Disability Benefits and Impacts on Welfare Dependence and Health

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Abstract

Background: In British Columbia, Income Assistance (welfare) for disabled persons has different eligibility criteria than other categories of income support. Once designated as permanently disabled, clients retain their eligibility permanently, and there is no requirement for these clients to seek or train for work. It also allows recipients to claim many medical benefits for free. ***Objectives:*** This paper investigates the effects of being granted disability benefits on clients' future Income Assistance dependence and health, using data containing an exogenous source of variation in the probability of being accepted into the program from a natural experiment that occurred in 1982. De facto criteria for eligibility were eased in 1982 due to a personnel change, resulting in more than 80% of applications for disability benefits being approved (versus roughly 60% in other years). ***Methods:*** Instrumental variables estimation is used to obtain reliable estimates of the impact on marginal clients (those affected by the change) of being granted disability status. It might be expected that welfare dependence, visits to hospital Emergency Room, and hospital lengths of stay would be affected by a clients wealth and the nature of her or his underlying disability, and would not be affected by whether or not the client was granted disability status. ***Results:*** For both sexes we find a positive causal impact of acceptance into the disability program on income assistance use, and a negative impact on our two measures of hospital use: number of emergency room visits and the cumulative number of overnight stays in hospital.

Introduction

In British Columbia, Income Assistance (IA) for fully disabled clients has different eligibility criteria and different benefit levels than other categories of income support. The caseload for disability benefits has increased dramatically in the past decade, more than doubling since 1990. This increase has naturally led to scrutiny of the program and interest in the likely causes and effects of the caseload growth.

This paper investigates the effects of being granted disability benefits on clients' future Income Assistance dependence and health, using data from a natural experiment that occurred in 1982. In that year, a personnel change (due to retirement) resulted in a *de facto* easing of the eligibility criteria for disability benefits. Previously, around 60% of applications were approved, but 86% were approved in 1982. Subsequently, procedures were changed and the approval rate dropped below 60%.

Currently, as at the time of our "natural experiment", clients who are designated fully disabled retain the designation permanently; they do not need to re-qualify month-by-month, seek work, or enroll in training for work. In 1982, being designated disabled also entitled clients to a variety of health-related benefits not then available to other single IA clients.

It might be expected that clients' dependence on welfare, visits to hospital Emergency Rooms (ER), and hospital lengths of stay (LOS) would be affected by the nature of the client's underlying disability, and would not be affected by whether or not the client was granted disability status.[1] However, this assumption is most likely to be true for the most severely disabled. As the program expands to enroll less severely disabled clients, it might be expected that, for these marginal cases, being granted disability benefits could change their future use of welfare and could affect their future health services utilization.

Instrumental variables estimation is used to obtain reliable estimates of the impact on marginal clients (those affected by the change) of being granted permanent disability status. The results of this analysis are relevant to current policy; given the recent expansion in disability benefits caseloads, it is worthwhile to understand the effect of being granted disability benefits on clients' future welfare dependence and health.

For health effects, our analysis is based on health care utilization measures indicating fairly severe morbidity; hospital emergency visits, and hospital in-patient stays (excluding dental procedures). It is important to remember that these crude measures are being examined as a first step, to determine whether large health effects can be detected. Health data available from 1989 are used in this study, therefore we cannot examine health effects prior to 1989.

[1] Of the people we talked to, many thought it would have some effect, but there was great disagreement on the direction. Granting disabled clients a stable income and assistance with the special expenses related to their disability is intended to improve their ability to manage and live with their disability. Labeling clients as disabled could also affect self-perception, causing them to perceive increased needs for health care.

Institutional Background

Currently, income support for disabled clients is called the Disability Benefits Program. (More information at: http://www.sdes.gov.bc.ca/programs/disablty.htm.) There are at present two levels of benefits: fully disabled (Level II) clients retain their designation for life; Level I clients must periodically re-qualify. Level I clients are included with basic IA caseloads; disability caseloads and benefits refer only to Level II clients. In the 1980s, disability programs covered only the fully disabled (i.e. Level II clients); others were not recognized as disabled.

Monthly disability benefit payments for support and shelter are income and asset tested, but (regardless of amounts paid for support and shelter) all disabled clients are eligible for additional assistance with a wide variety of health-related costs. For the most part, disabled clients now receive the same kinds of assistance as other IA clients; they do not have to pay medical premiums, their drug costs and health-related costs are covered (equipment, supplies, and transportation), and they are eligible for other benefits such as bus passes and homemaker services.

Throughout the 1980s, however, single individuals receiving basic IA did not have their medical premiums, drug costs, or medical equipment and supply costs paid; these costs were only covered for families with children on IA. Therefore, during the 1980s, being granted disability status provided a significant additional benefit to single recipients.

Programs to assist the disabled have existed in many forms since the 1930s, with eligibility policies generally becoming more liberal over time. (Additional program background is presented in Appendix B.) As Figure 1 shows, the number of individuals receiving benefits (per 1,000 BC population) has grown more than five-fold over the past 40 years (Official March 31 series).

The "Natural Experiment" (Source of Exogenous Variation)

In the early 1980s a single official who was responsible for the program approved most applications for GFH benefits. In 1982, this official retired, and a new adjudicator began to handle applications for GFH. Within a few months, analysts in the Ministry noticed that the handicapped caseload was increasing at an unusual rate, and examination of the data revealed the cause to be that a much higher proportion of applicants were being approved by the new adjudicator than had been approved by previous officials. At the end of 1982, responsibility for reviewing applications was transferred from the Health Care Division to the Income Assistance Division in order to rectify the situation. Subsequently, the approval rate returned to normal levels; but the individuals approved for GFH during 1982 were not reinvestigated and so were allowed to remain on GFH.

Table 1 shows the details of the situation. As seen on the left ("applications") portion of the table, over the period from 1980 to 1985 a total of eight different adjudicators made decisions about disability status. In 1980 and 1981, Adjudicator 8 dominated the process, making just over 80% of the decisions, with Adjudicators 7 and 4 doing the bulk of the remaining work. Adjudicator 2 decided about 65% of the applications in

1982, a year with a large increase in the number of applications (almost certainly because this was the depths of a recession). Adjudicator 2 was replaced in early 1983, and Adjudicator 1 became the main adjudicator with Adjudicator 3 having a growing role.

These personnel changes would have had no impact on the program, or on the applicants, if the adjudicators had similar standards and followed a comparable decision-making process. However, as can be seen on the right hand side of Table 1, each had quite different approval averages. Adjudicator 1 approved about 54% of the applications, while Adjudicator 2 approved about 94%. Four of the others approved about 75-78% of applications, and the remaining two had 57% and 62% approval averages. Since files were allocated among adjudicators based on who was on duty on a given date, there is no reason to believe that applicants to different adjudicators would have different levels of disability. However, it is plausible that since the recession years have higher application rates, applicants in those years might have better average levels of health; if adjudicator standards had remained constant, healthier applicants should have experienced a lower approval rate (rather than the higher approval rate observed). It therefore seems reasonable to assume that the variation in approval rates across adjudicators represents an exogenous change, unrelated to characteristics of the applicants. In this study we exploit this exogenous variation in approval rates to identify the effect of being officially labeled as disabled on a marginal applicant.

Data

Administrative data from the following BC Government files and time periods are used in this study.[2]

- GAIN for Handicapped (GFH) application records (BC Ministry of Social Development and Economic Security) for 1980 to 1985.
- Income Assistance records for 1981-84 GFH applicants (BC Ministry of Social Development and Economic Security) for 1980 to 1989.
- Emergency Room visits for 1980-85 GFH applicants (BC Ministry of Health) for 1989 to 1997.
- Hospital separation records for 1980-85 GFH applicants (BC Ministry of Health) for 1989 to 1997.

Income Assistance records were used to provide information on prior (12 months) and subsequent (5 years) welfare dependence for GFH applicants. For the analysis of future IA as an outcome, only 1981 to 1984 applicants were included in order to have complete data on prior and subsequent IA dependence. For the analysis of future ER visits and hospital stays, all applicants from 1980 to 1985 were included. Hospital and ER records were used to provide information on 1980-1985 GFH applicants' health.[3]

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[2] In all particulars this project has complied with the requirements of BC's privacy legislation (*Freedom of Information and Protection of Privacy Act*) and applicable Ministry policies for research uses of personal data.

[3] Unfortunately, reliable data from the BC health database (http://www.hlth.gov.bc.ca/vs/dac/index.html) was not available for this study for years before 1989, so that clients' health events soon after their application for GFH cannot be evaluated.

In our subsequent analysis we everywhere look at men's and women's outcomes separately, and we include only those between the ages of 18 and 60. (The program does not normally serve those under age 18, but some individuals' forms are processed before their eighteenth birthday.) We start with the entire population of applicants, but drop just under 900 observations because either age, gender or the decision (on disability status) is missing. We also drop a further 43 observations because their reported sex and family type (e.g. single mother) is inconsistent. In the end we include 15232 observations: 8120 men, and 7112 women.

Age distributions for each gender are shown in Figure 2. There is a large spike in the distribution at ages 18 and 19 because those who have been disabled at earlier ages become eligible for the program and apply for entry. The distribution between age 20 and the late 40's is relatively flat, and then there is a sharp increase to age 60. This is largely as expected given anecdotal evidence about the program. We model age as a cubic polynomial with an additional dummy variable for those aged 18 and 19.

Table 2 presents descriptive statistics for the variables of interest. While the two genders' demographics and outcomes are largely similar, some differences are evident. First, a positive decision is statistically more likely for men (in excess of the 1% level), but for practical purposes the magnitude of the gap is small. Further, male applicants use slightly more IA in the five years following their application, are less likely to go the emergency room, and have shorter stays in hospital. Male applicants are, on average, also about 2 years younger than their female counterparts.

The distribution among ability categories, which are not mutually exclusive, are similar across the sexes. There is no consistent pattern; women are rated somewhat more able to care for themselves than men in some ways (fewer are confined to a chair or need help eating; more can walk on a flat surface), and less able than men in other ways (more women are confined to home; cannot climb stairs; and need help dressing). The differences are not large, and overall the sexes appear similar. More than three-quarters of applicants (of both sexes) can walk on a flat surface; more than 70% can climb stairs, and fewer than 5% are judged to be confined to a chair, confined to home, or to require help eating (each category).

The physician diagnostic category distributions for men and women are also broadly similar, although some small differences are evident. For both men and women, the most common diagnoses relate to muscle/skeletal disease, mental illness, HIV/AIDS or Other, or Pulmonary/Cardiology. Men were somewhat more likely than women to be diagnosed with mental handicap, mental illness, motor/neuron problems, pulmonary/cardiology problems, substance abuse, and HIV/AIDS or Other; women were more likely to be diagnosed with back pain, muscle/skeletal problems, and obesity. Overall, the sexes do not appear strikingly different.

Methods

This study will use the variation across adjudicators in the probability of an application being approved as a source of exogenous variation in the population of program applicants to study the impact of being labeled as "disabled". In particular, we study the impact on income assistance (IA) use and on two health "outcomes": emergency room visits and the length of stay in hospital.

Our analysis looks at each dependent variable in turn, first using ordinary least squares (OLS) to summarize the population relationship, and then two stage least squares (2SLS) to explore causal relationships.[4] If a common parameter assumption is made, i.e. we assume that the causal impact of the treatment is the same for everybody, then the 2SLS estimates can be thought of as representing the impact of labeling on all those who are labeled as disabled. However, as has been seen in recent work on the return to education (see Card, 1999 for a survey), a more plausible interpretation in this context is that the 2SLS results represent the causal impact of the treatment on the marginal group who are labeled in one regime and not in the other. Those applicants with extreme forms of disability have a very high probability of being labeled as disabled by all the adjudicators. The marginal group, whose actions are reflected in the 2SLS coefficient estimates, are applicants with less severe indications who are approved by the adjudicators with the higher propensity to approve an application, and turned down by adjudicators with lower acceptance rates.

In some specifications we further enrich our instrument set by interacting the adjudicator indicator variable with the age of the applicant at the time of application. We explored interacting the adjudicator identifier with the physician diagnosis, and/or indicators of physical limitations, but the sample size is too small to support doing so since some of the resulting data cells are extremely small (e.g. Adjudicator 5 only looked at 5 cases where the physician diagnosed a gastro-intestinal problem).

One issue that is of concern, but not addressed formally at this point, follows from a large number of respondents being on the boundary of the parameter space. For example, IA use in the five years following the decision must be between 0 and 60, and about 50% of the sample are on one of these two boundaries. One common approach to this problem is to use a Tobit-like specification. But we are reluctant to pursue this course of actions since the coefficient estimates are hard to use for policy purposes. A large number of applicants who are on IA for 60 months may desire more months, but for policy purposes desires that exceed 100% of the available time are not relevant. A similar issue arises in the health data for those who do not go the emergency room, or have an overnight stay in the hospital, in the 5 year period covered by the study. In regressions using continuous health measures the logarithm of the variable is used in the regressions. This requires that any zeros be replaced by some small strictly positive number: we change them to 0.1. Although this has been done in the literature before, it is clearly arbitrary and we will seek to improve the specification in later drafts, perhaps using count models for the health data. The 2SLS approach has the advantage at this

[4] There are a wide variety of common references discussing 2SLS; Davidson and MacKinnon (1993) is an example. See Angrist and Krueger (1999) for a recent discussion of the interpretation of estimates from these types of procedures.

stage of being fast, interpretable, and a method with which we have some experience as a discipline.[5]

Another empirical issue, obvious in Table 1, is that the adjudicator's decision-making periods are typically short and highly collinear with the year in which the decision occurs. This matters for income assistance use, which tends to follow the business cycle with a lag. A series of year-of-decision indicator variables are used to control for cyclicality, but this dramatically reduces the partial R^2 of the adjudicator dummy variables in the first stage regression, and increases (at least doubles) the standard errors of the endogenous variable's coefficient. Still, since the period under study contains a major recession, we believe that it is important to allow for year effects to eliminate spurious results. We do not have the same concern about year effects in the health data and thus do not include year indicator variables there.[6]

Results

All of the 2SLS regression models run, have a small common set of three first stages for each gender: two for IA (one including previous IA history, and one for those with no previous IA history measured) and a second for the health data. The two for IA are very similar and only the one including IA history regressors are included in Table 3. The health first stages are common and are presented in Table 4. Only summary statistics

[5] Another, somewhat related issue, concerns our use of OLS in the first stage rather than a probit or logit since the endogenous variable is an indicator variable (see Heckman 1978). We use OLS at this point, although it might be less efficient, since it is faster to compute and is consistent in the presence of heteroskedasticity in the first stage (Olsen 19??).

[6] There are a number of individuals in the sample who die at some point in the period for which we have death data (1989 to 1997). We drop all such individuals from the analysis.

are presented for each: the sample size, the R^2 for the regression, the partial R^2 for the instruments or second set of instruments, and the results of an F-test on the instruments in the first stage.

In Table 3, which presents first stage summary statistics for IA use, it is clear that the adjudicators contribute reasonable explanatory power to the models. For each gender, the first column (column 1 for women, 3 for men) summarizes the first stage using only the adjudicator indicators as instruments, and the second column summarizes regressions with both the adjudicator identifier and the same identifier interacted with the applicant's age as instruments. The partial R^2 is about 2 or 3% in the smaller regressions, and the addition of the age interactions raises it by just under another 1% for both sexes. The p-values on the full set of instruments for each sex is well in excess of the 1% level, giving further support to the relevance of the instruments. One exception is the test on the adjudicator identifiers in the presence of the age cross terms for the men. This points to the collinearity between the two sets of instruments in this case. If anything, given the evidence in Table1, on might expect that the adjudicators would be a much more powerful determinant of the decision. Table 4 provides evidence on this. More direct evidence comes from regressions, like those providing the results in Table 3 but not shown, that are without year dummies. The partial R^2s are substantially higher.

Table 4 presents similar results for the health first stages. But in this case, without year indicator variables, the adjudicator indicators have a partial R^2 of about 11%. The adjudicators play a very large roll, independent of the observables, in determining the probability of an applicant being labeled as disabled. Adding the age interactions increases the R^2 by just under 1%; comparable to that seen in Table 3.

Table 5 presents results from the second stage regression looking at months of IA use in the 5 years following the decision. Only the coefficients on the endogenous variables are presented to save space; other variables included in the regressions are described in the notes to the tables. The p-values shown are Hausman-type tests constructed as auxiliary regressions (see Davidson and MacKinnon p. 237) to test if there is any statistically significant difference between the OLS and IV estimates. Three sets of regressions are presented in the table, each using a different sample: first the sample is all applicants, second all applicants with some IA use in the previous 12 months, and on the bottom those with no IA use in the previous 12 months.

The OLS estimate of the average number of months of IA use for GFH participants by gender is remarkably similar. Those granted disability status appear to use about 5.8 more months of IA in the five years following the decision than other applicants with similar observable characteristics. Further, the difference between those granted, and not granted, disability status is statistically significant in excess of the 1% level. When 2SLS is used, the point estimate increases slightly, although as can be seen from the p-values, the difference is never statistically significant. However, the interpretation of these latter coefficients is quite different. They imply that those who are labeled as disabled as a result of more lenient adjudicators are therefore causally induced to claim extra months of benefits that they would not otherwise claim. That is, the marginal people would use less IA if they were not labeled as disabled. Of course, the magnitude of the difference, while sizeable, is not enormous. Out of a possible 60 months, we observe an increase of 7 to 10 months.

The set of results in the middle of Table 5 look at the subset of applicants who had received some IA in the year prior to the decision regarding disability status. In each regression, OLS and IV estimates are comparable in magnitude to those above. For the second subgroup on the bottom of the page, those who had not claimed IA in the year before, the OLS estimates are slightly higher and the 2SLS ones slightly lower, for both sexes, but the differences between the three sets of regressions are not enormous. Overall, while the two subsets are not identical, they are quite similar and there appears to be a causal impact of the labeling. Those on the margin who are granted disability status act like the inframarginal disabled individuals who would be labeled in both regimes.

Table 6 performs an identical exercise to that in the uppermost panel of Table 5, but the dependent variables are (the logarithm of) the health outcomes. The upper portion of the table looks at the number of emergency room visits in a five year period starting in 1989, and the lower part explores the cumulative number of nights of hospital stay in the same period. Note that applicants may have between 5 and 9 years between the decision and the start of the period of data availability for health outcomes, the age used in the analysis is therefore that in 1989, not at the time of the decision.

Looking first at the OLS results, it is clear that those granted disability status use more health services in both regressions. This makes sense: those granted the status have, on average, more health problems than those denied. For both women and men though, the coefficient on the same variable in the 2SLS model for emergency room visits is negative (although never statistically different from zero).[7] Despite the coefficients not being different from zero, the Hausman-type tests suggest that it is very likely that the 2SLS estimates are different from the OLS ones for the women, although it is less likely for the men. Similar results are observed for hospital length of stay. There is a large and statistically significant decrease for women, but a smaller and statistically insignificant difference between the OLS and 2SLS estimates for men.

It is plausible that, on average, the disabled use more of the health services under study as seen in the OLS regressions. However, the additional resources available to the marginal disabled person as a result of acceptance into the program may help that person (especially the women) to reduce emergency room visits and hospital stays. To explore this in more detail, and as a first pass at addressing the problem that arises because a large fraction of the sample never uses the emergency room, and/or never stays overnight in hospital, the regressions in Table 7 break process into two. First it looks at the probability of *any* use for each, and then, conditional on use (i.e. using only the part of the sample with at least one use) it looks at the quantity of services used.

[7] It is possible to make some slight modifications to the model (e.g. changing the order of the polynomial on age, or modifying the year indicator variables), and obtain statistically significant negative 2SLS results for the women.

In table 7 emergency room use is addressed first, followed by length of stay. The upper panel in Table 7 uses an indicator for any emergency room use as the dependent variable in the second stage. For both sexes the OLS results indicate that those labeled as disabled, on average, are 2% or 3% more likely to go to an emergency room in the five year period. The 2SLS estimates are always less, and for women are statistically negative in one specification. Moreover, in both specifications for women, and in the one using only adjudicator indicators as instruments for men, the difference between the OLS and 2SLS is statistically significant. Being accepted in the GFH program seems to causally reduce emergency room use for the marginal person.

Moving down table 7, the next panel looks at the number of emergency room visits conditional on at least one, and here men's and women's behaviour appears to diverge. For women the OLS indicates that the program participants make about 10% (% since the logarithm of the number of visits is used) more visits conditional on making one, but for men the point estimate is half of that and not statistically significant. For women, the 2SLS estimates are even larger, they are both different from zero and (clearly for the first, at the 11% level for the second) from the OLS estimates. However, for men the coefficient estimates are of different signs for each specification, and neither is statistically different from zero.

Hospital stays are addressed in the lower half of table 7. As with emergency room use, a dichotomous measure of use is analyzed first. Consistent with the Table 6 results, GFH participants are 2-3% more likely than those rejected from the program to have overnight hospital stays. Moreover, the 2SLS estimates show that marginal women are less likely to stay overnight as a result of being enrolled in the program. In fact the coefficients are negative, different from zero and from the OLS estimates. For men, acceptance into the program has little impact; the 2SLS estimates are close to zero and not statistically different from the OLS ones. For length of stay, the OLS coefficients for each sex show those accepted into the GFH program to have longer accumulations for both sexes.[8] The 2SLS estimates for women are lower, but similar to the OLS ones; they are neither different from zero nor from the OLS coefficient and have large standard errors. Men have stronger results. The 2SLS point estimates are statistically significantly below the OLS ones that the difference is significant in both specifications, although they are not different from zero. Marginal men accepted into the program appear to have a shorter cumulative hospital stay.

Discussion and Conclusion

Overall, the analysis suggests that, at least on the margin, being accepted into the GFH program has a causal impact on IA and health outcomes. Members of both sexes increase their IA use relative to individuals who are not accepted. Further, emergency room use and hospital length of stays, items that are not directly affected by being labeled as “disabled” by the Ministry responsible for Income Assistance, appear to be affected. For both measures the incidence of use decreases, but there are mixed results across the sexes for the intensity of use conditional on one event. Clearly, however, the actions of one department of government affect another in this case.

[8] With the current dataset, we cannot determine whether the cumulative LOS resulted from one or several hospital stays.

Variation in acceptance rates across adjudicators is a valid instrument to look at this issue with, in order to obtain estimates of causal impacts. Since applicants cannot choose their adjudicator, the allocation of files to adjudicators is close to random.[9] Further, the differences across adjudicators in this instance is sufficiently large that we can have confidence in the reliability of the instrument (see Card, 1999).

More work is, however, needed on this topic before we can be certain of the results. While it is not possible to expand our data set in some directions, it appears to be possible to do so in others. We hope to obtain geographic location data, and data on IA use for those who applied for GFD in 1985 that is missing at the moment. Further, it may be possible to get more detailed health outcome data, and to obtain death data (if not hospital data) for the 1980s, in order to analyze severe health effects that immediately follow the application for disability benefits. Relatedly, we may want to look more carefully at the sample of those who die in the period under study who are omitted from the current analysis. On the analysis front, we need to explore additional methods that allow the peculiarities in our data, especially the truncation resulting from the existing maximums and minimums of outcome use.

[9] An exception to this might be that in recession years, covered by some adjudicators and not others, the applicant pool might, on average, be healthier than in non-recession years.

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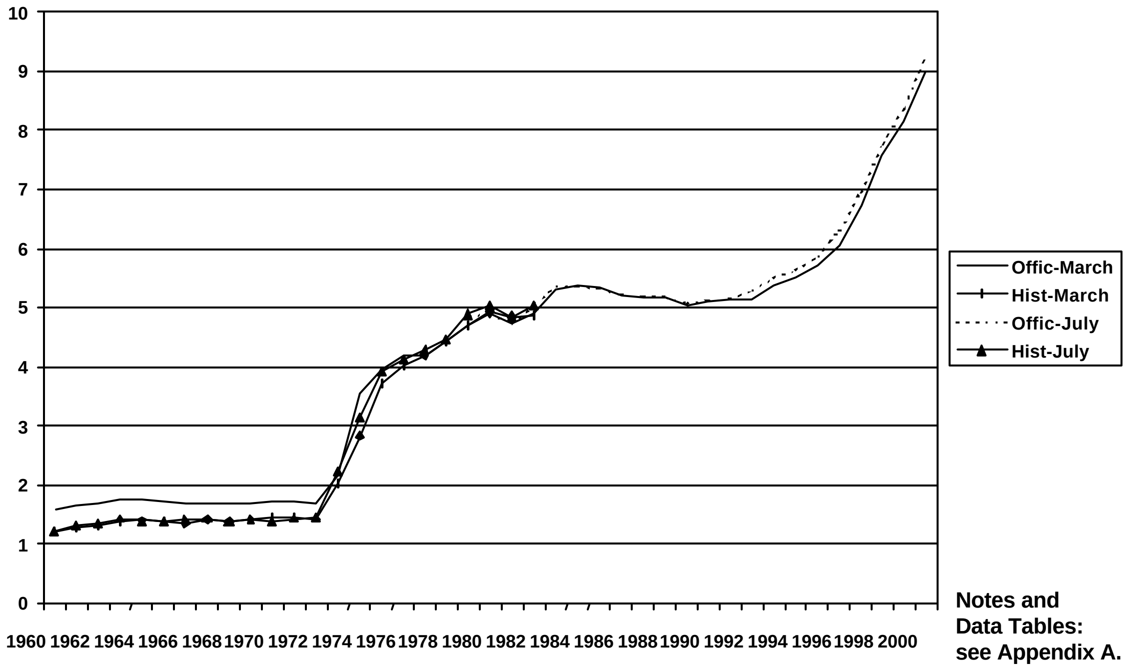
List of Appendices

Appendix A: Figures and Tables

Appendix B: Disability Benefits Program History

Figure 1: Disabled/Handicapped Cases per 1,000 BC Population



Notes and Data Tables: see Appendix A.

Notes to Figure 1: Disabled/Handicapped Cases per 1,000 BC Population

Population figures for 1960 through 1999 from are Census data from Statistics Canada. Year 2000 population is a projection from BC Stats, (http://www.bcstats.gov.bc.ca/data/pop/pop/bctab3.htm). There is a break in the official Census population data between 1970 and 1971, due to the inclusion of an estimate of net census undercount from 1971 onward, and a change from reporting population at June 1 of each year (through 1971) to reporting population at July 1 of each year (from 1971 on). Official census figures were not revised to incorporate an estimate of net census undercount prior to 1971, although population for 1971 was reported at June 1 without the estimate of net census undercount and at July 1 with the estimate of net census undercount. For this paper, we constructed a consistent series for population at July 1 from 1960-2000 by applying the percentage net census undercount and the percentage difference between June 1 and July 1 population (reported for 1971) to official population figures for 1960-70. For all years in our series, year-to-year population growth rates are the same as those in official Census data.

Several data series for disabled client caseloads are reported. The sources and caveats for each are described below. March 31 caseloads are shown because these figures are reported in Ministry Annual Reports, and therefore are consistently available back to 1960. July figures are shown for better comparison to population at July 1, and because of an inconsistency in the March 31 figures for 1974, 1975, and 1976.

"Offic-March"

- Dates: 1960 to 2000; caseload at March 31.
- Disability caseload data for the years 1960 to 1979 inclusive and for 1982 are from the Ministry of Social Development and Economic Security's historical annual reports. For the years 1974 to 1976 inclusive, disability caseload is reported as recipients rather than cases, and recipients are reported for December 31 of the year of interest rather than March 31st, e.g. the 1974 recipients is for December 31, 1974 (not March 31, 1974.) These three years are therefore slightly overstated relative to other years in the series.
- Caseload data for 1980 to 1981 inclusive and 1983 to 1990 inclusive are from the Ministry of Social Development and Economic Security's historical GAIN Program Monitoring Reports.
- Disability caseload data for 1991 to 1999 inclusive are from the Ministry of Social Development and Economic Security administrative data, confirmed by the Ministry's GAIN Program Monitoring Reports and BC Benefits Monitoring Reports. (Only Level II disability benefits clients are included in the disability benefits caseload; the Level I disability designation is temporary, and those clients are included in Basic IA cases.)

Hist-March and Hist-July

- Dates: 1960 to 1982; caseloads for the months of March and July.
- Source: Duncan, 1987. Caseload numbers were read from graphs because data tables were not included in the report. These data appear to consistently exclud dependents; comparison of these series and the official figures reported as "Offic-March" shows that the "Offic-March" series probably over-reports 1974, 1975, and 1976 by including dependents.
-

Offic-July

- Dates: 1979 to 2000, caseloads for the month of July.
- Source: Disability caseload data for 1979 to 1981 inclusive and 1983 to 1990 inclusive are from the Ministry of Social Development and Economic Security's historical GAIN Program Monitoring Reports. Disability caseload data for 1991 to 1999 inclusive are from the Ministry of Social Development and Economic Security administrative data, confirmed from the ministry's GAIN Program Monitoring Reports and BC Benefits Monitoring Reports. (Only Level II disability benefits clients are included in the disability benefits caseload; the Level I disability designation is temporary, and those clients are included in Basic IA cases.)

Data Tables for Figure 1

Cases per 1,000 Population

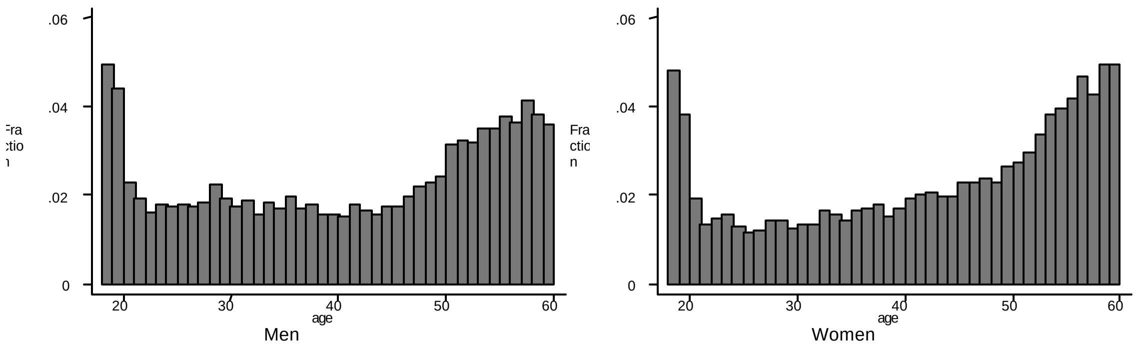
Year	Offic-March	Hist-March	Offic-July	Hist-July
1960	1.59	1.22		1.22
1961	1.66	1.29		1.32
1962	1.70	1.32		1.35
1963	1.75	1.38		1.43
1964	1.76	1.40		1.40
1965	1.74	1.38		1.38
1966	1.68	1.35		1.41
1967	1.71	1.40		1.43
1968	1.69	1.39		1.39
1969	1.69	1.42		1.42
1970	1.74	1.44		1.37
1971	1.71	1.45		1.43
1972	1.67	1.43		1.46
1973	2.16	2.03		2.22
1974	3.56	2.82		3.15
1975	3.97	3.72		3.92
1976	4.22	4.03		4.12
1977	4.20	4.18		4.28
1978	4.43	4.44		4.48
1979	4.70	4.69	4.84	4.88
1980	4.91	4.92	4.90	5.03
1981	4.73	4.85	4.72	4.85
1982	4.89	4.87	#N/A	5.05
1983	5.30		5.37	
1984	5.37		5.36	
1985	5.33		5.31	
1986	5.21		5.21	
1987	5.18		5.20	
1988	5.17		5.18	
1989	5.02		5.07	
1990	5.09		5.12	
1991	5.14		5.15	
1992	5.13		5.27	
1993	5.38		5.49	
1994	5.52		5.63	
1995	5.71		5.84	
1996	6.06		6.30	
1997	6.72		6.95	
1998	7.57		7.77	
1999	8.13		8.37	
2000	9.01		9.25	

Data Tables for Figure 1 (cont.)

Population and Cases

Year	Population	Offic-March	Hist-March	Offic-July	Hist-July
1960	1,642,972	2,619	2,000		2,000
1961	1,670,765	2,767	2,150		2,200
1962	1,702,455	2,900	2,250		2,300
1963	1,742,453	3,058	2,400		2,500
1964	1,789,629	3,154	2,500		2,500
1965	1,842,959	3,205	2,550		2,550
1966	1,921,621	3,230	2,600		2,700
1967	1,994,744	3,404	2,800		2,850
1968	2,054,228	3,481	2,850		2,850
1969	2,112,685	3,565	3,000		3,000
1970	2,182,424	3,788	3,150		3,000
1971	2,240,472	3,842	3,250		3,200
1972	2,302,085	3,851	3,300		3,350
1973	2,367,272	5,125	4,800		5,250
1974	2,442,581	8,700	6,900		7,700
1975	2,499,569	9,918	9,300		9,800
1976	2,533,793	10,680	10,200		10,450
1977	2,569,720	10,794	10,750		11,000
1978	2,614,033	11,568	11,600		11,700
1979	2,663,041	12,526	12,500	12,876	13,000
1980	2,743,256	13,469	13,500	13,432	13,800
1981	2,823,930	13,362	13,700	13,317	13,700
1982	2,872,929	14,040	14,000	#N/A	14,500
1983	2,905,490	15,387		15,600	
1984	2,945,634	15,824		15,800	
1985	2,974,262	15,852		15,804	
1986	3,004,074	15,661		15,661	
1987	3,050,141	15,790		15,851	
1988	3,115,665	16,118		16,140	
1989	3,198,547	16,051		16,217	
1990	3,291,379	16,743		16,844	
1991	3,373,399	17,325		17,386	
1992	3,470,307	17,818		18,294	
1993	3,571,525	19,205		19,610	
1994	3,681,750	20,337		20,729	
1995	3,784,008	21,619		22,103	
1996	3,882,043	23,527		24,446	
1997	3,959,698	26,595		27,505	
1998	3,998,325	30,264		31,056	
1999	4,023,100	32,726		33,692	
2000	4,067,200	36,637		37,636	

Figure 2: Age Distributions by Gender



All included applicants for disability benefits, 1980 to 1985.

Table 1: Adjudicator Activity

	Applications								Approvals	
Adj. #	1980	1981	1982	1983	1984	1985	Total		1980-85	
									#	%
1	3	0	1	2,083	2,064	1,458	5,609		3,040	54.2
2	4	12	2,025	236	0	0	2,277		2,146	94.3
3	0	0	1	292	432	1,023	1,748		998	57.1
4	157	140	341	2	0	0	640		505	78.9
5	2	7	129	1	0	0	139		103	74.1
6	78	85	4	0	0	0	167		126	75.5
7	195	152	1	0	2	0	350		265	75.7
8	1,843	1,871	586	0	2	0	4,302		2,689	62.5
Total	2,282	2,267	3,088	2,614	2,500	2,481	15,232		9,872	64.8

Table 2: Variable Descriptions

	Women		Men	
	Mean	**Std. Err.**	**Mean**	**Std. Err.**
Endogenous Variables				
Approved for disability benefits	0.636	0.0057	0.659	0.0053
Outcome Variables				
Months IA in Future 5 years [10]	32.663	0.3125	33.846	0.2842
Emergency Room Visits [11]	1.152	0.0321	1.029	0.0272
Length of Stay (excl. dental) [11]	37.782	2.1539	29.915	1.5900
Explanatory Variables				
Age (continuous variable)	42.117	0.1578	40.230	0.1501
Age 18 or 19 (=1 if age is 18 or 19)	0.086	0.0033	0.093	0.0032
Eligibility Variables (1 = potentially eligible)				
remedial treatment/training tried [12]	0.756	0.0051	0.765	0.0047
supervision required	0.346	0.0056	0.347	0.0053
Ability Variables (1 = yes) [13]				
confined to chair	0.031	0.0021	0.037	0.0021
confined to home	0.044	0.0024	0.036	0.0021
able to climb stairs	0.719	0.0053	0.723	0.0050
able to walk on flat surface	0.793	0.0048	0.788	0.0045
require help to eat	0.022	0.0017	0.028	0.0018
require help to dress	0.062	0.0029	0.054	0.0025
Type of Disability [13]				
Missing (no disability type in file)	0.046	0.0025	0.023	0.0017
BP = Back Pain	0.031	0.0021	0.027	0.0018
GI = Gastro/Intestinal [14]	0.020	0.0017	0.023	0.0016
MC = Severe Medical Condition [15]	0.032	0.0021	0.031	0.0019
MH = Mental Handicap	0.072	0.0031	0.085	0.0031
MI = Mental Illness	0.163	0.0044	0.170	0.0042
MN = Motor/Neuron	0.047	0.0025	0.054	0.0025
MS = Muscle/Skeletal	0.237	0.0050	0.188	0.0043
OB = Obesity	0.013	0.0014	0.003	0.0006

[10] IA history and future IA dependence is reported only for the 4,886 women and 5,583 men who applied for disability status in the years 1981 through 1984; experienced some dependence on IA in the 12 months preceding their application for disability benefits; and did not die during 1989 to 1997 (the period for which death records were available for this study). All other variables reflect disability applicants for the entire 1980-1985 period, representing 7,112 women and 8,120 men.

[11] Emergency visits and hospital separations for 1989 to 1997, excluding those who died during the period.

[12] Information supplied by the Ministry case worker. The wording related to remedial treatment and training changed in 1983. Previously, the forms report whether remedial treatment and/or training has been tried; during 1983 this changed to reporting whether all non-medical remedial treatment and/or training and/or retraining possibilities have been tried.

[13] Information supplied by the physician.

[14] includes liver dysfunction, genitourinary disorders, gastrointestinal disorders

[15] includes immunological disorders, cancer

Table 2: Variable Descriptions (cont.)

	Women		Men	
	Mean	**Std. Err.**	**Mean**	**Std. Err.**
Type of Disability [13] (cont.)				
HIV/AIDS and OTH = Other [16]	0.222	0.0049	0.246	0.0048
PC = Pulmonary/Cardio [17]	0.110	0.0037	0.136	0.0038
SA = Substance Abuse	0.006	0.0009	0.013	0.0013
Explanatory Variables (cont.)				
Total Months of IA in prev. 12 months [10]	6.244	0.0752	6.546	0.0673
Continuous months of IA, prev. 12 mos. [10]	5.752	0.0765	5.895	0.0692
Adjudicators				
1	0.366	0.0057	0.370	0.0054
2	0.147	0.0042	0.151	0.0040
3	0.116	0.0038	0.113	0.0035
4	0.043	0.0024	0.041	0.0022
5	0.008	0.0011	0.010	0.0011
6	0.010	0.0012	0.012	0.0012
7	0.023	0.0018	0.023	0.0017
8	0.286	0.0054	0.279	0.0050

[16] "Other" includes sensory loss, blood disorders, chronic fatigue syndrome, fibromyalgia, environmental sensitivities, endocrine conditions, traumatic injury, no definitive diagnosis, and other conditions

[17] includes cardiovascular conditions, pulmonary disorders

Table 3 - First Stage Regressions Statistics, Income Assistance

	----- Women -----		----- Men -----	
	1	2	3	4
	Adj. only	*Adj. + Interact.*	*Adj. only*	*Adj. + Interact.*
N	4422	4422	4937	4937
R^2	0.2412	0.2495	0.2553	0.2648
Partial R^2	0.0342	0.0083	.0274	0.0095
F-test of adjudicator dummy variables and all interactions				
Contraints, df	--	14, 4377	--	14, 4892
F - Stat	--	34.30	--	26.34
P-Value	--	0.0000	--	0.0000
F-test of adjudicator dummy variables				
Contraints, df	7, 4384	7, 4377	7, 4899	7, 4892
F - Stat	53.24	7.41	37.45	0.91
P-Value	0.0000	0.0000	0.0000	0.4981
F-test of all interactions				
Contraints, df	--	7, 4377	--	7, 4892
F - Stat	--	12.85	--	16.35
P-Value	--	0.0000	--	0.0000

Table 4 - First Stage Regressions Statistics, Health

	- - - - - Women - - - - -		- - - - - Men - - - - -	
	1	2	3	4
	Adj. only	*Adj. + Interact.*	*Adj. Only*	*Adj. + Interact.*
N	6473	6473	7177	7177
R^2	0.2218	0.2218	0.2497	0.2573
Partial R^2	0.1161	0.0084	0.1134	0.0076
F-test of adjudicator dummy variables and all interactions				
Contraints, df	--	14, 6435	--	14, 7139
F - Stat	--	122.55	--	137.50
P-Value	--	0.0000	--	0.0000
F-test of adjudicator dummy variables				
Contraints, df	7, 6442	7, 6435	7, 7146	7, 7139
F - Stat	210.57	10.10	239.70	5.79
P-Value	0.0000	0.0000	0.0000	0.0000
F-test of all interactions				
Contraints, df	--	7, 6435	--	7, 7139
F - Stat	--	19.71	--	21.18
P-Value	--	0.0000	--	0.0000

Table 5: Months of Income Assistance Receipt in the Five Years After the Decision on the Application

	Women			Men		
	1	2	3	4	5	6
	OLS	2SLS (Inst=Adj)	2SLS (Inst=Adj, Adj*age)	OLS	2SLS (Inst=Adj)	2SLS (Inst=Adj, Adj*age)
All Applicants						
deci	5.796*	8.427*	7.471*	5.860*	10.569*	8.692*
	(0.688)	(3.250)	(2.885)	(0.696)	(3.634)	(3.157)
p-value	--	0.413	0.559	--	0.186	0.354
R-sq	0.389	0.387	0.388	0.298	0.291	0.295
N	4422	4422	4422	4937	4937	4937
Applicants on IA at some point in the 12 months prior to the application						
deci	4.930*	8.349+	7.713+	4.562*	10.329*	8.399+
	(0.793)	(3.488)	(3.147)	(0.763)	(3.800)	(3.425)
p-value	--	0.343	0.338	--	0.13	0.257
R-sq	0.165	0.16	0.162	0.201	0.189	0.196
N	3143	3143	3143	3829	3829	3829
Applicants not on IA at any point in the 12 months prior to the application						
deci	7.598*	7.853	6.185	10.125*	8.668	7.115
	(1.238)	(7.029)	(5.555)	(1.484)	(8.877)	(7.032)
p-value	--	0.967	0.781	--	0.856	0.629
R-sq	0.52	0.52	0.519	0.5	0.499	0.498
N	1279	1279	1279	1108	1108	1108

Notes:
Standard errors in parentheses: p<0.05 = +, p<0.01 = *. In addition to the intercept, control variables are: a third order polynomial in age and an age 18 or 19 dummy variable, 11 dummy variables representing physician diagnostic codes, 13 dummy variables indicating the nature of the disability, and a quadratic in each of months of IA in the past 12, and number of continuous months prior to the application month to a maximum of 12; all the variables are as delineated in table 3. The Income Assistance data covers applications in years 1981 through 1984. Columns 1 and 4 are OLS regressions, and the others are 2SLS. Columns 2 and 5 use only the adjudicator identifiers as instruments, while 3 and 6 additionally use adjudicators interacted with the applicant's age. The dependent variable is months of IA received in the 5 years following the application. The p-value is from a Hausman-type test using an augmented regression (see Davidson and MacKinnon 1993, pp. 237).

Table 6 - Health Outcomes

	- - - - Women	- - - - -	- - - - -	- - - - -	Men - - - - -	- - - - -
	1	2	3	4	5	6
	OLS	2SLS (Inst=Adj)	2SLS (Inst=Adj, Adj*age)	OLS	2SLS (Inst=Adj)	2SLS (Inst=Adj, Adj*age)
Emergency Room Visits						
deci	0.125*	-0.102	-0.049	0.090+	-0.054	-0.005
	(0.040)	(0.110)	(0.106)	(0.037)	(0.103)	(0.100)
p-value	--	0.026	0.074	--	0.133	0.305
R-sq	0.031	0.026	0.028	0.035	0.033	0.034
N	6473	6473	6473	7177	7177	7177
Length of Hospital Stay						
deci	0.323*	-0.332	-0.248	0.233*	-0.049	0.058
	(0.074)	(0.206)	(0.199)	(0.069)	(0.190)	(0.184)
p-value	--	0.001	0.002	--	0.11	0.304
R-sq	0.037	0.026	0.029	0.044	0.042	0.043
N	6473	6473	6473	7177	7177	7177

Notes: Standard errors in parentheses: p<0.05 = +, p<0.01 = *. In addition to the intercept, control variables are: a third order polynomial in age and an age 18 or 19 dummy variable, 11 dummy variables representing physician diagnostic codes, and 13 dummy variables indicating the nature of the disability as delineated in table 3. Hospital use data covers disability applicants for the years 1980 through 1985. Columns 1 and 4 are OLS regressions, and the others are 2SLS. Columns 2 and 5 use only the set of adjudicator identifiers as instruments, while 3 and 6 additionally use the adjudicators interacted with the applicant's age. The dependent variable is months of number of emergency room visits in, or cumulative days in hospital (length of stay), in the years 1989 through 1997. The p-value is from a Hausman-type test using an augmented regression (see Davidson and MacKinnon 1993, pg. 237ff).

Table 7 – Health Outcomes Treating Incidence and Duration Separately

	- - - - Women - - - - -			- - - - - Men - - - - -		
	OLS	2SLS (Inst=Adj)	2SLS (Inst=Adj, Adj*age)	OLS	2SLS (Inst=Adj)	2SLS (Inst=Adj, Adj*age)
2SLS Linear Probability Model for ANY use (0/1) of Hospital emergency room						
deci	0.033*	-0.060~	-0.038	0.026+	-0.008	0.004
	0.012)	(0.034)	(0.033)	(0.012)	(0.033)	(0.031)
p-value	--	0	0.002	--	0.055	0.221
R-sq	0.027	0.003	0.021	0.035	0.263	0.462
N	6473	6473	6473	7177	7177	7177
(ln) Number of Hospital emergency room visits conditional on at least one visit						
deci	0.109*	0.309*	0.262+	0.053	-0.112	-0.051
	(0.040)	(0.110)	(0.106)	(0.041)	(0.116)	(0.112)
p-value	--	0.046	0.114	--	0.126	0.309
R-sq	0.043	0.029	0.035	0.035	0.026	0.031
N	1910	1910	1910	1894	1894	1894
2SLS Linear Probability Model for ANY Hospital Stay (0/1)						
deci	0.034+	-0.085+	-0.066~	0.024~	0.003	0.018
	(0.013)	(0.037)	(0.036)	(0.013)	(0.035)	(0.034)
p-value	--	0.001	0.002	--	0.515	0.838
R-sq	0.03	0.018	0.021	0.038	0.038	0.038
N	6473	6473	6473	7177	7177	7177
(ln) Number of days of Hospital use conditional on at least one day's stay						
deci	0.319*	0.223	0.195	0.305*	-0.142	-0.048
	(0.060)	(0.170)	(0.159)	(0.064)	(0.178)	(0.167)
p-value	--	0.543	0.41	--	0.008	0.03
R-sq	0.056	0.055	0.055	0.062	0.045	0.051
N	2789	2789	2789	2567	2567	2567

Notes: Standard errors in parentheses: p<0.10 = ~, p<0.05 = +, p<0.01 = *. In addition to the intercept, control variables are: a third order polynomial in age and an age 18 or 19 dummy variable, 11 dummy variables representing physician diagnostic codes, and 13 dummy variables indicating the nature of the disability as delineated in table 3. Hospital use data covers disability applicants for the years 1980 through 1985. Columns 1 and 4 are OLS regressions, and the others are 2SLS. Columns 2 and 5 use only the set of adjudicator identifiers as instruments, while 3 and 6 additionally use the adjudicators interacted with the applicant's age. The dependent variable is months of number of emergency room visits in, or cumulative days in hospital (length of stay), in the years 1989 through 1997. The p-value is from a Hausman-type test using an augmented regression (see Davidson and MacKinnon 1993, pg. 237ff).

Appendix B: Disability Benefits Program History

Programs to assist the disabled have existed in a variety of forms, dating back to 1927 with the introduction of the means-tested Old Age Pension for all Canadian residents age 70 and older. (Duncan, 1987, chronicles program history in BC.) In 1937, the Blind Amendment to the federal *Old Age Pensions Act* extended this pension to residents of Canada 40 years of age and older who were certified “blind”. In 1952, the Act and its amendments were succeeded by the federal *Old Age Securities Act* (OAS) and the *Blind Persons’ Act* (BPA). The *Blind Persons’ Act* extended coverage to blind persons who were age 21 or older. The federal *Disabled Persons Act* (DPA), was established in 1955 to provide coverage to those who were not blind but severely limited in the performance of independent daily activities. (Allowances paid under BPA and DPA were cost-shared provincially and federally.) Employability was not a key eligibility criteria for these programs; the emphasis was on the applicant's medical condition and ability to perform daily activities. Eligibility for DPA was reviewed annually.

In the early 1960's, needs-testing was applied to the additional allowances then being paid to all DPA recipients. The existing Supplementary Social Allowance (SSA) was increased, but instead of being paid to all recipients, the amount actually paid (up to the maximum $30 per month) was determined individually, based on each recipient's actual expenses.

In 1970, the BC government established a $100 net earning exemption for disabled persons, excluding the blind. In order to receive this exemption, the recipient was required to discontinue his/her allowance of DPA and be paid under the BC *Social Assistance Act*, whose rates at that time were lower than DPA. However, a special rate (the Social Assistance equivalent) was established to ensure that DPA recipients who transferred to Social Assistance did not suffer a reduction in benefits.

In 1971, the BC government established the Handicapped Persons’ Additional Allowance (HPAA) under the BC *Social Services Act*, expanding eligibility criteria to individuals who were not eligible for DPA, but who were permanently unable to support themselves by reason of physical or mental disability. HPAA of up to $30 a month (based on need) was paid in addition to basic Social Assistance (then $80 per month for a single); the maximum benefit of $110 per month was less than DPA or the Social Assistance equivalent then being paid to DPA recipients who had transferred to Social Assistance (both a maximum of $135 per month, with a portion based on need).

In November 1972, the recently-elected New Democratic Party government in BC introduced Handicapped Persons’ Income Assistance (HPIA), a new program of income assistance for the handicapped. All disabled persons who were then receiving social assistance (HPAA or the Social Assistance equivalent of DPA) were requested to transfer to HPIA. HPIA benefits were higher ($200 per month rather than $110 for singles with HPAA or $135 for DPA or its Social Assistance equivalent), but HPIA's earnings exemptions were lower ($30 for singles versus $100 under Social Assistance).

One month later, in December 1972, the BC Government established the *Guaranteed Minimum Income Assistance Act* (MINCOME). Its goal was to provide income to seniors to assist with their everyday living requirements and to maintain their sense of independence. By June 1973, HPIA was fully incorporated into MINCOME, though HPIA remained a separate class of benefits.

As Figure 1 shows, the handicapped/disabled caseload, which had been stable (relative to total population) through the 1960s, began to grow dramatically under the new program. Many more people applied for and were granted HPIA than had received earlier forms of assistance.

In 1973, in response to the caseload growth, incentive allowances and increased earnings exemptions were established for HPIA recipients, intended to encourage them to seek work and gain financial independence if possible. In March 1975, two major changes in official eligibility criteria occurred. HPIA eligibility was restricted to those unable to work (and unlikely ever to be able to work) because of physical or mental disability; and the age criteria was changed to exclude applicants aged 60 to 64 (though these applicants were eligible for equivalent MINCOME or OAS benefits). The growth rate of the handicapped caseload did slow after 1975, but continued to outpace population growth through 1980.

In 1976, the Guaranteed Available Income for Need (GAIN) for Handicapped (GFH) program replaced HPIA. GFH provided income support and medical benefits and services to eligible individuals with a disability in British Columbia. Eligibility was determined through a combination of social and medical factors. Initially GFH recipients had to be between the ages of 18 and 59 years of age, but in 1979 the age limits were returned to 18 to 64. Eligible recipients also had to have income and assets within the limits set by policy for an individual with a disability; a diagnosed medical condition which was permanent and without possibility of remediation; no further opportunities for employment training; and require extensive assistance with daily living tasks or incur special expenses associated with essential needs.

In 1996, the current Disability Benefits Program replaced GFH. There were no major changes in eligibility or benefit levels. As with GFH, approval for full disability status (Level II) is permanent, with no requirement for applicants to periodically re-qualify. Information on current program features, eligibility, rates, and procedures is available at http://www.sdes.gov.bc.ca/programs/disablty.htm . Recent caseload figures are available at http://www.sdes.gov.bc.ca/research/keyfacts.htm .