THE TOWN WITH NO POVERTY

Using Health Administration Data to Revisit Outcomes of a Canadian Guaranteed Annual Income Field Experiment

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MINCOME, a Canadian Guaranteed Annual Income (GAI) field experiment ran in the province of Manitoba between 1974 and 1979, and ended with no final report and no analysis of data from the saturation site. This essay uses a quasi-experimental design and routinely collected health administration data to revisit outcomes for the saturation site. We found a significant reduction in hospitalization, especially for admissions related to mental health and to accidents and injuries, relative to the matched comparison group. Physician contacts for mental health diagnoses fell relative to the comparison group. A greater proportion of high school students continued on to grade 12. We found no increase in fertility, no increase in family dissolution rates and no improvement in birth outcomes. Our results document the value of health administration data for historical analysis, and demonstrate that a relatively modest GAI can improve population health suggesting the possibility of health system savings.

1. INTRODUCTION

The idea of a Guaranteed Annual Income (GAI) is once again receiving attention from policy and decision-makers at local, provincial and national levels. *In From the* Margins, a report of The Standing Senate Committee on Social Affairs (Dec. 2009) made several recommendations for addressing poverty, including recommendation 5 (Further examine a basic annual income based on a negative income tax), recommendation 34 (...increase the National Child Benefit to reach $5,000 by 2012) and recommendation 53 (Establish a basic income floor for all Canadians who are disabled). The idea of a guaranteed annual income for people with disabilities was picked up by a House of Commons committee studying poverty, and in Quebec, a government task force went further, recommending a minimum guaranteed income starting at $12,000 for everyone in the province. The proposal remains controversial; a *Globe and Mail* article on the topic by Erin Anderssen published in November 2010 attracted 1438 comments.[1]

One context in which a GAI is attracting particular attention is among those charged with responsibility for public health[2]. It is well-known that poverty is one of the best predictors of poor health (Feeny 2010; Marmot 2010, 2009; Morris 2007; Pickett 2009; Raphael 2007, 2010; Victorina 2009; Dahlgren and Whitehead 1991; Evans and Stoddart 1994; Marmot and Wilkinson 1999; CSDH 2008). It seems reasonable to ask whether a GAI, by reducing the prevalence of poverty in the community, might lead to better health outcomes and help to restrain the growing costs of treating poor health.

Canada has had a long flirtation with the idea of a GAI. Between 1968 and 1980, five field experiments were conducted in North America, primarily to investigate the impact of a GAI on the labour market. One of these experiments, *MINCOME*, was conducted in the province of Manitoba between 1974 and 1979 and had the distinction of being the only experiment to include a saturation site – the small town of Dauphin, Manitoba – in which everyone was entitled to participate in the experiment. For reasons to be discussed below, *MINCOME* ended without much analysis or a final report. This essay reports on our attempt to use routinely collected health administration data to "find" the Dauphin participants in the experiment, and to determine what impact *MINCOME* may have had on population health.

2. THE CULTURE OF THE PERIOD: GUARANTEED ANNUAL INCOME IN AMERICA

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[1] Erin Anderssen (19 November 2010) To End Poverty, Guarantee Everyone in Canada $20,000. But Are You Willing To Trust the Poor? *The Globe and Mail.* http://www.theglobeandmail.com/news/national/to-end-poverty-guarantee-everyone-in-canada-20000-a-year-but-are-you-willing-to-trust-the-poor/article1806904/
[2] The Public Health Agency of Canada (PHAC), for example, has established a working group on "upstream interventions" that is specifically examining the idea of GAI among other interventions.

Canadian interest in a GAI during the 1970s paralleled American investigation of the idea. In the US, the Civil Rights Movement of the 1960s brought home to ordinary Americans the persistence of poverty despite the growth and prosperity of the postwar period. In the 1960s, activists in both countries began to question the *status quo.* In the US, newly elected Democrats ushered in a series of new programs. In 1961, Aid to Families with Dependent Children (AFDC) was amended to offer assistance to the unemployed. Food stamps were introduced in 1964, and the program expanded in 1971 and 1974. Social Security amendments of 1962 and 1965 introduced federally funded social services and health care programs for welfare recipients and the retired. The Office of Economic Opportunity was created in 1964 to fight President Johnson's *War on Poverty*.

The distinguishing feature of the North American GAI experiments is that they were based on the idea of a negative income tax or refundable tax credit.[3] Despite its appeal to advocates for social justice, the most well-known advocate for a GAI in North America was Milton Friedman who championed the idea in *Capitalism and Freedom* (1962). Advocates saw it addressing several problems simultaneously. It would eliminate the "welfare trap" in which individuals moving off welfare and into the labour market encountered a strong disincentive to work in the form of very high marginal tax rates. Existing social assistance programmes were characterized by inconsistencies that saw some families fail to qualify for any assistance while others qualified under two or more programmes. These would be eliminated when the system was reformed into a seamless whole. For the first time, poverty among the working poor could be addressed. Moreover, using a single bureaucracy to administer a national social security scheme was bound to be more efficient than a set of parallel bureaucracies administering inconsistent and overlapping programs. Critics worried that labour markets would suffer under a negative income tax scheme because individuals, who would receive a minimum payout even if they chose not to work, might reduce their work effort. This last concern set the stage for the GAI experiments.

In the US, the Office of Economic Opportunity (OEO) championed the idea of a negative income tax as part of the antipoverty plan it developed each year. Traditional welfare advocates, located largely in the AFL-CIO, the Department of Health, Education, and Welfare (HEW) and the Department of Labor, countered that the basic scheme put into place in the 1930s had never been fully implemented and never been given the full

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[3] Lady Juliet Rhys Williams (1898 – 1964) is credited with inventing the phrase "negative income tax" in the context of British policy debates. In 1944, she developed a scheme for the reform of income tax. This was adopted as Liberal Party policy and a pamphlet describing it produced. She refined the scheme in 1950 so that income tax and social security were both dealt with. She gave evidence before a Royal Commission on Taxation of Profits and Incomes on the reform of income tax. In 1945, she left the Liberals and jointed the Conservative Party where she later became an influential member of the Monday Club.

opportunity to eliminate poverty. They advocated incremental changes to existing programs rather than a GAI, and recommended increased minimum wages, unemployment insurance, expansion of AFDC, increased Social Security benefits, better manpower training, and full employment policies.

The OEO plan was debated from 1965 until 1969 when Johnson left office. Each year the latest plan was considered by a White House task force. In 1965, Otto Eckstein of the Council of Economic Advisors chaired one of the task forces; he was cautiously supportive and considered a number of variants. A 1966 task force recommended that a presidential commission review plans for a negative income tax. While supportive of the schemes, these task forces feared political opposition. A commission, chaired by Ben Heineman, was established in 1968 and reported in 1969, after Johnson had left office. The Heineman commission recommended that the existing welfare scheme be replaced by a negative income tax. By then, however, the new president – Richard Nixon – had already declared support for a more limited form of welfare reform. The American GAI experiments began under the OEO and continued within the Department of Health, Education and Welfare after the Nixon administration abolished the OEO. (Levine et al. 2005: 97).

When Nixon came to office, he appointed Donald Rumsfeld to head the poverty program, and Rumsfeld brought along an assistant named Dick Cheney. Robert Levine, one of the original experimenters who went on to work for the RAND Corporation, credits Rumsfeld for saving the poverty program by shifting them in a republican direction, towards "experimentation rather than action" (Levine et al. 2005: 98).

The main goal of the experiments was to establish the size of the labour supply response to a GAI. As the data began to emerge, investigators began to ask other questions. How does a GAI affect human and other capital accumulation? What is the effect on family formation and fertility? How is health affected?

The first experiment was conducted on an urban population in New Jersey and Pennsylvania between 1968 and 1972. A second experiment was conducted in Gary, Indiana to examine the effect of a GAI on single parents. A third experiment was conducted in North Carolina and Iowa to look at the effects on rural populations. The final experiment was the Seattle-Denver Income Maintenance Experiment (SIME-DIME) which had access to a much larger experimental population. These experiments were the first large-scale social experiments and consciously modeled on techniques from the natural sciences: "we wanted to try *science* to find out something very specific" (Levine et al.: 97). The researchers used a randomly selected experimental population, and matched controls. They collected quantitative and qualitative data from both subjects and controls to determine the effect of the GAI on a wide variety of social behaviours.

The results of the experiments were debated in policy circles and in the media at two different times. In 1970, when the FAP was being debated in the House and Senate, the administration encouraged researchers to release results. These preliminary results showed very modest labour market responses, but were dismissed by critics as premature.

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In the late 1970s, during the discussion of Jimmy Carter's Program for Better Jobs and Income, the results again attracted attention. This time, the very modest labour market responses did not attract nearly as much attention as anther finding: participants receiving a guaranteed annual income appeared to have a significant increase in the divorce rate relative to the controls.

The experiments generally found a 13% reduction in work effort from the family as a whole, with one-third of the response coming from the primary earner, one-third from the secondary earner and the final third coming from additional earners in the family (Levine et al. 2005: 99). Because the primary earner typically worked many more hours than the secondary and tertiary earners, this implied a relatively small reduction in work effort by primary earners. Female spouses reduced their hours and re-entered the workforce less quickly after a break. The general result that secondary earners tend to take some part of the increased family income in the form of more time for household production, particularly staying home with newborns, was found in all the experiments. Tertiary earners, largely adolescent males, reduced their hours of work dramatically but the largest decreases occurred because they began to enter the workforce later. Taking a first job at an older age suggests that some of these adolescent males might be spending more years in school. The biggest effects, that is, could be spun as either an economic cost in the form of work disincentives, or an economic benefit in the form of human capital accumulation.

The most damning result, however, came in the form of somewhat questionable family dissolution rates in the SIME-DIME experiment. These results seemed to imply that black experimental families had a divorce rate 57% greater than the controls, and while experimental families had a divorce rate 53% greater than the controls. This finding caused Senator Moynihan, early on one of the strongest advocates for a GAI, to withdraw his support and was largely responsible for the failure of Jimmy Carter's welfare reform scheme. Further analysis of the data, published in 1990, rejected these findings as a statistical error, and no other experiment found any effect on marital stability (Cain 1990).

In North Carolina, children in experimental families showed positive results on elementary school test scores. In New Jersey, data on test scores was not collected, but a positive effect on school continuation rates was found. In SIME-DIME there were positive effects on adult continuing education (Levine et al. 2005: 100). These results are all the more remarkable when juxtaposed to the academic literature that shows it is very difficult to affect test scores, dropout rates or educational decisions by direct intervention.

Inconsistent attempts were made to collect health data, specifically on issues such as low birth weight which can be associated with significant deficits in later life. The Gary, Indiana study found positive effects on birth weight in the most at-risk groups (Levine et al. 2005: 100).

For a moment, it looked as though the war on poverty might take a new twist. The political right, however, mobilized. Opponents of welfare reform seized upon the results

of the experiment to prove that a GAI was impossible. By the late 1970s, results showing very modest effects on work effort were portrayed as disastrous for the labour market. More extreme reactions came from Senator Williams from New Jersey, an opponent of the FAP, who argued that the experimental families were "double-dipping" and should be prosecuted for welfare fraud. David Kershaw, who was then running the experiments, went to great lengths to protect the confidentiality agreement experimenters had with subjects and prevent the congressional investigators unleashed by the General Accounting Office from seizing the files (Levine et al., 2005). Whatever the scientific merit of the experiments, the political moment for a general GAI in the US had passed.

3. THE CANADIAN EXPERIMENT IN CONTEXT

In Canada, there were parallel, albeit less dramatic, developments. After WWII, family allowances were introduced. The Canada Pension Plan and its counterpart in Quebec, designed to augment Old Age Security and private pensions, was introduced in 1966, although planning began in the late 1950s. Throughout the 1960s, debates about universal health insurance culminated in a series of policy changes that saw all provinces with fully complying plans in place by 1972. Income support schemes remained the responsibility of the provinces, but the federal government increased its support of provincial plans throughout the 1960s.

The idea of a universal minimum level of income support for all Canadians was first recommended by the Croll Committee Report in 1971. In the same year, the Castonguay-Nepveu Commission of Quebec suggested a similar scheme. In the early 1970s, a Social Security Review reintroduced the concept. On the basis of these proposals, the Canadian government, in partnership with the Province of Manitoba, conducted a GAI Experiment [*MINCOME*] between 1974 and 1979. At the time, it was widely believed that this experiment would serve as a pilot for a universal program, parallel to universal health insurance, that would revolutionize the ways in which Canadians pay taxes, receive benefits and earn income. The oil shocks and persistent stagflation of the 1970s brought different governments to power at both the federal and provincial levels, and brought *MINCOME* to an end without implementation of the anticipated universal basic income proposal.

In 1986, however, the idea was revived once again by *The Royal Commission on the Economic Union and Development Prospects for Canada*, known as the Macdonald Commission. Once again, the excitement generated by such a radical proposal did not translate into a universal basic income scheme, although subsequent governments continue to flirt with the idea and the most effective new social support programs in Canada, such as the Child Benefit, are built on the lines of a GAI. Most recently, the Standing Senate Committee on Social Affairs, Science and Technology reintroduced the concept in its report entitled *In From the Margins: a call to action on poverty, housing and homelessness* (December 2009).

In March 1973, Manitoba submitted a proposal for funding of a full experiment (rather than an administrative test or pilot project) to the federal Department of National Health

and Welfare. It contemplated a budget of $17 million and expected to enrol well over 1,000 families, with Ottawa paying 75% of the costs. On 4 June 1973, Manitoba and Canada formally signed an Agreement Concerning a Basic Annual Income Experiment Project covering cost-sharing and jurisdictional issues. The design of the project selected families from two experimental sites: Winnipeg and the rural community of Dauphin. A number of small rural communities were also selected to serve as controls for the Dauphin subjects. The Winnipeg sample was designed along the same lines as the US experiments: subjects were randomly selected from Winnipeg, and paired with matched controls from the same community. The major advantage of this design was that subject families were isolated from one another, which made it possible to vary the parameters of the negative income tax between families. The randomly drawn dispersed sample, and the use of controls, also made it possible to isolate the effects of the GAI and to draw conclusions about causation. The main goal was to gauge work response, and therefore the disabled, the institutionalized and the retired were excluded. This is the only part of the experiment that received research attention, and ultimately the findings were very similar to US findings: secondary and tertiary wage-earners tended to have a moderate labor market response, while primary earners showed little change in the number of hours worked in response to registration in the GAI (Hum and Simpson 1991).

The Canadian experiment, however, had one unique feature. It was the only experiment to contain a "saturation" site. Every family in Dauphin and its rural municipality, with a population of approximately 10,000, was eligible to participate in the GAI. This time, the elderly and the disabled were not excluded. The justification at the time was that the isolation of the treatment sample in the classic experiments would put families in a highly unrealistic situation, quite unlike the conditions that would attend a universal program. The Dauphin site was explained as an attempt to answer questions about administrative and community issues in a less artificial environment (Hum and Simpson 1991: 45).

The Dauphin cohort all received the same offer: a family with no income from other sources would receive 60% of Statistics Canada low-income cut-off (LICO), which varied by family size. Every dollar received from other sources would reduce benefits by fifty cents. All benefits were indexed to the cost of living. Families with no other income and who qualified for social assistance would see little difference in their level of support, but for people who did not qualify for welfare under traditional schemes – particularly the elderly, the working poor, and single, employable males – *MINCOME* meant a significant increase in income. Most important for an agriculturally dependent town with a lot of self-employment, *MINCOME* offered stability and predictability; families knew they could count on at least some support, no matter what happened to agricultural prices or the weather. They knew that sudden illness, disability or unpredictable economic events would not be financially devastating.

The actual conduct of the experiment ran into difficulties fairly quickly.[4] It was understood from the outset that "research" would be a joint responsibility, but Manitoba

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[4] The details of the *MINCOME* experiment and its operation come from working papers, and from formal and informal conversations with Ron Hikel (the senior Manitoba civil servant charged with overseeing the

would be responsible for administration. Midway through the experiment, with the social security review disintegrating and political support for the GAI waning, the project was altered in two ways. First, research veered away from the original focus on work incentives towards administrative issues. Second, the project was directed to adopt an "archive" strategy. That is, researchers would collect and archive data, but not engage in analysis.

The first response was to cut peripheral research programs. Originally, there were to be four foci: an economic program that centered on work incentives; a sociological program that looked at family formation, community cohesiveness, social attitudes, mobility and the like; an administrative program and a statistical program. The sociological program was the first to go. The researchers used ethnographic methods that were viewed with suspicion by the quantitatively-oriented senior research staff who were mostly economists – open-ended interviews, participant-observer methodologies and so on. Press accounts of this research were disparaging, claiming that for a very few dollars participants were expected to forego all their rights to privacy. Research on the farm labour supply was the next to go. It had always been seen as a concession to Manitoba agricultural interests, but of no real interest or importance. When it became clear that no more money would be forthcoming and that the original budget would not even allow a reasonable estimate of labour response, the primary motivation of the experiments, the researchers declared the research project a success, stopped doing labour market research, and spent the rest of the life of the project focusing on research related to administrative issues which would be both cheap to undertake and necessary since the money still flowed to participants. The project was told to archive whatever data had already been collected for later analysis.

The main reason for this change was financial (Hum and Simpson 1991: 43 – 47). The original budget of $17 million was never more than a wild guess and, in the event, proved far inadequate. The inflationary price increases of the 1970s, coupled with a larger than anticipated unemployment rate, meant that the proportion of the total going to program expenses exceeded estimates and was not under the control of the researchers. The payments to families were inflation-adjusted, but the budget was not. Moreover, these were statutory expenses. Costs for data collection would also have spiralled out of control, because wages paid to staff were not entirely under the control of researchers. Analysis was the last claim on the budget, and it was funded from an ever diminishing residual.

In the end, the project ran for four years concluding in 1979, but the data collection lasted for only two and virtually no analysis was done by project staff. Part of the explanation is a change in the intellectual and economic climate. Changes in government, both federally and provincially, reflected the changing mood. Neither the Progressive Conservative

government of Joe Clark in Ottawa nor Sterling Lyon's Tories in Manitoba were interested in continuing the GAI experiments. The fate of the original data themselves – boxes and boxes of paper files on families containing questionnaires related to all aspects of social and economic functioning – was unclear. They were stored in an unpublicized location by the Department of National Health and Welfare. In the end, only the Winnipeg sample, and only the labour market aspects of that sample, was ever made available. The Dauphin data, collected at great expense and some controversy from participants in the first social experiment ever conducted in Canada, were never examined.

By 1983, the economic turmoil of the 1970s was past but had left an enduring legacy in the form of a relatively large federal deficit and ongoing acrimony between the provinces and the federal government. In this context, a Royal Commission was established and given a broad mandate to examine all aspects of the ways in which the Canadian economy functioned. In 1982, "The Royal Commission on the Economic Union and Development Prospects for Canada", was appointed under the direction of the Right Hon. Donald Macdonald, who had been a senior federal minister in the energy and finance portfolios. One aspect of that overall review was to look again at the arrangements for social security provision across the country. Once again, a strong case for a GAI in Canada was made in the 1986 report of the Macdonald Commission, and several of its background research studies. Among its recommendations was a sweeping transformation of the ways in which Canadians pay taxes, receive benefits and earn incomes. The Commission itself described its proposals as "radical, not cosmetic, and wholesale rather than tinkering at the margin" (vol. 1, p. 48).

The Commission's Report (Vol. 2, pp. 778-83) documented what were widely perceived to be limitations with the current system: no national minimum standard for assistance and consequently differential support levels between provinces; administrative inefficiencies that leave some families eligible to receive benefits simultaneously from two or more different programmes; a confusing array of programmes that recipients often could not understand; and, most importantly, an inability to deal with the working poor. Welfare recipients were discouraged from moving from support to the labour market since any earnings would result in a dollar for dollar reduction in their benefits.

The Commission attempted to address these defects with a Universal Income Security Program (UISP), which would "simplify and rationalize the existing aggregation of programs" (vol. 1, p. 49). Always aware of the cost of social programs, the Commission did not argue that social expenditures for income support should be reduced, but did suggest that there be "no increase in the cost of transfers and tax expenditures" (vol. 2, p. 795). Perhaps fearing public reactions, the Commission went out of its way to argue that its proposals should not be considered a guaranteed annual income scheme (vol. 2, p. 795). Nonetheless, a GAI is precisely what they proposed. The design of the program would see the UISP replace some existing programs. The program would be funded from reallocated program expenditures from the discontinued programs and therefore impose no net cost. Families with earned income in the $8,000 to $12,000 range (in 1984 dollars) could expect an increase of $5,000 to $7,000. Families without other earnings could

expect a provincially funded and administered "top-up" since the UISP would replace only federally mandated programs. In order to garner public support, the Commission suggested that payments to young recipients might be dependent upon an active job search, demonstrated earnings or participation in locally administered training programs. Moreover, payments to those under age 35 might be restricted to half the payout level for those over 35 years of age (vol. 2, p. 798).

More than two decades have passed since the publication of the Macdonald Commission Report and the fundamental problem of poverty amidst plenty persists in Canada, as evidenced by the recent call for further consideration of a GAI in the Senate Committee Report *In From the Margins*. Over the past few years, there has been a re-emergence of interest among social agencies, as well as some federal and provincial government departments in the idea of a wholesale reform of social security along the lines of a GAI. Most persistent in this regard is Senator Hugh Segal who has raised the idea in various venues.[5] One aspect of this renewed interest is our ongoing work to document the actual consequences, including the health consequences, of the *MINCOME* experiment that were not reported at the time.

4. RECONSIDERING DAUPHIN

When we decided to investigate the Dauphin site for evidence that could illuminate this controversy, we were confronted with 1800 dusty boxes at the National Archives and traces of a few obsolete data tapes based on the labour market results of the Winnipeg sample. The Dauphin results had never been entered into a database. We wondered if we could examine the consequences of the *MINCOME* experiment in Dauphin by taking advantage of a unique population health database maintained in Manitoba. Some US experiments had gathered data on health outcomes, and we thought we might be able to replicate some of their findings (Kerachsky 1977, Lefcowitz and Elesh 1977).

Many people have argued that income security is one of the social determinants of health (Dahlgren and Whitehead, 1991; Evans and Stoddart, 1994; Marmot and Wilkinson 1999). However the precise pathways by which income influences health outcomes are less clear. Research has examined the relationship between health and each of the related concepts of mean family income, income distribution and the incidence of poverty. Our focus is on a slightly different dimension of economic well-being: income security, which is a concept distinct from income or socioeconomic status. Income security, the guarantee that all participants can expect a basic annual income whether or not they work, gives people a longer planning horizon, allowing them to get beyond just making ends meet.

Income security is conceptualized in many different ways in the social science literature. Sometimes it is treated in a way that makes it virtually indistinguishable from

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[5] Michael Enright conducted an interview with Hugh Segal, as well as EL Forget and Ron Hikel, for CBC Radio *Sunday Edition*, October 18 2009. http://www.cbc.ca/thesundayedition/2009/10/october-18-2009.html

socioeconomic status or poverty (Luckhaus 2000). More often, it is conceived as periods of time on social assistance, or periods of time below some significant marker such as the Statistics Canada low-income cutoff (LICO) (Sandefur 1997, Yelowitz 1996, Harris 1996). We claim that income security exists when the risk of falling below a particular income level is minimized (cf. Bertola 2004). That is, we conceived the GAI as an insurance policy. In the same way that people who buy fire insurance on their houses perceive the policy to be beneficial even if they never collect, the GAI benefited everyone in the saturation site, including families that never collected payments under the scheme. The benefit to those who did collect payments is obvious, but those whose incomes exceeded the threshold and therefore did not qualify still benefited from the reduction of risk. Because this is an agricultural community and even those working in other sectors had incomes dependent on harvests and agricultural prices, many people did not know with certainty in advance whether or not they would qualify for *MINCOME* stipends. The health and social benefits, including the willingness to encourage potentially useful adolescent children to stay in school rather than encouraging them to work, are dependent on perceived risk and not directly on whether the family qualified for support after the fact.

Moreover, because Dauphin was a saturation site in which all residents were permitted to participate and would receive a subsidy if they qualified, we expected to find stronger outcome evidence than one might predict based on the amount of money distributed or the number of families who received benefits. In this sense, it would resemble a universal social program. Universality is intended to promote social cohesion; a universal guaranteed annual income becomes a shared social experience rather than simply an individual benefit, and at least some of the US researchers attempted to focus on these community aspects of the GAI in the classic experiments (Ladinsky and Wells 1977). However, it is in the context of a saturation site that researchers can expect to find evidence of what some researchers have called a "social multiplier effect" – evidence that measured outcomes are stronger than one might expect because other members of the community share in the prosperity and social norms change to reflect evolving community standards (Scheinkman 2011).

Before we could justify access to the confidential data, however, we needed some evidence that it could, in principle, work. One of the effects that we expected might occur was that more adolescents, and especially more adolescent males, might continue high school beyond the mandated age (Mallar 1977; Maynard 1977; Maynard et al. 1979; McDonald and Stephenson 1979; Rea 1977; Weiss, Hall, Dong 1980). We accessed aggregate data on school continuation rates from the Department of Education, presented in Figure 1 below.

FIGURE 1 HERE

Money flowed to Dauphin families from *MINCOME* between 1974 and 1978. Dauphin students in grade 11 seemed more likely to continue to grade 12 than their rural or urban counterparts during the experiment while, both before and after the experiment, they were less likely than their urban counterparts and not significantly different from their rural counterparts to complete high school. Grade 11 enrolments as a percentage of the previous year grade 10 enrolments show a similar pattern. We could not disaggregate by gender. This figure is based on aggregate enrolment data provided by the Department of Education and does not control for underlying population dynamics. However, the population of Dauphin was stable and there were no classification issues that we are aware of.[6]

Although Dauphin was a saturation site, only about a third of Dauphin families qualified for *MINCOME* stipends at any point in time and, because of the structure of the payment scheme, many of those stipends would have been quite small. Why, then, is the educational response so apparent in aggregate data? Two factors, we suspect, are at work. First, most children in high-income families already continued into grade 12 and graduated from high school. Most of the students at risk for leaving high school early were in low-income families that would have either received *MINCOME* stipends, or thought there was a reasonable possibility that they would qualify for the stipends. Therefore, at-risk students were disproportionately likely to receive or expect to receive income supplementation. Second, we suspect a social multiplier was at work. A student in grade 11 trying to decide whether to continue to grade 12 would consider two things. Anticipated family income, including *MINCOME* stipends, is one. The young person, however, will also consider whether his or her friends intend to stay in school, and therefore it matters whether those families participate in the experiment. Ironically, the inability to randomize in a saturation site, far from being a liability, may have generated a response that would be invisible in a classic randomized experimental site.

If aggregate data can pick up an educational effect, the detailed individual data maintained in the population health database should be much more useful. The strongest response would have been detected if we could focus on families in receipt of *MINCOME* stipends, but ethical consideration would not allow us to identify *MINCOME* recipients. Therefore, we decided to look only for the community-level responses similar to those we found in the education data.

4.1 The Population Data Repository

The Manitoba Population Health Research Data Repository captures standardized data based on almost every physician and hospital contact in the province. This information (including patient and family identification numbers, physician claims, diagnoses, costs, and hospitalization and institutionalization data) is maintained and controlled by the provincial department of health. All records deposited in the repository have been

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[6] We looked specifically at the Indian residential school in Dauphin to ensure that our data were not picking up an influx of students into the public system, and found no evidence that this occurred.

processed by Manitoba Health to remove patient identifiers such as name and address, while preserving the capacity to link records together to form individual and family histories of healthcare use. Individual demographics, including 6-digit postal code of residence and marital status, are updated every six months. The health records are linked to vital statistics, so date of birth and death, as well as cause of death, is recorded (Roos et al. 1993).

FIGURE 2 HERE.

The database extends from 1970, when universal health insurance was established in Manitoba. The richness of the database has increased over time. In the 1970s, data available was limited to hospital abstracts, physician claims and vital statistics. Prescription drug use, linked survey data, social service and education data were not available. Moreover, in 1970 individuals were identified by name and 6-digit family identification number, which caused occasional confusion if parents and children had identical or similar names. When the 9-digit individual identification number was introduced, probabilistic linkage was used to identify individuals retrospectively (Roos et al. 1993). A second difficulty related to the early data is the absence of a 6-digit postal code. Individual addresses were represented by a municipality code, which is sufficient for our purposes. However, it limits the ability to link individuals to census data for small areas. Because we are dealing with a rural and small town population, this has little effect on our analysis. The 6-digit postal code and its ability to link individuals at small census agglomerations are particularly useful in urban settings.

4.2 Selecting the subjects and comparators

Subjects included everyone who listed a home address in the Municipality or the Rural Municipality of Dauphin continuously between January 1974 and December 1978. Individuals born between January 1974 and December 1978 with a home address in Dauphin or its rural municipality from the date of their birth until December 1978 were included as subjects. Individuals who died before December 1978 and were resident in Dauphin or its rural municipality between January 1974 and their death date were also included as subjects.

We excluded from the study individuals who moved into or out of Dauphin or its rural municipality between January 1974 and 1978. These individuals were not considered experimental subjects in either the original *MINCOME* design or in this analysis. These individuals were also excluded from the files from which we selected the comparison group.

For every subject included, we selected three other Manitoba residents as a comparison group through a combination of hard-matching and propensity matching. First, we hard-

matched on geography by removing from the database of potential matches all residents of Winnipeg (the only urban centre in the province), First Nations reserves[7], some municipalities without reserve status but with large populations of First Nations or Métis residents and people living in Northern Manitoba.[8] Winnipeg, with a 1971 population of 535,100 was omitted because access to health care, income and lifestyle differed between Winnipeg and the rest of the province in the mid-1970s. The second largest town in Manitoba was Brandon, with a 1971 population of 31,544. We kept Brandon in the database from which to select comparators because we assumed that it was more similar to the town of Dauphin, with a 1971 population of 12,173, than it was to Winnipeg. We took First Nations reserves out of the database because primary health care on reserve is a federal responsibility and therefore residents accessing primary care on reserve will not appear in a provincial database. We excluded towns without reserve status that nonetheless had large proportions of First Nations or non-status Indian residents because these towns are often just outside reserves and residents sometimes access health care on the nearby reserve. We excluded the north because this sparsely populated region contains large numbers of highly mobile young men working in the resource industries, whose healthcare utilization patterns can be expected to differ substantially from those of residents of stable towns in the agricultural heartland of the province. We also removed all individuals who lived in Dauphin or its rural municipality for only part of the period 1974 to 1978, and lived elsewhere for the rest of the period. After these exclusions, we were left with small town and rural residents living in the southern and central parts of Manitoba – places very much like Dauphin and its rural municipality.

From the people remaining in the database, we used propensity matching to select three comparators for every subject. Variables used for matching were limited by the data available to us in the data repository. Matching variables included year of birth, sex, number of people in the family, whether the family resided in a small town or a rural municipality, whether the family was a single-parent female-led family. The comparison between the subjects and our comparators on matching variables was excellent, with 99% matching exactly on sex and birth year.

We have no way to identify the ethnicity, religion, employment or income of any individual in our health database, and previous research shows all of these may be related to health utilization patterns. We therefore turned to the 1971 census to determine whether there were any systematic differences between our subjects and comparators on variables that might affect the outcomes. We used community-level variables and weighted each community by the number of people in our comparison group who were drawn from that community. We then compared these weighted results with those for Dauphin and its rural municipality.

Of all the variables available to us from the 1971 census, there were systematic differences between subjects and comparators only in ethnicity and agricultural

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[7] Most people living on reserve would have First Nations status, but not all First Nations people lived on reserve.

[8] Northern residents were identified as those living in Statistics Canada census division 16.

specialization.[9] The proportion of the Dauphin population claiming Ukrainian heritage, and, consequently, Ukrainian Catholic or Ukrainian Orthodox religious affiliation was greater than the proportion of those living in communities from which the comparators were selected. Dauphin agriculture was slightly more specialized in canola cultivation than elsewhere, with significantly larger proportions of census farms reporting canola cultivation, and larger proportions of improved land devoted to canola production. Agricultural differences, while significant, were small and, in any case, unlikely to be associated with outcome variables. No income or employment variables were significantly different.

Ethnic and religious differences, however, could affect some social outcomes and, in particular, may have affected fertility and family formation outcomes. In order to control for ethnic and religious differences that we could not eliminate or measure directly between subjects and comparators, we designed a method to measure the impact of *MINCOME* that would adjust for these differences. Instead of simply measuring significant differences in outcome variables between subjects and comparators, we determined whether the gap between subjects and comparators increased or decreased during the experimental period. This would also adjust for any systemic differences in access to healthcare as well as any other omitted variables between subjects and comparators that we were not able to measure directly.

5. ANALYSIS AND RESULTS

Our primary outcome variables relate to healthcare utilization – hospitalization and physician contacts observed at 6-month intervals from 1970 to 1985. Because we used a quasi-experimental design with a well-matched comparison group, we constructed a segmented time series model. The models have been run with the GENMOD procedure in SAS with a negative binomial distribution using an offset with the log population. This allows output to be determined as rates instead of counts.

Table 1 presents definitions of independent variables.

Table 1 here.

Parameter estimates are presented in Table 2.

Table 2 here.

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[9] 95% level of significance. Variables considered are listed in Appendix 1.

5.1 Did MINCOME affect hospital separation rates?

The first column in Table 2 presents model results for the dependent variable "hospital separations".[10] Because subjects and comparators are age and sex-matched, neither age nor sex appear as an independent variable and we do not eliminate instances of hospitalization related to childbirth.

All variables except the binary variables "Mincom" and "Nomincom" are significant at the 1% level. Results suggest that the rate of hospitalization in Dauphin was significantly higher than the rate for the comparison group before MINCOME began in 1974 (depend > 0). The rate of hospitalization was fairly flat over the entire study period (1970-1985) for the comparison group. However, the interaction term (yrmincome*depend) was significant and negative which suggests that the gap between Dauphin residents and their comparators narrowed, beginning in 1974 when the MINCOME money began to flow. By 1978, Dauphin residents had a significantly lower rate of hospitalization than the controls, but this began to narrow so that, by 1985, the significant difference in hospitalization separation rates between Dauphin subjects and the comparators disappears entirely.

One might imagine the relationship as the schematic in Figure 3 below.

Figure 3 here.

Before *MINCOME*, there was a significant gap between the rates of hospital separations among Dauphin residents and the comparison group, with Dauphin residents making greater use of hospitals. None of the health or census variables we examined could explain the persistent gap, but we note that there was a fairly new hospital in Dauphin which may have led to some supply-induced demand. Some, but not all, of the comparison group would have lived near a hospital and it is certainly possible that some of the comparison group may have had less convenient access to hospitals than the Dauphin residents, leading some individuals to forgo voluntary treatment. The gap may also reflect the influence of other variables for which we could not control, such as ethnicity.

These results seem intuitively reasonable because overall health has been linked to income security in a variety of ways in past research. If Dauphin residents benefited from increased income security during the *MINCOME* period, as we have suggested, then we would expect their use of healthcare resources to decline relative to the comparison group over that period. When the *MINCOME* money ceased to flow in 1978, we would expect the narrowing of the health gap to slow. In our study, the original gap between Dauphin

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[10] Hospital separations are separate events of hospitalization. The Hospital Separation Abstract that is completed for each hospitalization event includes up to 10 diagnostic codes and number of days hospitalized, among other data.

residents and the comparison group did not reappear. This may suggest that the benefits of income security persist for some time after the money ceases to flow.

We wondered whether these patterns would persist if we looked more carefully at particular causes of hospitalization that we expected to be especially related to income insecurity. First, we examined the hospital separation rate for "accidents and injuries". "Accidents and injuries" are identified by ICD-9 codes[11], and include such things as workplace and farm accidents, automobile accidents, and so on. We expected "accidents and injuries" to be sensitive to income security both because we have found these codes to be related to socioeconomic status in the past, and because many of the particular reasons one might be hospitalized with an "accident and injury" code are clearly related to the stress that might be induced by income insecurity. For example, farm or workplace accidents may be related to income insecurity if people continue to work in dangerous jobs when they are unwell or fatigued. Children suffer farm accidents if parents are unable to provide childcare during crucial harvest periods. Increased alcohol use may be associated with higher rates of family violence, automobile accidents, assaults, suicide attempts and so on. It is important to remember that these codes are assigned in small-town hospitals by people who are often neighbours of patients, and the precise nature of the accident or injury may be less clearly coded than it would be in a large city hospital, particularly if there is some socially sensitive issue involved. Therefore, we did not attempt to break down "accident and injury" hospitalizations further.

Again, results seem feasible and consistent with the overall rates of hospital separations. This time, there is a modest increase in "accident and injury" hospitalizations over the entire period. Again, Dauphin residents enter the 1970s with a significantly higher rate of hospitalization than the comparison group, but this gap narrows over the MINCOME period until, by the end of the period, there is no significant difference between Dauphin subjects and the comparators. Again, the differential does not re-emerge during the period under consideration.

Figure 4 here.

We wondered whether "mental health" hospital separations would follow a similar pattern. Again, we used ICD-9 codes to select relevant cases, and omitted all "congenital" cases so that what we were left with were instances of hospitalization for anxiety disorders, clinical depression, personality disorders and so on. Note that we include the hospitalization of individuals wherever they are hospitalized, so that even if an individual

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[11] We used ICD-9 codes because the longest run of health data has been coded as ICD-9. Over the period 1970 to 2008, we have moved from ICD-7 to ICD-10 codes, and each transition requires careful consideration as some codes change.

from Dauphin is hospitalized in a centralized provincial facility (in Winnipeg, for example) we capture that hospitalization. This may be of greater significance in the case of mental health hospitalizations which tended to be more highly concentrated in particular facilities, especially during the 1970s.

Hospital separations due to mental health diagnoses follow a pattern very similar to that of accidents and injuries. Again, the initial gap reflects a greater hospitalization rate for Dauphin residents at the beginning of the MINCOME period narrows during the period of a GAI and disappears by the end of the period.

Figure 5 here.

5.2 Did MINCOME affect physician contacts?

The second broad category of healthcare utilization variables available to us relate to the use of physicians. Every contact with a physician results in an entry in the database that includes the reason for the visit and the amount billed. Hospital separation data are excellent measures of health status because individuals typically have limited control over whether they will be hospitalized. Physician contacts, however, are to a large degree under the control of individuals. Therefore, rather than objective health status, physician contacts might represent a more subjective measure of health status which might be sensitive to income insecurity.

We examined overall physician contacts, physician contacts for "accident and injury" diagnoses and physician contacts for mental health diagnoses. Only the latter showed significant trends; parameters are significant only at the 5% level. The pattern is similar to that of hospital separations for mental health diagnoses, with the trend for Dauphin residents falling relative to the comparison group during the MINCOME period.

5.3 Do Other Effects of MINCOME Appear in the Health Data?

American GAI analyses purported to find other effects of the GAI field experiments. Keeley (1980a, 1980d) found positive effects on fertility. Kehrer and Wolin (1979) found a reduction in low-birthweight infants in some urban centres. Hannan, Tuma and Groeneveld (1977) claimed to have found an increase in family dissolution rates in the Seattle-Denver experiment, a finding contested by Cain and Wissoker (1990). The Manitoba data allow us to investigate, to some degree, each of these claims for the Dauphin subjects.

We found no evidence that fertility increased among Dauphin subjects relative to the comparison group. In fact, there is weak evidence of delayed childbirth among the youngest cohort of Dauphin mothers examined, although ethnic and religious differences

between subjects and comparators make attribution of differences to *MINCOME* suspect. Table 3 shows the proportion of women with at least one child by the mother's birth cohort.

TABLE 3. Proportion of women with at least one child by age 25

Birth Cohort	Dauphin Subjects	Comparison Group
1946-1952	0.69579	0.69794
1953-1959	0.54742	0.54545
1960-1966	0.46804	0.48605
1967-1974	0.44969	0.51091

The proportions were significantly different only for mothers born between 1967 and 1974. (Satterthwaite t-test; 5% sig.).

Table 4 shows the mean number of children born to women in each age cohort before age 25.

TABLE 4. Mean number of children before age 25 by mother's birth cohort.

Birth Cohort	Dauphin Subjects	Comparison Group
1946-1952	1.20227	1.24295
1953-1959	0.91181	0.93780
1960-1966	0.66667	0.65969
1967-1974	0.65723	0.81944

The mean number of children born to women before age 25 was significantly different between Dauphin subjects and controls only for mothers born between 1967 and 1974, with Dauphin women having significantly fewer babies. (Satterthwaite t-test: 5% sig.).

If anything, women born between 1967 and 1974 who lived in Dauphin during the *MINCOME* period were significantly less likely than the comparison group to give birth before age 25 and had, on average, significantly fewer children before age 25. This seems to suggest delayed childbirth and may be indicative of lower lifetime fertility. These women would have been younger than seven at the start of *MINCOME*, and no more than eleven when the experiment ceased. Their older sisters, born between 1960 and 1966 who would have been between eight and fourteen at the beginning of MINCOME and between eleven and eighteen at its end, were no less likely than their comparators to give birth early. This pattern makes it difficult to attribute declining early fertility to *MINCOME*. We note that there were ethnic and religious differences between the Dauphin subjects and the comparison group and, while we could not isolate any factor to which we could attribute the difference, it is likely that changes in religious education or social behaviour unrelated to *MINCOME* might account for declining fertility.[12] The one apparent difference between our subjects and controls relates to religious affiliation and its potential impact on fertility. The speed of the social changes related to fertility that occurred in all rural areas during the 1970s may not have been uniform across the province. We found no documented changes in Church teaching and were unable to document any systematic social changes that may have led to differential outcomes, but the possibility remains.[13]

One of the strongest claims made by individuals who advocate a GAI is that birth outcomes may be improved: improved nutrition and access to prenatal care may lead to healthier newborns. The only data we were able to use to determine birth outcomes were perinatal deaths – extremely rare events – and birthweight. The detailed birth records of recent years, with 1- and 5-minute APGAR scores and other data were not available in

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[12] The files we pulled for analysis were limited to people who were alive between 1974 and 1978. Therefore, we were unable to determine whether this pattern persisted for younger age cohorts. We analyzed fertility by age cohort because there were too few births in any one year to test for significant differences.

[13] We interviewed Roman Bosyk, a Ukrainian Orthodox priest who lived in Dauphin during the period who is currently Dean of Theology at St. Andrew's College, Manitoba; he could think of nothing that should have led to differential fertility outcomes in Dauphin relative to the comparators. We suspect a greater general acceptance of birth control among all rural residents during the 1970s, and we note that the combined Roman and Ukrainian Catholic affiliations between subjects and comparators according to the 1971 census is not significantly different. Nonetheless, we note the potential confounding and plan further qualitative work to determine the impact of religious and ethnic differences on changes in fertility during the 1970s.

the mid-1970s. We tested for significant differences in low-birthweight, at-risk birthweight[14], and small-for-gestational age newborns born to Dauphin subjects and comparison group members during the *MINCOME* period. No significant differences were found. While numbers were small, we attribute this finding to the institutional features of the jurisdictions under study. Low birthweight is usually attributed to a lack of prenatal care and poor maternal nutrition during pregnancy. Universal health insurance existed during the *MINCOME* period in Manitoba; in principal, both our Dauphin subjects and the comparison group had equal access to prenatal care. Moreover, both Dauphin subjects and comparison group members lived in rural, agricultural areas of the province. Poverty rarely manifests as food insecurity in such settings where subsistence farming, hunting and fishing supplement purchased food, and social organizations such as churches and clubs would have met residual need (Rhyne 1979).

The oddest outcome claimed by US researchers was that marital stability was undermined in jurisdictions that experimented with a GAI (Hannan, Tuma and Groeneveld 1977). The argument, which held great sway in US political debate, was that poor women, given a real choice by the existence of a GAI, would be less inclined to stay in unsatisfactory marriages. That finding was suspect from the outset[15] and convincingly challenged by Cain and Wissoker who argued that statistical errors destroyed the credibility of the finding (Cain and Wissoker 1990). Nevertheless, we examined our data to see if family dissolution rates might be affected. We found no evidence of increased family dissolution rates among the Dauphin subjects.

The population health data repository is routinely updated with family data, including residence of both parents and marital status, every six months. The currency and accuracy of the data, however, depends either on individuals calling Manitoba Health with new information or physicians updating information during routine interactions with the healthcare system. The latter happens regularly, but individuals who have few contacts with the health system have little incentive to update information. The data quality, therefore, may be suspect.

6. CONCLUSIONS

We took advantage of an historical accident to re-examine the impact of a Guaranteed Annual Income in the small town of Dauphin, Manitoba that served as the only saturation site in the five North American Negative Income Tax field experiments of the 1970s. Because universal health insurance was introduced in this jurisdiction just before the

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[14] "At-risk birthweight" includes both very small and very large babies, the latter often the consequence of gestational diabetes. Both categories are associated with poor health.

[15] There were a number of issues with the finding, but one worth noting is that many of the families in the comparison group would have received AFDC which specifically did not pay support to families with male heads while the families receiving a GAI faced no such restriction. Intuitively, the AFDC families should have had the greater incentive to dissolve marriages.

MINCOME experiment, we were able to access health administration data to determine whether population health might be affected by a Guaranteed Annual Income. We used a quasi-experimental design to determine whether contacts with the health care system declined among subjects who lived in the experimental community relative to a comparison group matched by age, sex, geography, family type and family size during the *MINCOME* experiment. We found that overall hospitalizations, and specifically hospitalizations for accidents and injuries and mental health diagnoses, declined for *MINCOME* subjects relative to the comparison group. Physician contacts for mental health diagnoses fell for subjects relative to comparators. Overall, the measured impact was larger than one might have expected since only about a third of families qualified for support at any one time and many of the supplements would have been quite small. This we attribute to the operation of a social multiplier. Because Dauphin was a saturation site, the involvement of friends and neighbours in the scheme might have led to changes in social attitudes and behaviours that influenced individual behaviour even among families that did not receive the supplement. We were unable to substantiate claims from US research that showed increases in fertility rates among subjects relative to controls, improved neonatal outcomes or increased family dissolution rates.

These results would seem to suggest that a Guaranteed Annual Income, implemented broadly in society, may improve health and social outcomes at the community level.

REFERENCES

Advisory Council on Public Welfare. 1966. *Having the Power, We Have the Duty.* Washington: Department of Health, Education and Welfare.

Anderssen, Erin. (19 November 2010) To End Poverty, Guarantee Everyone in Canada $20,000. But Are You Willing To Trust the Poor? *The Globe and Mail.* http://www.theglobeandmail.com/news/national/to-end-poverty-guarantee-everyone-in-canada-20000-a-year-but-are-you-willing-to-trust-the-poor/article1806904/

Baumol, W., 1974. An overview of the results on consumption, health, and social behavior. Journal of Human Resources 9 (2), 253–264.

Baumol, W., 1977. An overview of the results. In: Watts, H.W., Rees, A. (Eds.), The New Jersey Income-Maintenance Experiment, vol. III: The Impact on Expenditures, Health, and Social Behavior, and the Quality of the Evidence. Academic Press, New York, pp. 1–14.

Bertola G. 2004. A Pure Theory of Job Security and Labour Income Risk. Review of Economic Studies. 71(1): 43.

Bradbury, K.L., 1986. Discussion (of 'Non-labor supply responses to the income maintenance experiments'). In: Munnell, A.H. (Ed.), Lessons from the Income Maintenance Experiments. Federal Reserve Bank of Boston, Boston, pp. 122–125.

Bradbury, K.L., 1978. Income maintenance alternatives and family composition: an analysis of price effects. Journal of Human Resources 13 (3), 305–331.

Brownell M, Roos N, Fransoo R, Guevremont A, Frohlich N, Kozyrskyj A, Bond R Bodnarchuk J, Derksen S, MacWilliam L, Dahl M, Dik N, Bogdanovic B, Sirski M, Prior H. 2004a. Manitoba Child Health Atlas 2004: Inequalities inChild Health: Assessing the Roles of Family, Community, Education and Health Care. http://www.umanitoba.ca/centres/mchp/repotts/child_inequalities/

Brownell M et al. 2004b. How do educational outcomes vary with socioeconomic status? Key findings from the Manitoba Child Health Atlas 2004. Winnipeg: Manitoba Centre for Health Policy.

Brownell L, Lix L, Ekuma O, Derksen S, DeHaney S, Bond R, Fansoo R, MacWilliam L, Bodnarchuk J. 2003. Why is the Halth of Some Manitobans Not Improving? The Widening Gap in the Health Status of Manitobans. Winnipeg: Manitoba Centre for Health Policy.

Brownell M, Friesen D, Mayer T. 2002. Childhood injury rates in Manitoba: Socioeconomic influences. Canadian Journal of Public Health 93(supp): S50-S56.

Burke VJ and Burke V. 1974. *Nixon's Good Deed: Welfare Reform.* New York: Columbia University Press.

Cain, G, 1977. Fertility behavior. In: Watts, H.W., Rees, A. (Eds.), The New Jersey Income-Maintenance Experiment, vol. III: The Impact on Expenditures, Health, and Social Behavior, and the Quality of the Evidence. Academic Press, New York, pp. 225–250

Cain G and Wissoker D.1990. "A Reanalysis of Marital Stability in the Seattle-Denver Income Maintenance Experiment," *American Journal of Sociology*, March 1990: pp. 1235–1269.

Chen E, Matthews KA, Boyce WT. 2002. Socioeconomic differences in children's health: how and why do these relationships change with age? Psychological Bulletin. 128(2): 295-329.

Connor S, Brink S. 1999. Understanding the Early years. Community impacts on child development. Working Paper W-99-6E. Human Resources Development Canada, Ottawa, ON.

CSDH (2008). *Closing the gap in a generation: health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health.* Geneva, World Health Organization. [the Marmot report]

Dahlgren G and Whitehead M. 1991. Policies and Strategies to Promote Social Equity in Health. Stockholm: Institute for Futures Studies

Evans RG, Stoddart GL. 1994. Producing Health, Consuming Health Care. In: Evans RG, ML Barer, TR Marmor (Eds.) Why are some people healthy and Others Not? Determinants of the Health of Populations. New York: Aldine de Gruyter: 77-63.

Feeny D., Kaplan MS, Huguet N, McFarland BH. Comparing population health in the United States and Canada. Popul Health Metr 2010 Apr 29;8:8.

Forget EL 2008. The Case For Basic Income in Canada, in xxx

Friedman, Milton. 1962. *Capitalism and Freedom.* Chicago: University of Chicago Press.

Green C. 1967. *Negative Taxes and the Poverty Problem.* Washington: Brookings Institution.

Harris, K. M. 1996. Life after welfare: Women, work and repeat dependency. *American Sociological Review 61*(3): 407-426.

Harris R. 2005. "The Guaranteed Income Movement of the 1960s and 1970s", in Widerquist et al. (2005).

Haveman R, Wolfe B. 1994. Succeeding Generations: On the Effects of Investments in Children. New York: Russell Sage Foundation.

Herrick JM and Stuart PH. 2004. *Encyclopedia of Social Welfare History in North America.* Sage Publications.

Hertzman C. 1999. Population health and human development. In Keating DP and Hertzman C. (Eds.) Developmental health and the wealth of nations: Social, biological and educational dynamics. New York: Guilford Press: 21-40.

Hum D and Simpson W. 1991. *Income Maintenance, Work Effort, and the Canadian Mincome Experiment.* A study prepared for the Economic Council of Canada. Ottawa: Canadian Communications Group.

Johnson AW. 1975. "Canada's social security review, 1973-1975: the central issues" *Canadian Public Policy.* 1(4): 456-72.

Keeley, M.C., 1980a. Demand for children. In: Robins, P.K., Spiegelman, R.G., Weiner, S., Bell, J.G. (Eds.), A Guaranteed Annual Income: Evidence from a Social Experiment. Academic Press, New York.

Keeley, M.C., 1980b. Migration. In: Robins, P.K., Spiegelman, R.G., Weiner, S., Bell, J.G. (Eds.), A Guaranteed Annual Income: Evidence from a Social Experiment. Academic Press, New York.

Keeley, M.C., 1980c. The effects of negative income tax on migration. Journal of Human Resources 15, 695–706.

Keeley, M.C., 1980d. The effects of negative income tax programs on fertility. Journal of Human Resources 15, 675–694.

Kehrer, B.H., Wolin, C.M., 1979. Impact of income maintenance on low birthweight: evidence from the Gary Experiment. Journal of Human Resources 14 (4), 434–462.

Kerachsky, S.H., 1977. Health and medical care utilization: a second approach. In: Watts, H.W., Rees, A. (Eds.), The New Jersey Income-Maintenance Experiment, vol. III: The Impact on Expenditures, Health, and Social Behavior, and the Quality of the Evidence. Academic Press, New York, pp. 129–150.

Ladinsky, J., Wells, A., 1977. Social integration, leisure activity, media exposure, and lifestyle enhancement. In: Watts, H.W., Rees, A. (Eds.), The New Jersey Income-Maintenance Experiment, vol. III: The Impact on Expenditures, Health, and Social Behavior, and the Quality of the Evidence. Academic Press, New York, pp. 195–224.

Lefcowitz, M.J., Elesh, D., 1977. Health and medical care utilization. In: Watts, H.W., Rees, A. (Eds.), The New Jersey Income-Maintenance Experiment, vol. III: The Impact

on Expenditures, Health, and Social Behavior, and the Quality of the Evidence. Academic Press, New York, pp. 113–128.

Levine RA, Watts H, Hollister R, Williams W, O'Connor A, Widerquist K. 2005. "A Retrospective on the Negative Income Tax Experiments: Looking Back at the Most Innovative Field Studies in Social Policy", in Widerquist et al. (2005).

Luckhaus L. 2000. Equal Treatment, social protection and income security for women. International Labour Review 139(2): 149-78.

Mallar, C.D., 1977. The educational and labor-supply responses of young adults in experimental families. In:Watts, H.W., Rees, A. (Eds.), The New Jersey Income-Maintenance Experiment, vol. II: Labor-supply Responses. Academic Press, New York, pp. 163–184.

Marmot M, Allen J, Goldblatt P. A social movement, based on evidence, to reduce inequalities in health. SocSciMed 2010 Aug 17.

Marmot MB, Bell R. Action on health disparities in the United States: commission on social determinants of health. JAMA 2009 Mar 18; 301(11): 1169-71.

Marmot M.and Wilkinson R. 1999. Social Determinants of Health. Oxford: Oxford University Press.

Maynard, R., Murnane, R.J., 1979. The effects of a negative income tax on school performance: results of an experiment. Journal of Human Resources 14 (4), 463–476.

Maynard, R., 1977. The effects of the Rural Income Maintenance Experiment on the school performance of children. American Economic Review 67 (1), 370–375.

McDonald, J.F., Stephenson Jr., S.P., 1979. The effect of income maintenance on the school-enrollment and labor-supply decisions of teenagers. Journal of Human Resources 14 (4), 488–495.

Metge C, Black C, Peterson S, Kozyrskyj AL. 1999. The population's use of pharmaceuticals. Medical Care 37(supp): S42-S59.

Middleton, R., Allen, V.L., 1977. Social psychological effects. In: Watts, H.W., Rees, A. (Eds.), The New Jersey Income-Maintenance Experiment, vol. III: The Impact on Expenditures, Health, and Social Behavior, and the Quality of the Evidence. Academic Press, New York, pp. 151–194.

Morris JN, Wilkinson P, Dangour AD, Deeming C, Fletcher A. Defining a minimum income for health living (MIHL): older age, England. Int J Epidemiol. 2007 Dec; 36(6): 1300-7.

Moynihan DP. 1973. *The Politics of a Guaranteed Income: The Nixon Administration and the Family Assistance Plan.* New York: Random House.

Orshansky M. 1969. "How Poverty is Measured", *Monthly Labor Review* 92: 37-41.

Pickett KE, Wilkinson RG. Greater equality and better health. BMJ 2009 Nov 10; 339: b4320.

President's Commission on Income Maintenance Programs. 1969. *Poverty Amid Plenty.* Washington DC: US Government Printing Office.

--- 1970. *Background Papers.* Washington DC: US Government Printing Office.

Raphael D. Public policies and the problematic USA population health profile. Health Policy. 2007 Nov; 84(1): 101-11.

Royal Commission on the Economic Union and Development Prospects for Canada: Report. (1985) 3 vols. Ottawa: Supply and Services. [The Macdonald Commission]

Sandefur, G. D. & Cook, S. T. (April 1997). *Duration of public assistance receipt: Is welfare a trap?*,(University of Wisconsin-Madison, Discussion paper no. 1129-97). Madison, WI: Institute for Research on Poverty.

Simms CD, Persaud DD. Global health and local poverty: rich countries' responses to vulnerable populations. Can J Public Health 2009 May-Jun; 100(3): 176-9.

Standing Senate Committee on Social Affairs, Science and Technology. In From the Margins: A call to action on poverty, housing and homelessness. December 2009

Rea Jr., S.A., 1977. Investment in human capital under a negative income tax. Canadian Journal of Economics 10(4), 607–620.

Rhyne D. 1979. *Organization Life in River City: a case study of class, ethnicity, geographical mobility and status.* PhD Thesis. University of Toronto: Department of Sociology.

Robinson JR, Young TK, Roos LL, Gelskey DE. 1997. Estimating the burden of disease: comparing administrative data and self-reports. Medical Care 35: 932-47.

Roos LL, Mustard CA, Nicol JP, McLerran DF, Malenka DJ, Young TK, Cohen NM. 1993. Registries and administrative data: organization and accuracy. Medical Care 31: 201-212.

Roos LL, Nicol JP. 1999. A research registry: uses, development and accuracy. Journal of Clinical Epidemiology 52(1): 39-47.

Royal Commission on the Economic Union and Development Prospects for Canada: Report. (1985) 3 vols. Ottawa: Supply and Services. [The Macdonald Commission]

Scheinkman, José. Social Interactions. http://www.princeton.edu/~joses/wp/socialinteractions.pdf Accessed 14/02/2011.

Thoits, P., Hannan, M.T., 1980. Income and psychological distress. In: Robins, P.K., Spiegelman, R.G., Weiner, S., Bell, J.G. (Eds.), A Guaranteed Annual Income: Evidence from a Social Experiment. Academic Press, New York.

Tobin J. 1966 "The Case for an Income Guarantee", *The Public Interest* 4: 31-41.

Tobin J, Pechman JA and Mieszkowski PM. 1967. "Is a Negative Income Tax Practical?" *The Yale Law Journal* 77(1): 1-27.

Van Loon R. 1979. "Reforming welfare in Canada" *Public Policy* 27: 469-504.

Victorina CC, Gauthier AH. The social determinants of child health: variations across health outcomes – a population-based cross-sectional analysis. BMC Pediatr. 2009 Aug

Weiss, Y., Hall, A., Dong, F., 1980. The effect of price and income on investment in schooling. Journal of Human Resources 15, 611–640.

Widerquist K, Lewis MA and Pressman S. (eds) 2005. *The Ethics and Economics of the Basic Income Guarantee.* Hampshire UK and Burlington VT: Ashgate Publishing.

Williams, Juliette Evangeline Rhys, Lady D.B.E. 1953. *Taxation and Incentive.* London: William Hodge and Company.

--- 1943. *Something to Look Forward To: A suggestion for a new social contract*. London: MacDonald.

Wogaman P. 1968. *Guaranteed Annual Income: the moral issues.* New York: Abingdon Press.

Yelowitz, A. S. (September 1996). *Did recent Medicaid reforms cause the caseload explosion in the food stamp program?* (University of Wisconsin-Madison, Discussion paper no. 1109-96). Madison, WI: Institute for Research on Poverty.

APPENDIX 1

We found significant differences in the following variables in the 1971 census (95% confidence level):

- % reporting Ukrainian heritage (31.22% in Dauphin; 10.43% comparators)
- % reporting religion as Ukrainian Catholic (16.70% Dauphin; 5.25% comparators)
- % reporting religion as Ukrainian Orthodox (9.61% Dauphin; 2.25% comparators)
- % improved land in rapeseed (9.36% Dauphin; 3.67% comparators)
- % census farms reporting rapeseed (46.92% Dauphin; 18.40 comparators)

We found no significant differences on the following variables:

- Average family income
- % families with less than $2,000
- Average household income
- % households with less than $2,000
- Average wage and salary income
- Median wage and salary income
- % wage and salary earners who are full-time, full-year
- Average male employment income
- Median male employment income
- Average female employment income
- Median female employment income
- Average male total income
- Median male total income
- Average female total income
- Median female total income
- Male unemployment rate
- Female unemployment rate
- % males (15+) who never worked
- % females (15+) who never worked
- % British Isles ethnicity
- % native Indian ethnicity
- % French ethnicity
- % Polish Ethnicity
- % German Ethnicity
- % reporting religion as Roman Catholic

- % reporting religion as United Church
- % reporting religion as Mennonite
- % reporting religion as Anglican
- % reporting religion as Roman or Ukrainian Catholic
- % occupied dwellings owned by resident
- Average number of persons per room (all housing)
- % owner-occupied non-farm dwellings with no mortgage
- % improved land in wheat
- % census farms reporting wheat
- Average acres in wheat on farms reporting wheat
- % improved land in oats
- % census farms reporting oats
- Average acres in oats on farms reporting oats
- % improved land in barley
- % census farms reporting barley
- Average acres in barley on farms reporting barley
- % improved land in tame hay
- % census farms reporting tame hay
- Average acres in tame hay on farms reporting tame hay
- % improved land in flaxseed
- % census farms reporting flaxseed
- Average acres in flaxseed on farms reporting flaxseed
- % farms reporting cattle
- Average number cattle on farms reporting cattle
- % farms reporting pigs
- Average number pigs on farms reporting pigs
- % farms reporting chickens
- Average number chickens on farms reporting chickens
- % farms reporting laying hens
- Average number laying hens on farms reporting laying hens
- % farms reporting turkeys
- Average number turkeys on farms reporting turkeys
- Improved acres on census farm
- % improved acreage sprayed or dusted for insect or disease control
- % improved acreage dusted for weed or bush control
- Capital value per census farm
- Total sales per census farm
- % farms with sales > $10,000
- % farms with sales < $2,500
- Farm output/capital ratio
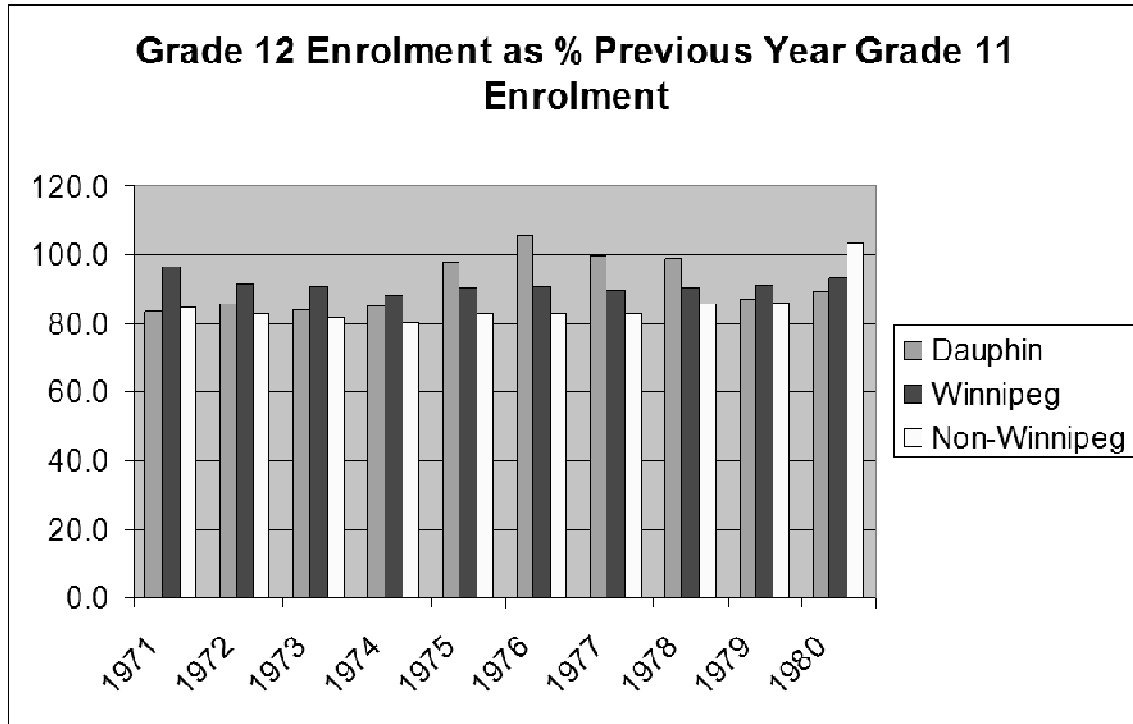- % census farms owned by resident

FIGURE 1

Grade 12 Enrolment as % Previous Year Grade 11 Enrolment
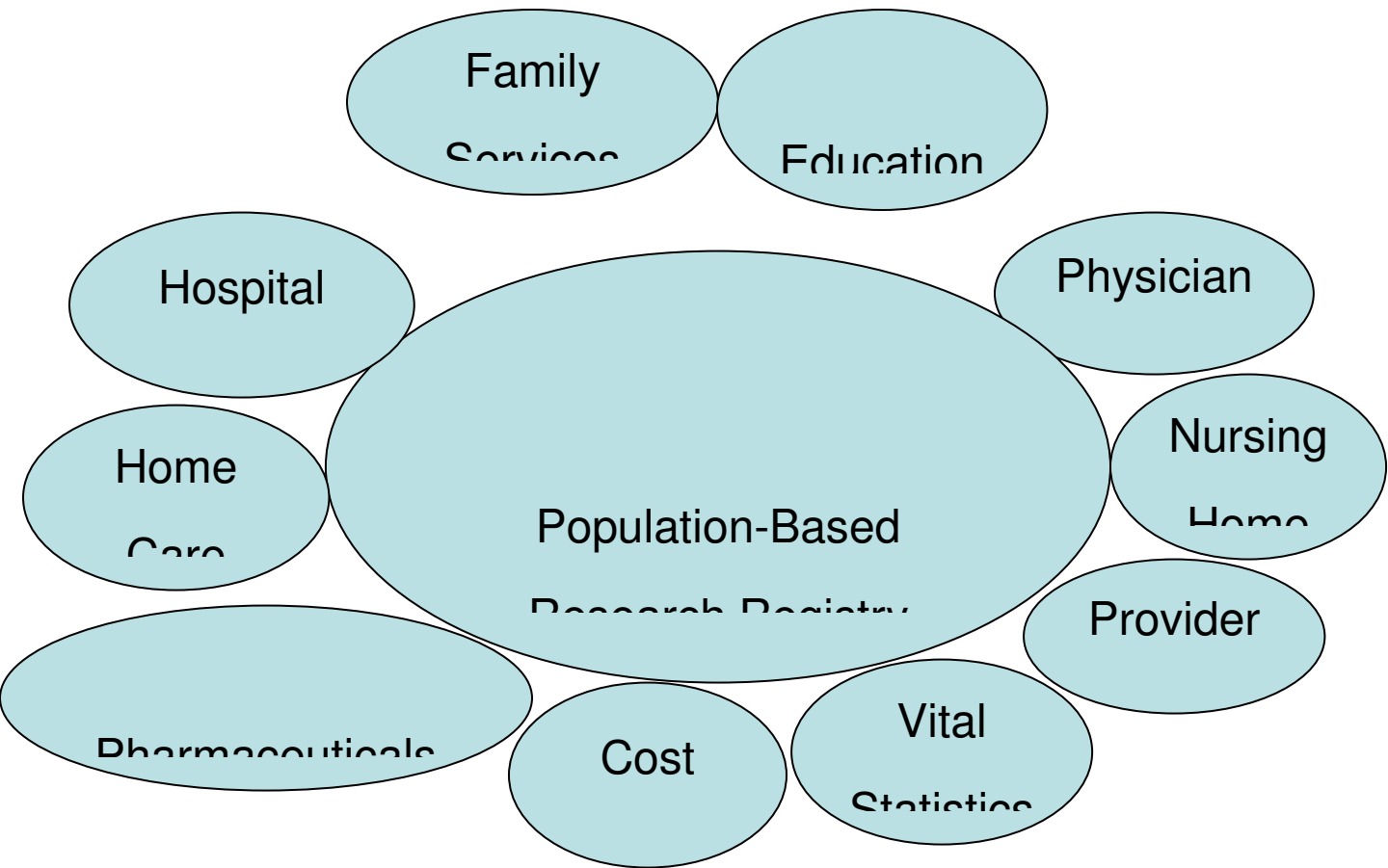
FIGURE 3

HOSPITAL SEPARATIONS

FIGURE 4

HOSPITAL SEPARATIONS:
accidents and injuries

FIGURE 5

HOSPITAL SEPARATIONS:
mental health diagnoses
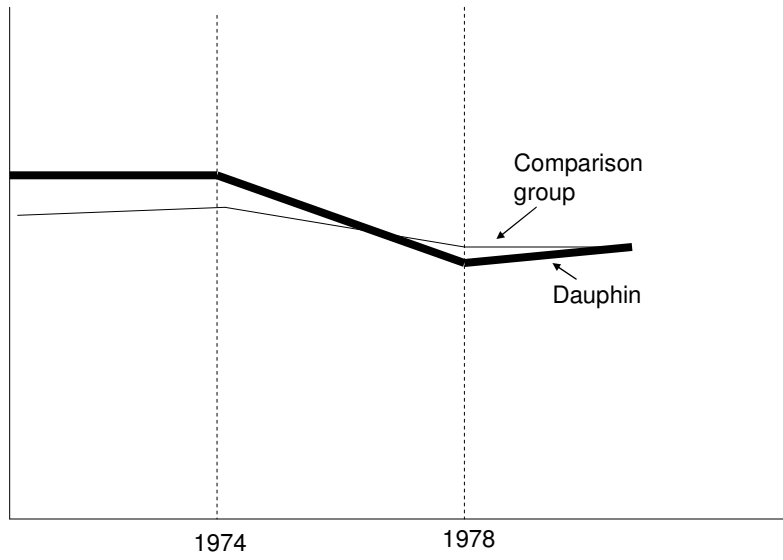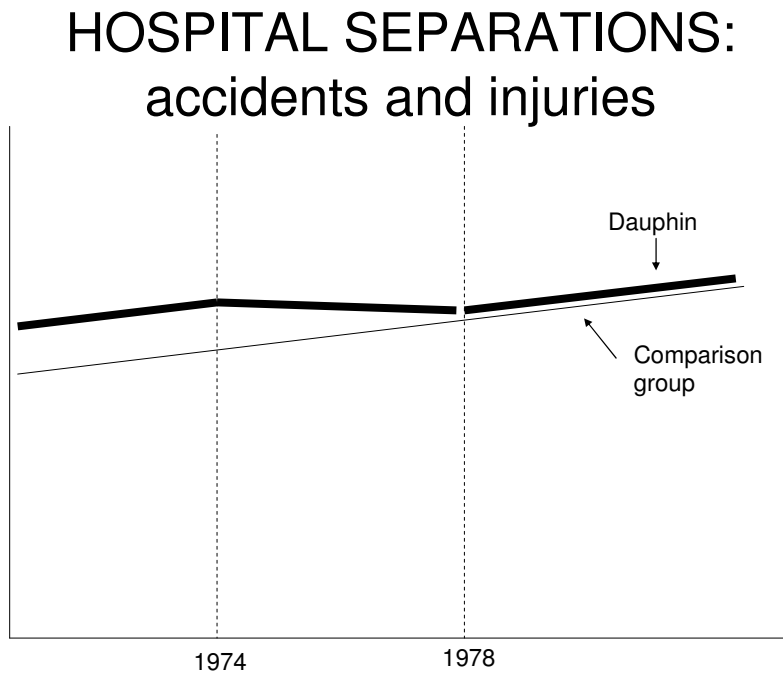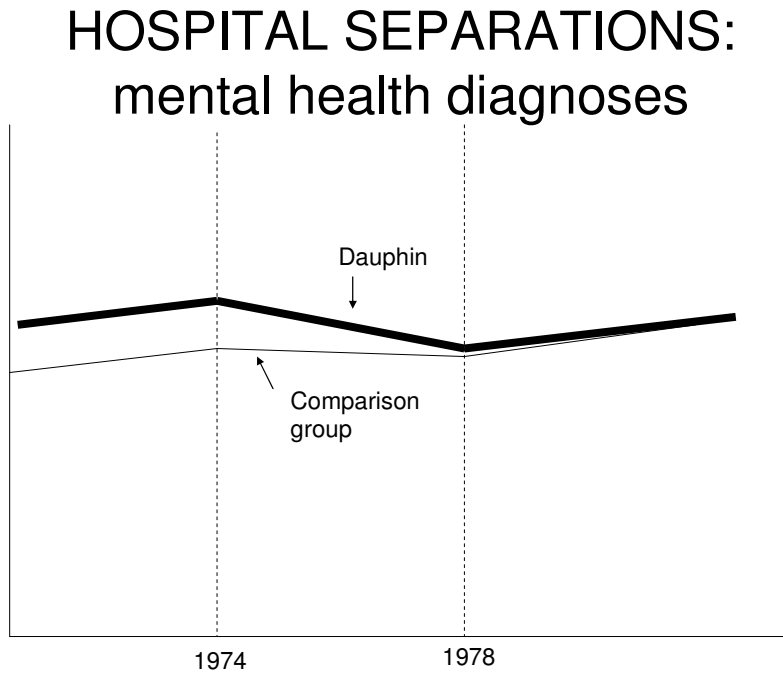
TABLE 1: Definitions of Independent Variables

VARIABLE	DEFINITION
Intercept	
Depend	1 if the individual lived in Dauphin throughout 1974-1978; 0 otherwise
Time_Seq	Sequence of 6-month time intervals from 1970 – 1985 (1,2,3 … 32)
Mincom	Binary variable defining MINCOME period (1974 +)
Yrmincom	Sequence of 6-month time intervals beginning 1974 (1,2 … 24)
Nomincom	Binary variable defining the period after MINCOME (1979+)
Yrnomincom	Sequence of 6-month time intervals beginning 1979 (1,2 …14)
Yrmincom*Depend	An interaction term that allows a differential rate of change between Dauphin subjects and the comparison group during and after the MINCOME period

TABLE 2: Segmented Time Series Model Outcomes Using a Negative Binomial Distribution

VARIABLE	HOSPITAL SEPARATIONS			PHYSICIAN CONTACTS
	OVERALL	ACC+INJ	MENTAL HEALTH	MENTAL HEALTH
Intercept	-2.5023*	-5.1478*	-6.0173*	-2.3815**
	(0.0226)	(0.0502)	(0.0749)	(0.0613)
Depend	0.1336*	0.2062*	0.4923*	-0.1027
	(0.0150)	(0.0340)	(0.0464)	(0.0394)
Time_Seq	0.0292 *	0.0582*	0.0867*	0.0142
	(0.0042)	(0.0093)	(0.0137)	(0.0118)
Mincom	0.0439	-0.1358	-0.0433	-0.0490
	(0.0254)	(0.0539)	(0.0768)	(0.0698)
Yrmincom	-0.0445 *	-0.0549*	-0.0844)*	-0.0086
	(0.0052)	(0.0113)	(0.0165)	(0.0144)
Nomincom	-0.0409	0.0411	0.2060	0.0881
	(0.0228)	(0.0489)	(0.0659)	(0.0592)
Yrnomincom	0.0214*	-0.0135	0.0342	0.0199**
	(0.0036)	(0.0076)	(0.0104)	(0.0094)
Yrmincom*Depend	-0.0107 *	-0.0110*	-0.0315*	-0.0089**
	(0.0013)	(0.0030)	(0.0037)	(0.0032)

Note: Parameter estimates are presented. Standard Errors are in parentheses. The negative binomial dispersion parameter was estimated by maximum likelihood.

*Significant at 1% level
**Significant at 5% level