# Quality is free: A cost-benefit analysis of early child development initiatives

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High-quality early child development initiatives are expensive. However, careful analysis of the returns on investment for such initiatives establishes that, from the government's perspective, the initiatives all but pay for themselves. The explanation for this is twofold. First, early childhood interventions enhance adult employability and earnings of program participants. This generates $8.2 billion in tax revenues that partially offset program costs. Second, early childhood interventions reduce the need for expensive remedial programs such as special education and medical treatment, reducing government expenditures by $4.9 billion.

**Key Words:** *Early childhood development; Health determinants; Outcomes*

## La qualité ne coûte rien : Une analyse coûts-avantages des projets de développement de la petite enfance

Les projets de développement de la petite enfance de qualité coûtent cher. Toutefois, une analyse attentive du rendement du capital investi pour ces projets établit que, du point de vue du gouvernement, ces projets se paient pratiquement d'eux-mêmes. L'explication est double. D'abord, les interventions en petite enfance favorisent l'employabilité et les revenus des adultes participant au programme, ce qui produit 8,2 milliards de dollars en recettes fiscales et compense partiellement les coûts du programme. Ensuite, les interventions en petite enfance réduisent la nécessité de recourir à des programmes correctifs coûteux, tels que l'éducation spécialisée et le traitement médical, ce qui réduit les dépenses gouvernementales de 4,9 milliards de dollars.

Canada is among the richest countries in the world, a prosperity that provides us with the resources needed to help our most disadvantaged. Yet, when it comes to disadvantaged children and, indeed all children, these resources have conspicuously failed to flow. What makes this state of affairs so puzzling is that the returns from investing in kids are huge – so big, in fact, that from society's perspective, these investments more than pay for themselves (1). The problem is that governments are reluctant to spend scarce tax dollars on children. This fiscal prudence is misplaced. Healthy kids become hard-working, innovative adults who pay the taxes needed to invest in tomorrow's kids. Furthermore, government expenditures fall as the expensive remedial costs of special education, children's aid, juvenile courts and more, are replaced by the inexpensive costs of prevention. In short, from a government fiscal perspective, early childhood interventions practically pay for themselves.

Any business person will immediately understand this argument. It is a pillar of modern business practice commonly referred to as 'total quality control' or 'quality is free'. In the present article, I use these concepts to lay out a business plan for financing early child development initiatives.

## A CHILDREN'S PROSPECTUS: SPECTACULAR RETURNS WITHOUT THE SNAKE OIL

Table 1 reviews results from two well-known studies of early childhood interventions: the Ypsilanti-based Perry Preschool Program (2), which reassessed subjects at 27 and 40 years of age; and the Chicago-based Child-Parent Centers (3), which followed subjects to 22 years of age.

The first row of Table 1 reports the benefits to society from each dollar spent on these early childhood programs. In the case of the Perry Preschool Program, the benefits were $8.14 by 27 years of age and $14.19 by 40 years of age (2). In the case of the Child-Parent Centers, the benefits were $7.14 per dollar spent (3). Thus, each dollar spent on children three and four years of age yields significant social returns for many years down the road.

Note that these benefits are discounted to take into account the fact that they are stretched out over many years, whereas the program costs must be paid up front. More technically, the benefits are discounted by 3% a year.

While benefit numbers such as $8.14 are large, from a hard-nosed business perspective, they are not quite the appropriate program assessment tool. From a business perspective, one needs to calculate a return on investment

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**TABLE 1**
**The return on investment (ROI) from investing in early childhood interventions**

| | Perry Preschool Program | | Child-Parent Centers |
|---|---|---|---|
| | Age 27 years | Age 40 years | ~Age 22 years |
| Social benefits per dollar invested | $8.14 | $14.19 | $7.14 |
| ROI, % | 9.1 | 7.4 | 10.9 |
| Returns as reported by a financial advisor, % | 10.7 | 9.0 | 12.5 |
| Increase in regular high school graduation, % | 47 | 47 | 28 |
| Reduction in violent crime, % | 114 | | 67 |

*An ROI that is positive (greater than 0%) means that the present value of the real return exceeds the initial capital cost. The ROI nets out inflation. To make it comparable to ROIs reported by financial advisors (and newspapers), in row 3 an inflation rate of 1.6% is added to the ROI of row 2. On the technical side, ROI = $(PD/I)^{1/T} - 1$, where PD is the present value of the returns to the program, I is the initial cost of the program and T is the horizon. For the Perry Preschool Program, I and PD are from reference 2 and T is the age minus three years, ie, T=24 in column 1 and T=37 in column 2. For the Child-Parent Centers, data are from reference 3, with T=19. Throughout, a 3% discount factor is used in calculating PD. Data on graduation rates and crime are from reference 3*

(ROI). The easiest way to think about an ROI is to imagine that the Perry Preschool Program is a government savings bond. The bond costs $15,000, which was the initial per-child cost of the Program. Then when the child is 27 years of age, the bond pays exactly enough interest to generate $8.14 × $15,000 in benefits minus the capital costs of borrowing the initial $15,000. The interest rate that achieves this is the ROI for the program. If the ROI is positive, then the program benefits exceed the program costs and the program should be funded. The second row of Table 1 reports ROIs. These are all positive and vary between 7.4% and 10.9% These ROIs are close to the 7% to 10% range reported in Heckman et al (4). If children were a business, these ROIs would trigger a management decision to invest in early child development.

Notice that the ROIs are big, so big that business people would offer up their first born for the opportunity to participate in such investments. The ROIs represent stellar long-term returns that are in excess of what can be earned long term from stocks or bonds. To make this point clearer, the third row of Table 1 adds in inflation so that the ROIs can be compared with the numbers that financial advisors and newspapers report. This row shows that investing in children is similar to buying a secure government savings bond that provides annual yields of between 9.0% and 12.5%, year in and year out for more than 20 years. Ask yourself: "Would you buy a 20-year bond that paid 12.5%?" These are extraordinary long-term returns and mean that early childhood interventions are pure value creation – quality is free.

Unfortunately, Canada has failed to appreciate the value of investing in children. Canada currently spends 0.2% of its gross domestic product on early childhood initiatives. In contrast, Sweden spends more than nine times that amount (1). In Mustard (5), he argues that care comparable with that offered in Sweden would cost Canadian governments an additional $15 billion a year. Mustard argues that we must spend $18 billion – we currently spend $3 billion (0.2% of gross domestic product), which means that we would need to spend an additional $15 billion. At first glance, $15 billion is a staggering amount and completely unaffordable. But it is affordable… because quality is free. In particular, it is free for society (1) and almost free for Canadian governments who must pay for the program. In the following section, I will demonstrate that Canadian governments only need to spend an additional $1.9 billion to meet Mustard's Swedish target. The remaining $13.1 billion would be the self-financing outcome of a virtuous circle in which investments in children increase government revenues and reduce government expenditures.

## QUALITY IS FREE

As I showed in Table 1, the returns from investing in children are impressive and represent a net gain to society – quality is free. However, the primary beneficiaries (children) are not the ones who foot the bill for early childhood programs. This falls to governments. Thus, for governments, quality is not free. Politicians will, therefore, want to know where the money is coming from. In this section, I lay out precisely where the money will come from and show that quality is practically free for governments.

### Employability

One of the most striking impacts of early childhood interventions involve those dealing with educational attainment. As shown in the second-last row of Table 1, early childhood programs increase the rate of high school graduation by between 28% and 47%. Young male high school dropouts have among the highest unemployment rates and lowest earnings of any group in Canada. Early childhood interventions partially fix this by reducing the size of this group. Currently, 10% of the school-age population is at risk of not graduating from high school (6). According to Table 1, such programs would thus induce between 2.8% and 4.7% of program participants to complete high school (10% of teenagers do not graduate from high school; 47% of this group is 4.7%, 28% of this group is 2.8%). I, therefore, conservatively assume that a Canadian early childhood program would increase the number of high school graduates by 2%. Because high school graduates have much higher rates of employment than high school dropouts, the program would increase the number of employed workers. These employed workers would earn income ($1.9 billion) and, because the taxman always gets his share, this would generate $690 million in taxes (see the online Appendix for the detailed calculations underlying all the numbers in this section <www.pulsus.com> or <www.paediatrchildhealth.com>).

An early childhood program would also increase the number of kids that complete a post-secondary degree. Based on Nores et al (7), I assume conservatively that the program induces 2% of participants to continue beyond high school and graduate with a university degree. University graduates

are more likely to be employed and, therefore, more likely to earn money and pay taxes. The induced 2% group would pay $740 million in taxes. Adding these two increases in tax revenues ($690 million and $740 million), the government would get back $1.4 billion in tax revenues (Table 2).

In these calculations (and others to follow), I am assuming that the early childhood program is universal, but that the benefits come almost exclusively from the at-risk population. If we move to a cheaper program that targeted the at-risk population, the costs would fall considerably, but the benefits would not. Thus, a targeted program would more than pay for itself.

**TABLE 2**
**Government-funded investments in children are almost self-financing**

| | Increased tax revenues and lower expenditures |
|---|---|
| Government fiscal benefits | |
| Increased labour force participation | $1.4 billion |
| Higher earnings from higher education | $2.8 billion |
| Reduced welfare, special education and justice costs | $1.1 billion |
| Higher parental labour force participation | $4.0 billion |
| Reduced health care costs | $3.8 billion |
| Total | $13.1 billion |
| Government fiscal costs | $15.0 billion |
| Additional government funding needed | $1.9 billion |

*The Mustard (5) program costs $18 billion. It would cost the Canadian government $15 billion because $3 billion is already spent on early childhood initiatives*

### Higher earnings from higher education

Earnings rise with education. Thus, not only are program participants more likely to work, but they will be paid more when they work. Assuming that the program induces a modest 2% more of the population to graduate from high school and another 2% more to graduate from university, the new graduates would earn an additional $7.9 billion and the taxman's take would be $2.8 billion (Table 2).

### Reduction in remedial programs for kids

We now know that children fall off the rails at a very early age. Tremblay (8) shows that children as young as 11 months have aggressive tendencies that predict whether the child will be in an age-appropriate grade after the age of six years, and whether the child will be engaged in criminal activities as a teenager and adult. Table 1 provides evidence of this for just one of many outcomes, namely, the incidence of violent crime. For example, at 27 years of age, the Perry treatment group was less than one-half as likely (114%) to have perpetrated a violent crime as the control group. The treated group was also much less likely to require special education or welfare. The costs of special education classes, welfare, children's aid and the justice system are large. Based on data from the Perry Preschool Program, early childhood interventions would reduce these government-borne costs by $1.1 billion ($1.1 billion represents only 5% of the $23 billion that Canada spent in 2003 on policing and the criminal justice system [9]). This is an example of quality being free: early interventions reduce the money spent later fixing problems.

### Family benefits

We know from early childhood programs that in families where kids are on track, stress at home is greatly reduced and parents have more time for other activities such as work. In addition, early childhood interventions provide reliable child care, making it easier for parents to find and retain a job. Not surprisingly, Canadian women with children younger than six years of age have very high rates of unemployment, which means that they want to work but are unable to do so. (Women with children younger than six years of age at home have an unemployment rate of 10.2%, whereas women whose children are six years of age or older have an unemployment rate of only 4.9%. Those familiar with unemployment statistics will recognize that a difference of 5.3% is huge.) Consider those Canadian women with children younger than six years of age who are not working. If one-half of them were able to find work because of early childhood programs, this would generate enough earnings to create a $4.0 billion tax windfall for governments. (These impacts on maternal employment are higher than estimates from the $5 per day child care program in Quebec [10,11]. However, I am evaluating a more extensive program.)

### Health

In any given week, one out of every 100 Canadian workers misses an entire workweek because of illness (12). We know that chronic illness imparts a huge burden on the economy. For example, depression costs the Canadian economy a staggering $6 billon annually. One-half of this cost is due directly to the lower workplace productivity of depressed workers (13). (They arrive at a cost of US$43.7 billion or US$173 per capita. Converting this to Canadian dollars at a purchasing power parity-adjusted 0.85 exchange rate and multiplying by the Canadian population yields $6 billion.) If we know anything about early childhood interventions, it is that they have significant effects on morbidity. There has been extensive replication of studies (5,14) showing that small size at birth or low birth weight is associated with increased rates of coronary artery disease, stroke, type 2 diabetes mellitus, adiposity, the metabolic syndrome and osteoporosis in adult life. We also know that some of these diseases can be prevented by early childhood interventions. Turning chronic illness into hard economic numbers has been done for some diseases, but not systematically for all diseases that can be mitigated by early childhood interventions. Assuming that 10% of the population is at risk of a chronic disease that is mitigated by early childhood interventions, and assuming that these interventions would reduce health care costs for the at-risk group by 25%, government health care expenditures would fall by $3.8 billion (Table 2).

Summing the five items mentioned in this section establishes that early child development initiatives would increase tax revenues and decrease government expenditures by a staggering $13.1 billion. For the government, a

$15 billion outlay on early childhood interventions returns $13.1 billion to its coffers. For the government, quality is practically free.

## CONCLUSIONS

Fraser Mustard (5) has put forward an ambitious $18 billion early child development program. Those who would argue that it is unaffordable, do not understand the basics of business: quality is free. Mustard's program could be financed by $13.1 billion in benefits generated internally by the program, $3 billion that is currently spent on early childhood programs and $1.9 billion in new government funding. All that stands between Canada's children and a world-class, high-quality, universal early child development program is $1.9 billion in government funding. Quality really is free for society, and practically free for governments.

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