing the counterfactual with the actual employment outcome of a group with disabilities, it is possible to move beyond a purely descriptive analysis, permitting inferences to be made about the extent to which the observed outcome is partly a reflection of the influence of disability on employment (acting in combination with non-disability factors that affect employment).[3]

2 This part of the analysis estimates the extent to which having a disability affects a person's likelihood of being in employment. The results are described in the report as estimating "the impact of disability on employment". Such a phrase is not meant to imply that a disabled person's reduced likelihood of employment is a simple consequence of the disability *per se*, with the corollary that any improvement would depend on eliminating or reducing the disability. "Impact of disability" should be seen as a convenient shorthand for "the impact of disability-related employment barriers," which include prejudice, discrimination, inflexibility on the part of employers and difficulties in obtaining special equipment. The usage of the report is not intended to direct attention away from the importance of labour market and societal factors that contribute to the outcome that is reported.

3 A caveat also needs to be made about the possible effect of "omitted variables". The variables available for estimating the counterfactual are limited to demographic variables included in both the Disability Survey and the HLFS. Those common demographics make up only some of factors likely to be influencing employment. As a result, the "control" variables available for estimating the counterfactual do not constitute a comprehensive set. This may reduce the accuracy of the counterfactual estimates.

In the context of the present study, being the same "in other respects" means being the same in terms of the relevant demographic factors that had been included in the Disability Survey and the HLFS. Some of these characteristics may themselves be the consequence of disability (e.g. low qualifications) and the impact of disability could be understated as a consequence.

To develop a procedure for estimating counterfactuals, it was necessary to determine which of the common demographic variables affect employment outcomes among people without disability. This would have been straightforward if the HLFS included questions on disability, but unfortunately it does not. The relationship between the demographic variables and employment was therefore analysed using the whole of the HLFS sample. This procedure took its rationale from a prior estimate that 17% of the sample could be expected to have a disability, so that the non-disabled part of the sample could be expected to dominate the results of the analysis, which thus would give a reliable identification of the variables affecting employment among non-disabled people. The variables identified were: age, ethnicity, educational qualifications, gender, whether the person had a partner, and whether the person had children. (The last three variables were found to influence the outcomes not only through simple "main" effects, but also through interactions that resulted in combined effects that were not simply the sum of their separate effects.) These six variables are referred to as the control variables.

Further analysis was undertaken to determine how these variables could be specified in the most economical way that preserved the major part of their statistical associations with employment. Thus, for example, qualifications were expressed as a binary dummy variable of "post-school qualification(s)" versus "no post-school qualification".

The data sets for both the Disability Survey and the HLFS were then used to create a synthetic data set of unit-record data for respondents distinguished according to whether or not they had a disability. The variables in the synthetic data set (apart from presence of a disability) were employment and the six demographic control variables. The procedure for generating the synthetic data set was complicated and is not further described here. It is set out in Jensen et al. (2004).

The synthetic data set was used to develop a statistical estimation procedure, based on specifying and fitting a set of regression models, for calculating the likelihood of employment in the absence of disability, given the control variables.

The regression equations provided a means of estimating for any person in the disability population the likelihood of their being in (any) employment, and of being in full-time employment, given their values on the control variables. For any group of

people in the Disability Survey (e.g. people with a vision disability at severity level 1), a counterfactual could be obtained with respect to employment (any employment or full-time employment), by estimating the likelihood of employment for each person in the group and calculating the average for the group. This average is the proportion of the group that could be expected to be in employment in the absence of disability.

Assessment of the Impact of Disability

An analysis was made of the Disability Survey data to identify aspects of disability that affect the likelihood of a person with a disability being employed. This was done using logistic regression, controlling for demographic factors. It was found that employment (whether measured as any employment or full-time employment) was affected by the person's type of disability and severity of disability.

This result, together with the procedure of estimating counterfactuals, laid the basis for analysing the impact of disability, whether considered simply in terms of the presence or absence of disability or in relation to the type and severity of disability.

Estimates are given below for the impact of disability on being in any degree of employment and being in full-time employment. The impact of a particular type of disability at a designated level of severity is specified as the proportion of people in the category who have a specified outcome (e.g. any employment) divided by the counterfactual proportion (e.g. the proportion of those people who would have been in any employment in the absence of disability).

For example, if the proportion in employment is 20%, and the counterfactual indicates that 80% of those people would be expected to be in employment in the absence of disability, the impact would be given as 20/80 or 0.25. Where there is no impact, the impact figure will be 1. The larger the impact, the further the figure will be from 1. An impact of 0.25 indicates that the proportion in employment is only a quarter what it would have been in the absence of disability, which might be regarded as a large negative impact.

IMPACT ANALYSIS: THE EFFECT OF DISABILITY ON EMPLOYMENT

This section describes the first phase of the analysis to assess the impact of disability on employment outcomes. The following section will sharpen this focus by incorporating into the analysis information on both number and severity of disabilities.

Impact on Labour Market Outcomes for Population as a Whole

As shown in Table 5, for the total disability population, the presence of a disability means that the percentage employed is about four-fifths of the value expected in the absence of disability. In other words, disability has reduced employment by a fifth. When full-time employment is examined, the impact is far more pronounced. In this case, the presence of a disability reduces employment probability to a little less than half of what it would have been.

Table 5 The Impact of Disability on Labour Market Outcomes

	Employed	Full-time Employed
Actual proportion	59%	29%
If no disability	72%	63%
Impact of disability	0.82	0.46

Impacts by Disability Type

When the results for any type of employment are examined across disability subpopulations (Table 6), the impact ratios range from 0.62 to 0.69, with the exception of hearing disability, for which the value is 0.87 (indicating a relatively small impact). For full-time employment, the impact ratios (not including hearing) range from 0.29 to 0.35, with the ratio for hearing being 0.45.

Table 6 The Impact of Disability Type on Labour Market Outcomes*

Disability Type**	Employed	Full-time employed
Vision disability	0.62	0.34
Hearing disability	0.87	0.45
Restricted mobility	0.68	0.35
Restricted coordination/dexterity	0.63	0.30
Learning/memory disability	0.69	0.34
Psychological/psychiatric disability	0.63	0.29

* This table excludes people in the Disability Survey whose limitation(s) are not identified in the survey. This set of respondents make up 9% of the disability sample and are included in the estimates given in Table 5 above. Because the unspecified disabilities had a comparatively weak impact on employment, the overall impact ratios given in Table 5 (which relate to all people with disabilities) are larger than might be expected from the values for the specified disability categories shown in Table 6.

** The disability categories are not mutually exclusive. People with more than one type of disability are represented in each category applicable to them.

Impacts for Different Demographic Groups

If the results for any type of employment are broken down by demographic subcategory, some interesting findings emerge, especially in relation to the situation of older people with disabilities. The impact ratio of those with disabilities in the 50–64 age group is 0.74. This compares with ratios of 0.88 and 0.86 for those aged 18–24 and 25–49, respectively.

The levels of employment of people in the Pacific and "other" ethnicity categories were significantly more affected by disability than the levels of those with European and Māori ethnicity. The former groups had impact ratios of 0.70 and 0.61 respectively, compared to ratios of 0.82 and 0.85 for Europeans and Māori. In addition, there was a relatively large impact of disability on those without qualifications. For that group the ratio was 0.71, compared with 0.90 and 0.88 for those with school qualifications and post-school qualifications, respectively.

The impact of disability on the prospects of people who were partnered and had children was quite small (0.95). For people in other types of families there was a larger impact (with ratios ranging from 0.73 to 0.76). The reason for this pattern is not entirely clear – other characteristics, including the severity of disability, could be mediating this outcome. Possible reasons could include social pressure to work for adults in families, "normalisation" effects of family membership, or the impact of "work-related" Family Assistance. However, further research would be required to determine whether any of these factors is significant. In relation to the causes of disability, the strongest impact arose from disease or illness. For this group the impact ratio was 0.69 compared with ratios ranging from 0.83 to 0.87 for the other causation groups.

Age of onset of earliest disability also shows variation in employment outcomes. For example, the younger age of onset (0–14 years) and older age of onset (45–64 years) both had considerably reduced probability of employment. Information on the duration of disability also suggests that the probability of employment is lower for those with long durations (20+ years).

Joint Impact of Disability Type and Severity on Employment (Any Level)

Within each disability subpopulation, people experience differing levels of limitation. For the vision, hearing, restricted mobility and restricted coordination/dexterity disabilities, each screening question therefore incorporated three possible responses – the respondent could do the action easily, with difficulty or not at all. Scores of 0, 1 and 2 were assigned to these responses, respectively, and scores were added together where a respondent experienced more than one limitation. In this way, both the number and severity of limitations experienced were incorporated into scores.

Figures 1 and 2 show, for vision and hearing disabilities, the proportion in employment at each level of severity. These proportions are shown by the bars. The figures also show (by means of dotted lines) the likelihood of any employment in the absence of a disability. The process used to derive these likelihoods has been discussed earlier. The gap between these lines and the top of each bar represents the impact of disability on employment outcomes for that subgroup.

As shown in Figure 1, vision disability displays a consistently negative relationship with employment prospects. That is to say, the higher one's score within this subgroup, the higher one's likelihood of being unemployed. This is also the case for restricted mobility, restricted coordination/dexterity, learning/memory and psychological/psychiatric disabilities. Graphs for these four subgroups can be seen in the full version of this paper at (Jensen et al. 2005), and results are also summarised in Table 7. While the pattern is a little uneven for the two physical disabilities, a generally negative trend is apparent.

As shown in Figure 2, the hearing group was the only disability variable that did not demonstrate a consistent relationship with employment outcomes. Total employment varied from 54% to 66% for all score levels, which was consistently higher than for other subpopulations. For those with the highest score of 4 points on the severity gradient, full-time employment was still markedly higher than for those with lower severity scores, at 51%.

For the learning/memory and psychological/psychiatric disability groups, questions were binary with only yes/no answers, which were assigned scores of 1 and 0, respectively. Therefore, for these subpopulations, the number of limitations is

incorporated into the score, but a measure of severity is not. The risk levels experienced by these two groups are summarised in Table 7.

Figure 1 Employment (Full-Time or Part-Time), by Level of Vision Disability

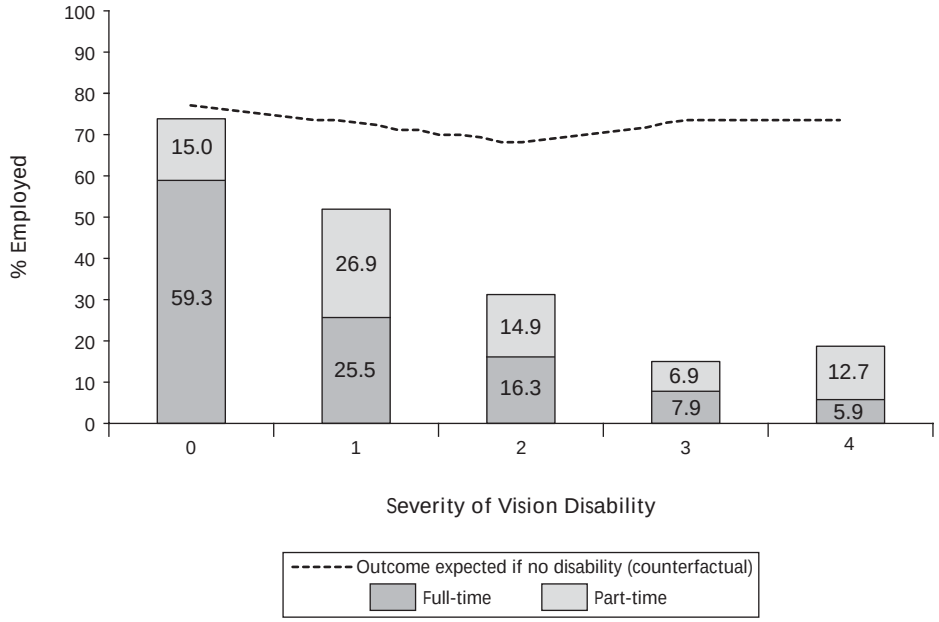
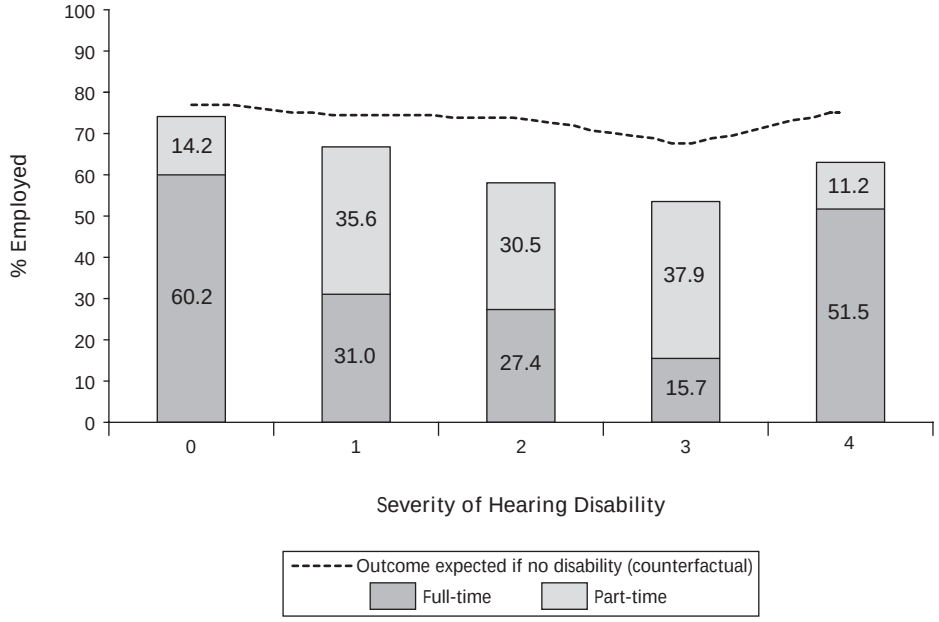


Figure 2 Employment (Full-Time or Part-Time), by Level of Hearing Disability



Summary: Impact Analysis – Any Level of Employment

The following table shows the ratio of the actual employment outcomes to the counterfactual proportions for employment of people with various disabilities, at various levels of severity.

Table 7 Joint Impact of Disability Type and Severity on Employment (Any Level) for Those Aged 18–64 Years (ratio of actual employment outcomes to counterfactual proportions)

Disability Type	Severity				
	0	1	2	3	4(+)
Vision disability	0.98	0.72	0.47	0.20	0.26
Hearing disability	0.98	0.91	0.79	0.81	0.83
Restricted mobility	1.00	0.80	0.77	0.67	0.51
Restricted coordination/dexterity	0.99	0.77	0.55	0.60	0.40
Learning/memory disability	0.98	0.81	0.47	0.49	0.43
Psychological/psychiatric disability	0.98	0.72	0.53	NA*	NA*

* Because of the small number of items available (2) to produce the psychological/psychiatric disability score, it is possible to distinguish only three score values of (0,1,2), with no values of 3 or 4 (see section "Scoring the Disability Types for Severity" above).

As shown in Table 7, the likelihood of being in any type of employment decreases with increasing severity of disability. The impacts of disability are most marked at the highest levels of severity (levels 3 and 4) for those categories showing impact ratios of 0.20 and 0.26, respectively. This finding reinforces the results of the 2001 Saskatchewan Employer Survey (Scott 2003) in which only 6% of employers said they had jobs that someone who was "blind or visually impaired" could do, when presented with a list of nine disability types. This was the joint lowest rating of the nine types, and identified those with severe vision disabilities as the people employers would have the most difficulty accommodating in their workplace.

Conversely, for those with hearing disabilities, the impact ratios for severity levels 3 and 4 were 0.81 and 0.83, respectively. While these figures represent a reduction of employment of approximately a fifth of the expected level in the absence of disability, those with hearing disabilities are, nonetheless, less adversely affected than other groups.

JOINT IMPACT OF DISABILITY TYPE AND SEVERITY ON FULL-TIME EMPLOYMENT

When full-time employment outcomes are examined across disability subgroups, the impact of having a disability is a lot more pronounced, with very steep drop-offs particularly visible between the 0 and 1 categories in Figures 3 and 4. Once again, the patterns observed for restricted mobility, restricted coordination/dexterity, learning/memory and psychological/psychiatric disabilities are similar to those presented for vision disability (Jensen et al. 2005). As elsewhere, the pattern observed for the hearing group is not as consistent as for other categories. This group is, nonetheless, considerably disadvantaged when full-time employment outcomes are examined.

The gap between the top of each bar and the line indicating the expected level of full-time employment in the absence of a disability widens as severity of disability increases. This gap analysis is summarised in the following section.

Figure 3 Full-Time Employment, by Level of Vision Disability

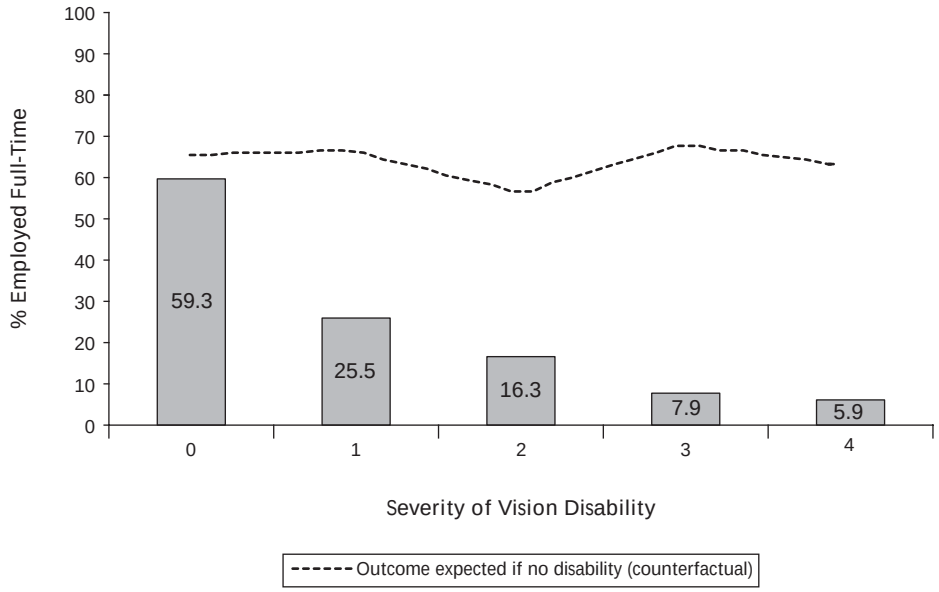
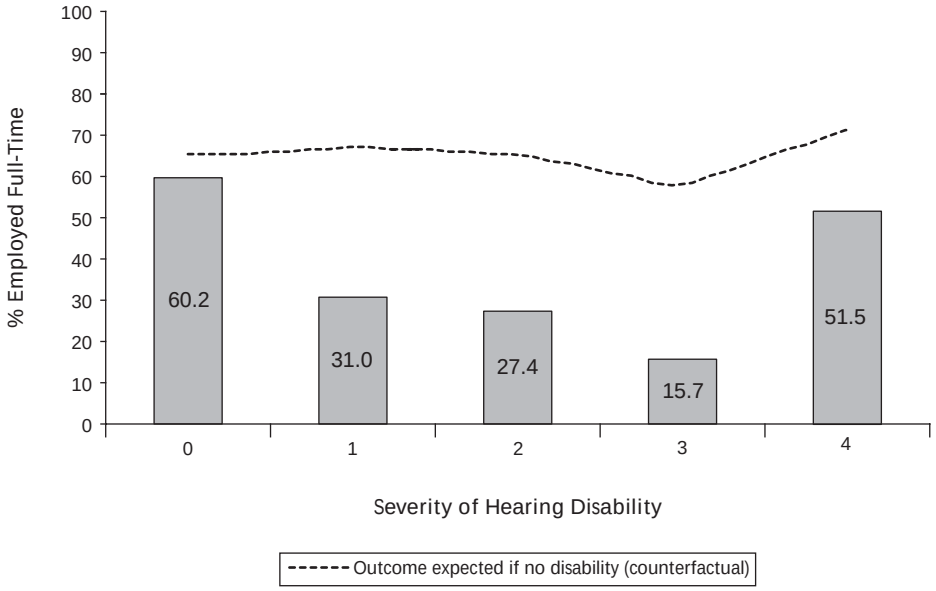


Figure 4 Full-Time Employment, by Level of Hearing Disability



Summary: Impact Analysis – Full-Time Employment

Table 8 shows the ratio of the actual full-time employment outcomes to the counterfactual proportions for employment of people with various disabilities, at various levels of severity.

Table 8 Joint Impact of Disability Type and Severity on Full-Time Employment for Those Aged 18–64 Years

Disability Type	Severity				
	0	1	2	3	4(+)
Vision disability	0.92	0.39	0.30	0.12	0.10
Hearing disability	0.93	0.47	0.42	0.28	0.73
Restricted mobility	0.96	0.41	0.46	0.35	0.22
Restricted coordination/dexterity	0.94	0.43	0.17	0.23	0.12
Learning/memory disability	0.93	0.43	0.24	0.15	0.18
Psychological/psychiatric disability	0.93	0.32	0.27	NA*	NA*

* Because of the small number of items available (2) to produce the psychological/psychiatric disability score, it is possible to distinguish only three score values of (0,1,2), with no values of 3 or 4 (see section "Scoring the Disability Types for Severity" above).

As was the case for any level of employment, those with vision disabilities are most adversely affected at the highest severity levels (3 and 4), for which the impact ratios were 0.12 and 0.10, respectively.

The relationship between full-time employment outcomes and severity of hearing disability does not show a clear gradient with respect to severity. It is notable that, at level 4, all disability groups, barring hearing disability, have less than a quarter of the expected level of full-time employment in the absence of a disability.

THE DISABILITY-RELATED EXCLUSION RISK SCORE INDICATOR (DERS)

This section looks at how employment outcomes vary when the number, type and severity of disabilities are all considered together.

To do this, an examination was made of the extent to which severity scores on the six types of disability, taken together, could account for statistical variation in employment participation, and whether it would be possible to devise a comparatively simple but efficient procedure for producing a risk score that would be predictive of non-participation. The analysis demonstrated that the latter was feasible, and resulted in the specification of a score that has been called the Disability-Related Exclusion Risk Score (DERS). To calculate an individual's DERS score, the non-truncated severity scores are subjected to simple transformations that produce new integer values that make approximately equal contributions to estimating non-employment risk, and thus are able to be simply added together without loss of efficiency. The effect of the transformations is to provide a simple weighting of the severity scores.[4]

A DERS score of zero indicates that the person does not have a disability of any of the six types. On the following graphs, a score of zero is labelled ND, for "no disability". People with scores of 9 or more have been amalgamated together.

The term "risk" is used here in a statistical sense, relating to probability. Use of this term is not meant to imply that employment is always appropriate for every person with a disability. The approach (although not the specific estimation procedures) is similar to that employed by Berthoud (2003b) who also used a cumulative risk model and found that the higher the number of disabilities experienced and the greater the severity, the higher the risk of non-employment.

4 The hearing disability severity score does not contribute to the DERS score. This is because employment outcomes do not have a clear gradient on the hearing score.

Additive Risk: The Overall Impact of Disability and Severity on Labour Market Outcomes

When DERS scores are graphed against employment outcomes (any employment and full-time employment), sharp reductions in employment are observed as the risk score increases. The rate of full-time employment shows a greater reduction across the DERS range than does the rate of any employment. The same pattern was seen earlier for each disability type in the results showing employment rates graphed by severity scores.

The graph for any employment shows that those with a DERS value of 5 had an employment rate of about 35%, while those with a score of 9 had a rate of 11% (less than a third of the former value).

Figure 5 Disability-Related Exclusion Risk Score (DERS) and Employment Levels

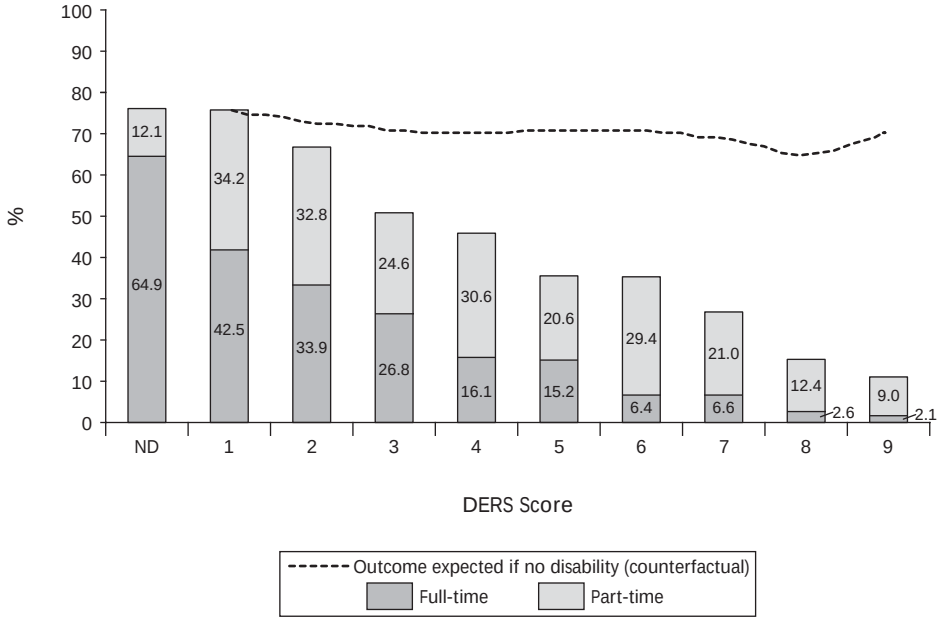


Figure 6 shows that those with a DERS value of 5 had a full-time employment rate of 15%, while those with a score of 9 had a rate of only 2%.

Figure 6 Disability-Related Exclusion Risk Score (DERS) and Full-Time Employment Levels

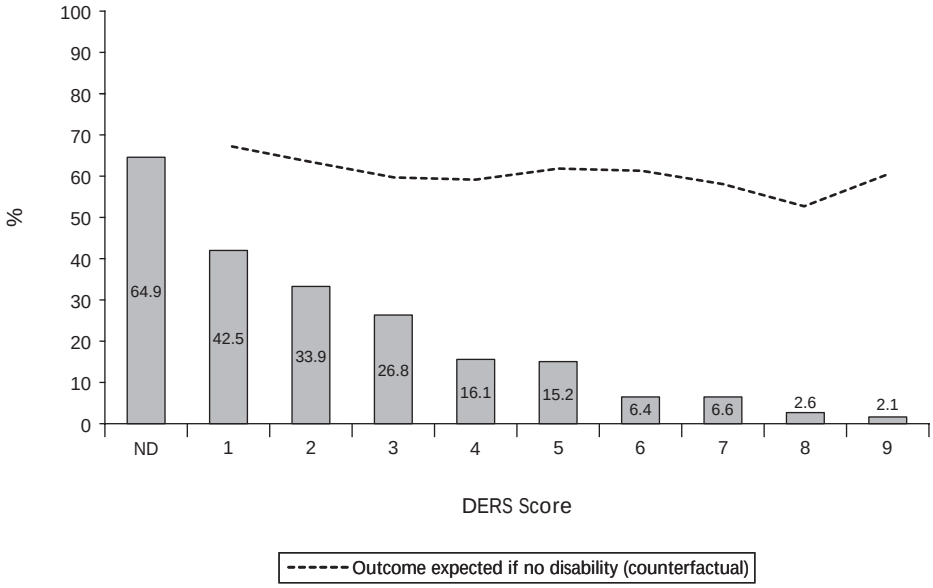


Table 9 Impact of DERS on Labour Market Outcomes for Those Aged 18–64 Years

Type of Outcome	DERS Score									
	ND	1	2	3	4	5	6	7	8	9
Any employment	1.00	1.01	0.92	0.73	0.67	0.50	0.51	0.40	0.23	0.16
Full-time employment	1.00	0.63	0.54	0.45	0.27	0.24	0.10	0.11	0.05	0.04

The strong relationship between the DERS score and employment levels confirms the validity of an approach that combines both number and severity of limitations. It might be argued that a person who has three activities they can do with difficulty is less severely disabled than a person who has one activity they cannot perform at all, although the former would have a higher DERS score. However, Figure 5 shows that DERS works well as an indicator of likelihood of employment.

As was the case with disability subcategories, when full-time employment outcomes and expectations are concerned, impacts are accentuated, as shown in Figure 6 above.

With increasing DERS scores, full-time employment decreases, with a rate of less than 10% for scores of 6 and above.

Table 9 on previous page shows the ratio of the actual labour market outcomes attained to the counterfactual expectation levels for people at various levels of risk, as captured by the DERS indicator. The results of this analysis are shown in Figures 5–6 above, and are summarised in Table 9.

CONCLUSION

As discussed in the introduction to this paper, most developed countries have had increases over recent years in the numbers of people receiving income support benefits for ill health and disability. In many such countries, the latter groups now constitute the majority of income support beneficiaries, with disability benefits costing more than unemployment benefits in 19 out of 20 OECD countries for which comparable statistics are currently available (OECD 2003).

In New Zealand, the number of people receiving a Sickness Benefit (SB) has increased from approximately 29,000 in June 1993 to 40,000 in June 2003, while the number receiving an Invalids Benefit (IB) has almost doubled over this same period, from approximately 35,000 to 69,000. In addition, at 3 April 2004, there were 15,583 claimants aged 16–64 years in receipt of ACC weekly compensation of 26 weeks or more duration. These developments provide the background to the present research and part of the impetus to carry it out. The research is aimed at understanding variation in employment among the disability population and the contribution that disability has made to these outcomes.

Disabilities have been grouped into six broad types, using an empirically derived typology produced for the purposes of this study. The results of the impact analysis show that each of the six types of disability has a negative impact on employment but that the effect is smaller for a hearing disability than for any of the other five types of disability. Furthermore, for a hearing disability, the effect on total employment does not seem to vary with regard to the severity of the disability. For all other disability types, increased severity results in a reduced rate of employment. An interesting question arises concerning why a hearing disability might have less adverse consequences for employment than another type of disability.

One of the most striking features of the results is that the impact of disability is relatively modest when employment is measured as part-time or full-time employment, but is large in relation to full-time employment. Although some types of disability would permit a person to engage in a small amount of work but preclude full-time work, many types of disability would not cause this restriction. This suggests

the possibility that many people with disabilities who currently work only part time have the potential to engage in full-time work if better employment support mechanisms were available and employers were more willing to employ them. This could be a fruitful focus for future research on how it might be possible to raise the level of employment among people with disabilities. Areas of future investigation could include factors such as how to support people with disabilities into all types of employment including self-employment, the nature of the support required to facilitate increased employment, how to overcome "demand side" barriers to employment faced by those with disabilities and what mechanisms are required to facilitate sustainable employment for those with disabilities.

The Ministry of Social Development has embarked on a strategy for assisting people with ill health and disability. This is in response to the growth in the numbers of people receiving SB or IB, in recognition of the need to improve planning for an ageing population and the need to widen New Zealand's employment base to include groups that have traditionally been disregarded in employment policy. The Ministry's strategy focuses on illuminating the barriers to social and economic participation caused by disabilities, and to creating greater inclusion in society through the removal of those barriers.

This report adds to current understanding of the extent to which disability limits participation in society and provides an improved evidential basis for policy analysis currently being undertaken to develop new ways of reducing the barriers faced by people with disabilities. Ultimately, though, more understanding is required of the ways in which disability creates barriers and limits the lives of those affected. The findings of the report point to some areas where new research can usefully be directed. Such research could yield substantial returns. Policy innovation based on a strengthened knowledge base has the potential to raise the level of participation in employment and also other areas, to the benefit not only of people with disabilities but also of society as a whole.

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