

Development and implementation of a framework for estimating the economic benefits of an accessible and inclusive society

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Abstract

Purpose – To develop a framework for estimating the economic benefits of an accessible and inclusive society and implement it for the Canadian context. The framework measures the gap between the current situation in terms of accessibility and inclusiveness, and a counterfactual scenario of a fully accessible and inclusive society.

Design/methodology/approach – The method consists of three steps. First, the conceptual framework was developed based on a literature review and expert knowledge. Second, the magnitudes for each domain of the framework was estimated for the reference year 2017 using data from various sources. Third, several sensitivity analyses were run using different assumptions and scenarios.

Findings – It was estimated that moving to a fully accessible and inclusive society would create a value of \$337.7bn (with a range of \$252.8–\$422.7bn) for Canadian society in the reference year of 2017. This is a sizeable proportion of gross domestic product (17.6%, with a range of 13.1–22.0%) and is likely a conservative estimate of the potential benefits.

Originality/value – Understanding the magnitude of the economic benefits of an accessible and inclusive society can be extremely useful for governments, disability advocates and industry leaders as it provides invaluable information on the benefits of efforts, such as legislation, policies, programs and practices, to improve accessibility and inclusion of persons with disabilities. Furthermore, the total economic benefits and the benefits per person with a disability can serve as inputs in economic evaluations and impact assessments.

Keywords Disability, Barriers to inclusion, Accessible and inclusive society

Paper type Technical paper

Introduction

Over the last few decades, many countries have passed laws targeted at removing barriers to participation in various social domains for persons with disabilities (United Nations, 2020).



Despite progress made to date, persons with disabilities still face discrimination and other barriers to full participation in society (ILO, 2012). Impacts of social exclusion include lower labor force participation rates and labor-market earnings (Furuoka *et al.*, 2011; Buckup, 2009; Shima *et al.*, 2008), higher levels of poverty (Morris *et al.*, 2018), higher healthcare costs (WHO, 2011; Anderson *et al.*, 2011), lower educational attainment (Morris *et al.*, 2018; Montez *et al.*, 2017) and lower life satisfaction (Eurofound, 2018). Identifying robust and comparable estimates of the economic benefits of accessibility and inclusion (or conversely the costs of exclusion) of persons with disabilities at the country level remains a complex undertaking, largely due to the lack of standardized methodology and appropriate data resources needed to compute such estimates. Over the last decades, some attempts have been made to estimate the national costs of exclusion of persons with disabilities in certain domains (Banks and Polack, 2014; Buckup, 2009; Metts, 2000) but, to our knowledge, no study has estimated the societal benefits of an accessible and inclusive society in a broad range of domains for any country. Our attempts to do so set the stage for further refinement of the approach. Our work can also serve as an input into the impact analysis of the Accessible Canada Act, federal legislation that was enacted in 2019 in part to address Canada's obligations under the United Nations Convention on the Rights of Persons with Disabilities, which Canada ratified in 2010. In terms of policy, our estimates provide invaluable insights into the magnitude of gains to be realized by society and can inform decisions in areas warranting priority attention and investments.

Literature review

Several researchers have attempted to develop and implement an approach for estimating the societal costs of barriers to full participation of persons with disabilities. Most have taken what is sometimes described as a bottom-up approach, in which micro-level data are used to estimate the magnitude of costs. Most also focus exclusively on labor-market output and productivity losses. For example, Metts (2000) estimated the costs of exclusion of persons with disabilities in 207 countries. In a report prepared for the World Bank, he approximated annual value of countries' gross domestic product (GDP) losses by extrapolating results from a Canadian study by Moore *et al.* (1997). That study used a prevalence-based human capital approach to translate direct and indirect costs of illness, disability and premature death in Canada in terms of labor-market output and productivity losses (Moore *et al.*, 1997). Thus, the underlying assumption in the study by Metts (2000) is that labor-market circumstances in countries around the world are similar to those of Canada. Drawing on GDP data from the United Nations Development Programme, the estimated costs of exclusion for countries ranged from 15 to 40% of GDP (Metts, 2000).

In another study, Buckup (2009) estimated the costs of exclusion of persons with disabilities for ten low- and middle-income developing countries in Asia and Africa in a report prepared for the International Labour Organization (ILO). Building on previous research, he developed a new approach to estimating the labor-market output and productivity losses under three broad categories. The first category accounts for the reduced productivity of employed persons with disabilities associated with lower than optimal levels of engagement. The second component accounts for the higher unemployment rate among persons with disabilities compared to those reporting no disability, and the third component accounts for the higher labor market inactivity levels among persons with disabilities compared to their able-bodied counterparts. Based on this approach, Buckup (2009) estimated that the output and productivity losses ranged from 3 to 7% of GDP for the 10 countries in the study.

In another relevant study, Banks and Polack (2014) reviewed several studies to identify the key pathways by which the exclusion of persons with disabilities might manifest in terms of societal losses in low- and middle-income countries. In a report prepared for a nonprofit

German organization (CBM), [Banks and Polack \(2014\)](#) investigated the costs of exclusion under three key life areas – education, work/employment and health. The study highlights pathways by which persons with disabilities experience widespread exclusion and through which societal losses may be incurred. However, the researchers did not quantify the monetary values associated with these losses. Rather, they concluded that, though the theoretical basis for these pathways is strong and backed by several epidemiological and modeling studies, further empirical research was needed to develop an approach to estimating the extent, magnitude and scope of the costs of exclusion imposed on individuals, their families and society.

Other studies have considered what is sometimes described as spillover effects that arise from more accessible and inclusive environments. For example, in a recent study commissioned by the Government of Ontario, Canada, [Kemper *et al.* \(2010\)](#) examined the potential economic and social benefits of five new accessibility standards associated with the Accessibility for Ontarians with Disabilities Act (AODA) implemented in 2005. The researchers proposed that Ontario businesses could benefit from the implementation of these standards in at least three ways. First, they assumed increased access to retail and tourism opportunities would give rise to growth in these sectors. Second, they considered the potential benefits gained by accessibility-focused businesses, which could serve global markets. Third, they considered the benefit of increased educational attainment. Specifically, they assumed universities, colleges and other postsecondary institutions could educate the next generation of workers and develop new intellectual property that would help businesses compete in the markets defined by accessibility requirements. They concluded that enhanced workforce participation among persons with disabilities not only would increase their income, but also increase GDP per capita in Ontario by up to \$600 per year (2005 Canadian dollars). Additionally, they concluded that the new standards would allow persons with disabilities to attain parity with the average educational achievement of Ontarians, giving rise to another \$200 (2005 Canadian dollars) increase in Ontario's GDP per capita.

Despite several empirical studies that have made inroads into developing and implementing an approach to estimating the costs of exclusion of persons with disabilities, identifying robust estimates of the total costs at the country level remains a complex undertaking, largely due to the lack of a comprehensive conceptual framework that includes a broad range of relevant domains. Another challenge is the lack of disability statistics and related data at the national level ([Rohwerder, 2015](#); [Walton, 2012](#); [Hays *et al.*, 2002](#)). Most of the previous studies have focused on a limited number of social domains, primarily labor productivity and output losses. Consequently, the values to be gained in a number of other key domains remain unknown, which is a significant gap in knowledge that is important for public sector decision-making in terms of evaluating the effectiveness of accessibility- and inclusivity-related initiatives.

The objective of this study is to develop a comprehensive framework for estimating the economic benefits of an accessible and inclusive society and implement it for the Canadian context. We assume that in an accessible and inclusive society, persons with disabilities have the opportunity to participate fully in all aspects of life ([United Nations, 2007](#)). These opportunities include participation in education, employment, public health programing and community living. Persons with disabilities must be able to live the lives they choose and have a good quality of life, as well as enjoy the same rights and respect for their dignity and privacy, as do persons without disabilities.

The framework for this study draws on approaches used in two literatures: (1) the costs of exclusion literature described above and (2) the costs of illness/economic burden of disease literature, which is a more established literature in the health economics discipline. What is conceptually different from costs of illness/economic burden of disease studies from this study is that the cost of exclusion is not framed around a counterfactual scenario of the

absence of impairment or disability, but rather the absence of barriers to inclusion. To estimate these costs, we considered the gap between the current situation in Canada in terms of accessibility and inclusiveness, and a counterfactual scenario of a fully accessible and inclusive Canada. The key question being addressed by this study is as follows:

What would be the benefits to Canadian society, in reference year 2017, if Canada was accessible and inclusive in all domains relevant to full participation?

We use the reference year 2017 because the most recent version of the Canadian Survey on Disability (CSD) was administered that year. A fully accessible and inclusive society is a gold standard to strive toward. It is an ideal that requires continuous efforts. We note that only the benefits of an accessible and inclusive society are considered in this study. Invariably, there will be expenses/costs incurred by the public sector in developing and enforcing regulations, as well as in the delivery of goods and services associated with accessibility. For employers and others, there will be compliance costs and other expenses incurred in creating accessible and inclusive environments. Other organizations may also incur expenses/costs associated with the provision of accessible goods and services. These expenses/costs must be estimated as part of a full-fledged economic evaluation or impact analysis. Ideally, the benefits outweigh the costs at the aggregate level. The comparison of benefits relative to costs of regulatory development and enforcement, compliance activities and other activities of creating accessible and inclusive environments, and efforts associated with the provision of accessible goods and services is not part of this project. Rather, they are ideally studies unto themselves undertaken when programs are developed and require evaluation.

Although it is not easy to put a price tag on all domains of exclusion/benefits of inclusion, since many are intangible, there is great value in providing a grounded understanding of the potential values to be gained if efforts and resources are invested to improve accessibility and inclusiveness in different social domains. Understanding the magnitude of the economic benefits of an accessible and inclusive society can be extremely useful for governments, disability advocates and industry leaders, as it provides invaluable information on the benefits of efforts, such as legislation, policies, programs and practices. Furthermore, the total economic benefits and the benefits per person with a disability can serve as inputs in economic evaluations and impact assessments.

Research methodology

Study steps

The methodology of this study consists of three steps that are commonly used in economic burden studies ([Drummond *et al.*, 2015](#)). First, we identified key domains based on a literature review and discussion with experts to inform the development of a conceptual framework. Second, we estimated the monetary impacts of each domain, drawing on insights from the literature and public use data from various sources. Our search for relevant literature to help with both the development of the conceptual framework and its implementation was met with the realization that we were exploring substantially new terrain. Therefore, in the third step, we ran sensitivity analyses using different scenarios and considered a range of values for measures that had a high level of uncertainty. The details of each step are described in the following paragraphs.

Conceptual framework

We undertook a scan of literature to identify key domains of the costs of exclusion/benefits of inclusion. Our framework drew on several economic burden studies, the key ones being [Buckup \(2009\)](#), [Walton \(2012\)](#) and [Kemper *et al.* \(2010\)](#). We advanced the methods drawn from

these often-cited studies in several ways. In particular, we considered a broader range of relevant domains. We also drew on the knowledge of several experts who provided rich insights into the various domains where benefits might be realized from a more accessible and inclusive society. We involved experts with the following backgrounds in the research project team meetings: an expert in disability management, two disability policy analysts, two economists and one statistician. Brainstorming meetings were fairly unstructured. We first presented a draft version of a conceptual framework. Experts then provided feedback to help us (1) identify domains that were overlooked in the conceptual framework, (2) identify possible interactions or overlaps among domains, (3) identify available data and finally, (4) validate the analytic findings. We also discussed counterfactual scenarios, high-level assumptions, data gaps and sensitivity analyses. Participants were all given a chance to contribute to the discussion until consensus was reached.

[Figure 1](#) depicts the final version of our conceptual framework, which consists of 14 domains: (1) healthcare expenses; (2) out-of-pocket expenses; (3) output and productivity; (4) quality of life and social role engagement; (5) life expectancy; (6) informal caregiving; (7) children with disabilities; (8) human rights; (9) transportation; (10) tourism; (11) general productivity; (12) administration of social safety net programs; (13) pensions and (14) market multiplier effects. Given the interrelated nature of many aspects of the benefits from increases in accessibility and inclusiveness, we sought to identify domains that have unique and reasonable distinct values. We attempted to minimize overlaps in our estimation of benefits in each domain. Invariably, there are connections across domains. These are depicted with the two-way arrows linking adjacent domains, which are meant to be representational. Though the arrows point to adjacent domains, there are connections across many domains in the framework.

We took a societal perspective in our estimation and parsed out benefits directly and indirectly accruing to the various stakeholders affected by a move to a fully accessible and inclusive society. We aggregated these benefits across all stakeholders to identify the societal benefits in each of the 14 domains, in total and per capita. Some elements of public sector benefits (including any reduced expenditures in income benefit programs) are simply reduced transfer payments arising from the fact that higher labor-force participation of persons with disabilities results in lower levels of dependency on social safety net programs and other such transfers. Therefore, we did not include them in this study, since they do not reflect a loss or gain to society, but simply a transfer of purchasing power from one entity to another.

In this study, we took a prevalence-based approach ([Jo, 2014](#)), since we are interested in the benefits associated with increases in accessibility and inclusion of all persons with disabilities in Canada at a point in time (a specific calendar year), regardless of the time of disability onset. In a prevalence-based approach, one estimates the number of persons affected by a condition (in this case disability) in a given year, and then estimate the costs for only that year for persons who live through the year, and for the remainder of an expected lifetime for persons who die prematurely in the year ([Jo, 2014](#)). As noted, we chose the reference year 2017 because of the availability of a rich data source for that year, namely the CSD. The CSD provides information about Canadian adults whose day-to-day lives and their full participation in society are limited because of a long-term condition or health-related problems. The survey also provides relatively comprehensive information on educational attainment, employment and income of persons with and without disabilities in Canada. We note that the lack of data on key parameters in the conceptual framework presented many challenges to its implementation, but we adapted data from various sources to fill in gaps.

Valuation of domains

In our framework, we named benefit domains as direct and indirect. Direct benefit domains are those that directly accrue to persons with disabilities or are directly related to their

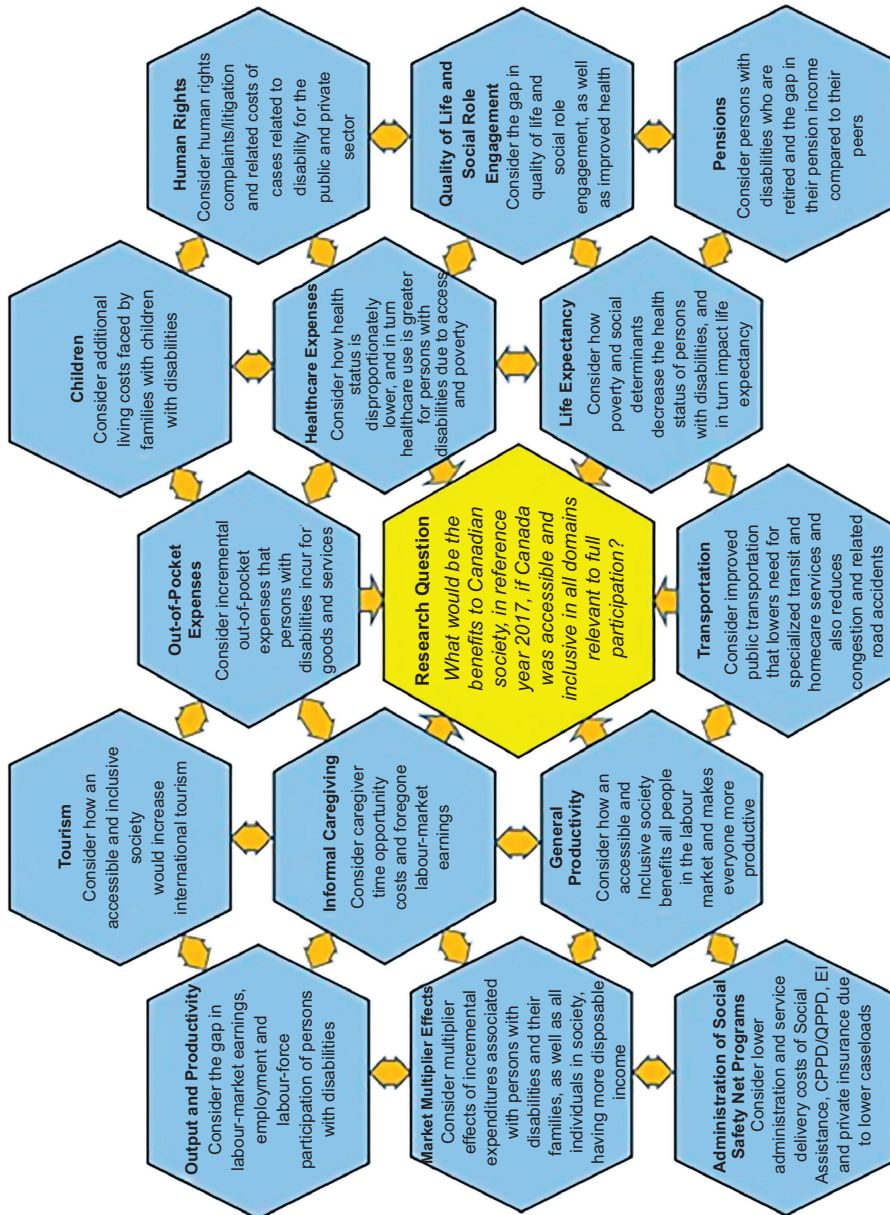


Figure 1.
Conceptual framework
for estimating the cost
of exclusion

experiences. Indirect domains are those that accrue to persons without disabilities and other entities in society. These indirect benefits are sometimes described as spillover effects. We note that the distinction between direct benefits and indirect benefits is not crisp, in that many of the domains are multifaceted with impacts accruing to persons with disabilities, as well as others in society. More important than distinguishing between the direct and indirect labeling is ensuring that the framework is as comprehensive as possible, and that the benefits estimated within domains are distinct from those in others to minimize double counting (i.e. counting the same benefits twice). Given that there were no comprehensive studies on the benefits of an accessible and inclusive society on which to draw on for precedence, we used what if scenarios to consider a range of possibilities. The following paragraphs provide more details on conceptualization of each of the domains, the considered assumptions for the counterfactual scenarios and the computations undertaken in them.

Direct domains

Healthcare expenses. For this domain, the underlying premise is that poverty and social exclusion of persons with disabilities decreases their health status, and in turn impacts healthcare expenses (WHO, 2011). We began with an estimate of the incremental healthcare expenses associated with poverty of approximately 20%, based on data generated by the Public Health Agency of Canada (PHAC, 2004). Total healthcare expenses in Canada were \$242bn (11.3% of GDP), or \$6,604 per person (2017 Canadian dollars) based on the Canadian Institute for Health Information (CIHI, 2018). From this information, we estimated the total healthcare expenses associated with poverty at \$48.4bn. We also estimated that 3.74 million people live below the official poverty line in Canada, according to the 2017 census (Statistics Canada, 2017a). Using these two inputs, we estimated healthcare costs associated with poverty at approximately \$13,000 per person living below the poverty line (2017 Canadian dollars). In the baseline counterfactual scenario, we assumed no difference in poverty among persons with and without disabilities, and hence no difference in healthcare expenses associated with poverty. We note that these healthcare expenses associated with poverty are different than healthcare expenses associated with disability.

Out-of-pocket expenses. In many cases, persons with disabilities incur extra costs for assistance with accessing goods and services, and with domestic activities. Using data from the CSD in 2012, we estimated out-of-pocket expenses for assistance with activities of daily living of persons with disabilities under nine categories: preparing meals; everyday housework; heavy household chores; getting to appointments/errands; personal finances; personal care; basic medical care at home; moving around in the house and childcare (Giesbrecht *et al.*, 2017). We estimated the average out-of-pocket expenses of wheel-mobility device users at \$1,528, and for nonusers at \$2,910 (2012 Canadian dollars). To estimate other types of out-of-pocket expenses, including prescription and nonprescription drugs, purchase and maintenance of aids and specialized equipment, healthcare and social services, and transportation, we drew on a survey about out-of-pocket expenses undertaken by Employment and Social Development Canada (Roy and Chahin, 2016). As a baseline counterfactual scenario, we assumed 50% of out-of-pocket expenses would not be incurred by persons with disabilities and their families if society were accessible and inclusive.

Output and productivity. To estimate the market output and productivity losses due to barriers to employment, we used the human capital approach (Pike and Grosse, 2018), in which the wage rate times the absence time is used to estimate the value of lost output and productivity. We drew on the methodology developed by Buckup (2009), but modified it based on more recent data from the CSD in 2017, building on previous analysis of the CSD data by Morris *et al.* (2018). The CSD provided up-to-date information on the differences between the personal pretax labor-market earnings of persons with disabilities and their

peers without disabilities. We also added a percentage to the estimated labor-market earnings to account for payroll/fringe benefits (Tompá *et al.*, 2017). We drew on employer contribution data from the Canadian National Accounts to estimate this percentage. Buckup (2009) assessed the gap in output and productivity due to disability in the following three categories: (1) persons with disabilities who are employed but not able to use their human capital to the maximum; (2) persons with disabilities in the labor-market but who are unemployed because of barriers to employment and (3) persons with disabilities who have left the active labor-force because of barriers to participation. As a baseline counterfactual scenario, we assumed that earnings potential of persons with disabilities is equal to their peers without disabilities in the same age bracket if society were fully accessible and inclusive, i.e. full leveling up (Appendix provides more details regarding the calculations).

Quality of life (QOL) and social role engagement. In this domain, we considered the gap in QOL and social role engagement of persons with disabilities compared to their able-bodied peers. Due to the absence of a comprehensive approach for estimating all aspects of QOL (Power and Green, 2010), we used a Health-Related Quality of Life (HRQOL) measure, specifically quality-adjusted life years (QALYs) as estimated with the Health Utilities Index (HUI), to approximate QOL gains from moving to a fully accessible and inclusive society. We approximated the gap in QOL by comparing the average QOL of persons with and without disabilities in the current context, adjusted for age and sex. To estimate the difference of HRQOL for persons with and without disabilities, we drew on the Restriction of Activities module from the Canadian Community Health Survey (CCHS, 2010). In the baseline counterfactual scenario, we assumed that in an accessible and inclusive society there is no difference in QOL of persons with and without disabilities. We translated QOL into monetary terms, drawing on frequently used values in the health economics field for a QALY. The monetary value of a QALY can be derived from general public or patients' perspective for general health states or specific health states via willingness-to-pay or modeling approaches (Drummond *et al.*, 2015; Neumann *et al.*, 2014). Another source of monetary values for a QALY is the health policy arena. We used \$100,000/QALY, which is in the mid-range of the values identified in contingent-valuation and health policy literatures (Appleby *et al.*, 2007; Hirth *et al.*, 2000). For more information about the theoretical aspect of willingness to pay, readers are referred to Drummond *et al.* (2015).

Life expectancy. Some studies suggest that disability is related to lower life expectancy (Thornton, 2019; Lang *et al.*, 2018; Thomas and Barnes, 2010; Berthelot *et al.*, 2010; WHO, 2008). Impact of disability on life expectancy can be direct, due to the health impairment, as well as indirect, through the social determinants of health, such as lack of access to safe housing, nutritious foods, social support, health service and education. Considering the modest body of research in this domain, we only focused on persons with learning disabilities. Drawing on available studies, we assumed 14 years of life lost due to shorter life expectancy for persons with learning disabilities (Thornton, 2019; Learning disability Today, 2016). We estimated the paid-labor-market output and productivity losses and QOL losses of persons with learning disabilities that are associated with premature mortality. To do so, we estimated the number of premature death of persons with learning disabilities in 2017 using the mortality rate of general population in Canada (Statistics Canada, 2017b). Then, following the approach taken by Tompá *et al.* (2017), we estimated the sum of working life years lost due to premature mortality and estimated the monetary value of lost earnings using the average wage of the general population for each age and sex category, discounting future lost earnings to the reference year 2017. We also estimated the sum of QOL years lost because of premature mortality and monetized the QALYs lost using the values noted above.

Indirect domains/spillover effects

Informal caregiving. We assumed that in an accessible and inclusive society there would be less demand for informal caregiving services. Therefore, informal caregivers' time, productivity, and QOL would not be compromised. The benefits to be realized in this counterfactual scenario include more personal time, no productivity losses due to caregiving-related absenteeism and enhanced QOL of informal caregivers. To estimate the value of caregiver time, we drew on [Hollander et al. \(2009\)](#). They estimated the replacement cost of unpaid care in Canada at \$24.2bn (in 2007 dollars). They used homemakers' cost at the hourly market rate to monetize the value of caregivers' time. We extrapolated the value of caregiving services from this study to 2017, drawing on population growth rate from [Statistics Canada \(2018\)](#), which gave us a value of \$31.6bn. For the baseline counterfactual scenario, we assumed a reduction of 50% of the value of unpaid caregiving services. To estimate the productivity losses due to caregiving-related absenteeism, we drew on [Battmas \(2017\)](#). They reported that employees lose 10 working days per year, on average, to handle care responsibilities which were estimated to cost society \$5.5bn (2015 Canadian dollars). We assumed in an accessible and inclusive society, there would be no output and productivity losses due to caregiving-related absenteeism. To estimate the potential enhancement of QOL losses of informal caregivers, we first extracted the age and sex distribution of informal caregivers in Canada from [Sinha \(2013\)](#). Second, we extracted the HUI for the general population in the same age and sex groups ([CCHS, 2010](#)). Third, we drew on [Hughes et al. \(1999\)](#) and assumed the HUI of informal caregivers is 14% lower than society's average, as a conservative assumption. Lastly, for the baseline counterfactual scenario, we assumed an enhancement of 50% of QOL for caregivers in an accessible and inclusive society. We estimated the monetary value of QALY losses of caregivers, as described above.

Children with disabilities. Families of children with disabilities consistently report incremental expenses compared to families with children without disabilities. We assumed that in an accessible and inclusive society there would be less of these types of expenses incurred by these families. To estimate the number of children with disabilities in Canada for our reference year 2017, we drew on data on the prevalence of children with disabilities from the Statistics Canada's Participation and Activity Limitation Survey (PALS) in 2006, as CSD does not include children younger than 15 years. We estimated the prevalence of children with disabilities at 3.7% in 2006 ([Statistics Canada, 2006](#)), and then extrapolated it for 2017, using the number of persons under 14 years from the 2016 census, i.e. 5,913,180 ([Statistics Canada, 2019a](#)). To estimate the incremental expenses that families with children with disabilities incur, we drew on the study by [Roy and Chahin \(2016\)](#). They used the microdata file of the PALS in 2006 to gather background information on families with children with disabilities as well as data on additional living costs and work-related issues for those families. They estimated these costs under five categories: (1) prescription and nonprescription drugs, (2) purchase and maintenance of aids and specialized equipment, (3) healthcare and social services, (4) transportation and (5) help with everyday housework. For the baseline counterfactual scenario, we assumed that 50% of such out-of-pocket expenses would be averted. This would arise due to lower levels of need because of increased accessibility and inclusiveness.

Human rights. In this domain, we considered disability-related human rights complaints and litigation costs for the public and private sectors. To estimate the disability-related discrimination complaints case, we focused on complaints that were received by the Canadian Human Rights Commission and their provincial/territorial counterparts (see [Appendix](#) for details). Registered complaints can be considered the "tip of the iceberg" of human rights-related issues that may arise in society. To estimate case costs, we drew on the British Columbia average human rights tribunal operating costs as a starting point ([BCHRT, 2017](#)). They estimated the total new complaint cases in 2017 at 2,273 and the total tribunal operating

costs at \$2,997,161 (2017 Canadian dollars). We considered two times the average per case tribunal operating costs (i.e. \$4,623) as a baseline counterfactual scenario to account for the out-of-pocket costs incurred by complainants and defendants. In our counterfactual scenario, we assumed that there is equal opportunity and treatment of all persons regardless of ability and, as a result, there are no human rights issues related to discrimination against persons with disabilities. Therefore, such cases would not exist, and expenses would not be incurred by stakeholders.

Transportation. We estimated the benefits of accessible and inclusive public transportation in three categories. The first is a reduction in collisions and related costs. We assumed accessible and inclusive public transportation lowers road collisions, based on a study by the Canadian Urban Transit Association. They estimated a loss of \$800m per year as a result of motor vehicle collisions involving senior drivers (65 years and older) with mobility disabilities, and then predicted that accessible and inclusive transit could reduce 1% of the economic and social costs of motor vehicle collisions (Seider, 2013). We drew on this study as a starting point to estimate the benefit of accessible and inclusive transportation for all Canadian society. Total annual economic and social costs of motor vehicle collisions in Canada were estimated at \$25.0bn (2009 Canadian dollars) (Seider, 2013). In the baseline counterfactual scenario, we assumed that accessible and inclusive transit could annually reduce 5% of the economic and social costs of motor vehicle collisions.

The second category is a reduction in transit operating costs. We considered how accessible and inclusive public transportation lowers transit operating costs. The Canadian Urban Transit Association reported that making conventional transit more accessible could decrease the demand for expensive specialized transit service (Seider, 2013). They reported the incremental net cost of serving one passenger on specialized transit rather than conventional transit at \$22 (2009 Canadian dollars). Canadian specialized transit systems carry about 17.5 million passengers each year. Therefore, the total incremental operating cost of specialized transit services was estimated at \$385m (2009 Canadian dollars). We assumed in an accessible and inclusive society that specialized transit demand is reduced by 10% (about 1.75 million trips) and potential savings related to reduced specialized transit operating costs to be \$40m.

The third category is time savings and reduced anxiety. The Canadian Transportation Agency study estimated the benefits arising from the proposed Accessible Transportation for Persons with Disabilities Regulations (Canadian Transportation Agency, 2019) would be \$574.7m (in 2012 Canadian dollars) from time savings. Additionally, improvements in accessibility were assumed to reduce the number of individual vehicles on the road, since public transport would be more convenient and affordable for persons with disabilities and others who would rely less on their personal vehicles.

Tourism. Accessible and inclusive tourism provides not only an important market opportunity but also helps ensure that all persons are able to participate in tourism and enjoy travel experiences. To date, there is limited research estimating the economic benefits of accessible tourism. Drawing on an accessible tourism study in Europe (European Commission, 2014), we assumed the international tourism sector in Canada could benefit in terms of revenue expansion by 28.9% from further contribution by persons with access needs. This benefit could be generated by increased demand for goods and services by travelers, increasing income and employment within the destination in supply chain-linked industries, and increased sales at destinations from household spending of the income earned from tourism and its supporting sectors. To estimate the potential benefits of accessible and inclusive tourism, we assumed that in 2017 tourism in Canada generated \$41.2bn in revenue or 2.06% share of the total GDP (2017 Canadian dollars) (Destination Canada, 2017). To avoid double counting with other

domains (e.g. the domain of output and productivity), we only considered the economic contribution of international tourism to the total benefit.

General productivity. In this domain, we considered how an accessible and inclusive society benefits all persons in the labor market and makes everyone more productive. Some of the more frequently cited benefits related to increased overall productivity include staff retention, access to talent, increased innovation, increased engagement, better reputation, lower training costs, improved coworker interaction and increased morale (ILO, 2020; Deloitte, 2017; Samans *et al.*, 2015; Schur *et al.*, 2014). Furthermore, many working-age Canadians experience a temporary disability at some time over their working lives, whether from a work injury/illness or some other short-term health deficit, from which they fully recover. These individuals also benefit from improved accessibility and inclusiveness. To estimate the benefits of increases in productivity and output of the broader labor market, we drew on national statistics of aggregate labor-market earnings (Statistics Canada, 2017c), and considered a percentage increase in output of labor productivity based on historical trends between 1980 and 2017 (Statistics Canada, 2019b). In our baseline counterfactual scenario, we assumed that in an accessible and inclusive society, labor market output and productivity would increase by 0.75%.

Administration of social safety net programs. In an accessible and inclusive society, we assumed that programs would have lower administration/overhead costs due to lower caseloads. To estimate these costs, we drew on data retrieved from the annual accounts of national expenditure data on the major federal, provincial and disability support programs that provide income support to persons with disabilities for calendar year 2013 (Metcalfe Foundation, 2015) (see Appendix for details). The programs covered include social assistance, Canada/Quebec Pension Plans disability benefits (CPPD and QPPD), Employment Insurance sickness benefits, veterans' disability benefits and awards, workers' compensation benefits, private short and long-term disability benefits, and federal tax credits for persons with disabilities. We assumed 15% administrative costs for all programs except 20% for Veterans disability and pension awards, and 25% for workers' compensation claims. These percentages were drawn from previous research that considered the administrative costs of private insurance and workers' compensation (Tomba *et al.*, 2017). We did not consider the income benefits provided by these programs as they are simply transfers of purchasing power. As a baseline counterfactual scenario, we assumed 50% of administrative costs would be averted in an accessible and inclusive society.

Pensions. In this domain, we estimated the difference in total income of seniors with long-standing disabilities to that of their peers. The CSD provides up-to-date information on the differences between the personal pretax income of persons with disabilities and their peers without disabilities (Morris *et al.*, 2018). We assumed before-tax median total income of persons aged 65+ years with disabilities would be the same as persons without disabilities. For persons with disabilities who are retired in our reference year 2017, the phenomenon described above would suggest lower pension income in 2017 is due to lower levels of labor-market earnings and concomitant contributions to various retirement pension schemes over their working years. Pension income does not reflect value-added activity in the reference year, so the key element that was considered in this domain is the higher spending associated with higher pensions and its related multiplier effects. Therefore, in our model, we only considered the multiplier effects of increased pension income for persons with disabilities, and not the increased income itself.

Market multiplier effects. This domain is about the expansion of markets from increased expenditures. This expansion is sometimes described as multiplier effects, wherein each extra monetary unit spent in the market results in a magnitude of expansion of the market that is a multiple of that unit spent (Ramey and Zubairy, 2015). We considered the multiplier effects of incremental expenses associated with persons with disabilities and their families, as

well as all individuals in society, having more disposable income. The initial expenditure arises from several sources: (1) increased employment, output, productivity and related earnings of persons with disabilities; (2) increased labor-market earnings due to increases in life expectancy of persons with learning disabilities; (3) increased tourism expenditures; (4) increased output and productivity, and related earnings of all labor-force participants and (5) increased pensions of retired persons with disabilities. The size of the multiplier depends on several factors (details on its calculation are provided under [Appendix](#)). We estimated the multiplier at 1.57, which means that every \$1.00 of new income generates \$1.57 in GDP.

Sensitivity analysis

Given the number of data elements required for the bottom-up approach and the variety of assumptions made in order to estimate the benefits in the various domains, our estimates were sensitive to the values used for key parameters. Therefore, we undertook sensitivity analysis in which we considered different values for these key parameters. We estimated the lower and higher bounds of the cost of exclusion/benefits of inclusion as a percentage of GDP. The parameters and ranges considered were based on our knowledge of what data elements and assumptions were most at issue. We also turned to the literature to see what sensitivity analysis considerations were made in other studies ([Appendix](#) provides more details regarding the range of input parameters considered).

Findings

[Figure 2](#) presents the total economic benefits of an accessible and inclusive Canada, sorted by magnitude from the smallest to the largest domain. The largest magnitude is from QOL and social role engagement, which comprises 39.1% of the total benefits. This is followed by output and productivity at 17.6%, informal caregiving at 17.5%, market multiplier effects at 14.0%, general productivity at 3.8%, out-of-pocket expenses at 3.7%, healthcare expenses at 2.0% and lastly six other domains that each comprises less than 1% (tourism, administrative costs of social safety net programs, transportation, life expectancy, children with disabilities and human rights). The domain of pensions is included in the market multiplier effects, rather than considered separately, as the only benefit considered in that domain was the multiplier effects of greater consumption ability of retired persons with disabilities.

[Table 1](#) categorizes total economic benefits of an accessible and inclusive Canada into five high-level categories: (1) averted healthcare and related out-of-pocket expenses; (2) increased output and productivity of persons with disabilities; (3) increased quality of life and social role engagement of persons with disabilities; (4) spillover effects and (5) market multiplier effects. The total benefits are estimated at \$337.7bn (with a range of \$252.8–422.7bn), or 17.6% of the GDP in 2017 (with a range of 13.1–22%). The largest portion of the benefits is from increases in QOL and social role engagement estimated at \$132.2bn (6.9% of the GDP). This is followed by spillover effects at \$76.7bn (4% of the GDP), increases in output and productivity at \$62.2bn (3.2% of the GDP), market multiplier effects at \$47.3bn (2.5% of the GDP), and averted healthcare expenses at \$19.4bn (1% of the GDP). The per case (person with a disability) benefit is estimated at \$54,066 (with a range of \$40,473–67,675). In order of magnitude from largest to smallest, this is composed of increases in QOL and social role engagement at \$21,156/case, increases in output and productivity at \$9,957/case, spillover effects at \$12,273/case, market multiplier effects at \$7,578/case and averted healthcare expenses at \$3,100/case. [Appendix](#) provides more granular results for each domain.

[Figure 3](#) presents a tornado diagram detailing how key parameters affect the total benefits in terms of percentage of GDP. This figure has been sorted from the lowest to highest magnitude domain. The percentage ranges identified reflect changes from the baseline total

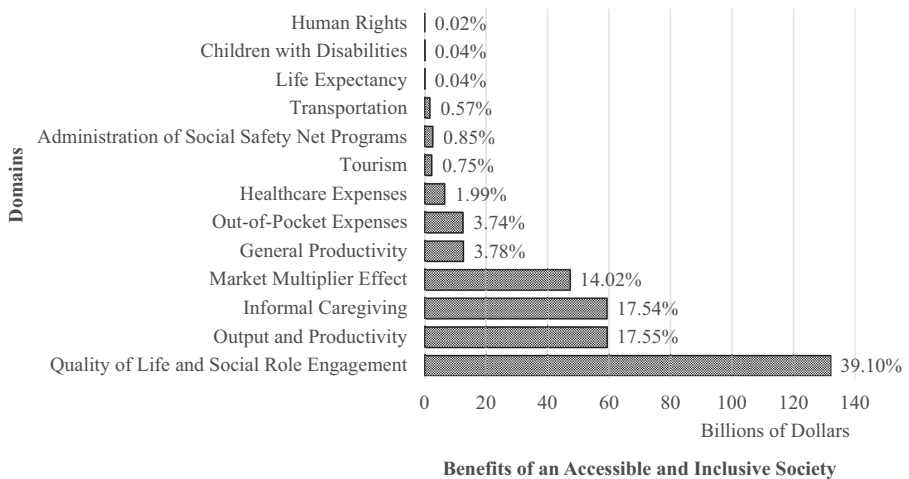


Figure 2.
Economic benefits, by
domain, of an
accessible and
inclusive Canada
(percent of total
benefits)

Note(s): In this figure, the domain of pensions is not illustrated, as the impact of this domain is only the market multiplier effects of increased consumption ability of retired persons with disabilities, so it has been included with other market multiplier effects

benefits estimate of \$337.7bn (17.6% of the GDP). The domain with the largest impact on the total benefit is QOL and social role engagement, and the smallest is tourism. The percentage of GDP ranges from 13.1 to 22% around the baseline value for different values of QOL and social role engagement, whereas it ranges almost imperceptibly for tourism.

Discussion

This study sheds light on substantial economic benefits that could be realized by society from a move towards greater accessibility and inclusiveness of persons with disabilities in a broad range of social domains. We estimated the value of benefits that could be realized by Canadian society in reference year 2017 amounted to \$337.7bn (with a range of \$252.8–422.7bn). This is a sizeable proportion of GDP from that year (17.6%, with a range of 13.1–22%) and is likely a very conservative estimate of the potential benefits. In multiple one-way sensitivity analyses the maximum magnitude of benefits ranged from \$252.8 to 422.7bn, or from 13.1 to 22.0% of GDP. In summary, our estimates indicate that persons with disabilities and all members of society have the potential to significantly benefit from an accessible and inclusive Canada.

Economic burden studies are usually built on some assumptions to address methodology or data gaps. This provides a way for economists to make economic implications easier to study. Undoubtedly, a comprehensive understanding of the results can only be achieved by exploring these assumptions. For example, the underlying assumption about productivity losses are that an accessible and inclusive labor market would allow all persons to participate equally and earnings would be leveled-up, regardless of disability status. This would imply similar levels of educational attainment and skills, which is currently not the case due to barriers for persons with disabilities accessing education. Thus, achieving some of the benefits identified may take time and ongoing efforts to level the playing field. Consequently, the benefits identified might be considered a gold standard or potential to strive towards, much like burden of disease/cost of illness studies. These studies estimate the economic

Benefit type	Sex	Prevalence of disability	Quality of life and social role engagement	Spillover effects	Output and productivity	Market multiplier effects	Healthcare expenses	Total benefits
Total	Both	6,246,630	\$132.2 B 6.9%	\$76.7 B 4.0%	\$62.2 B 3.2%	\$47.3 B 2.5%	\$19.4 B 1.0%	\$337.7 B 17.6%
Percent of GDP								
Per case			\$21,156	\$12,273	\$9,957	\$7,578	\$3,100	\$54,066
Total	Men	2,763,540	\$57.1 B 3.0%	\$34.7 B 1.8%	\$35.3 B 1.8%	\$20.9 B 1.1%	\$8.6 B 0.4%	\$156.6 B 8.1%
Percent of GDP								
Per case			\$20,673	\$12,539	\$12,769	\$7,578	\$3,100	\$56,660
Total	Women	3,483,090	\$75.0 B 3.9%	\$42.0 B 2.2%	\$26.9 B 1.4%	\$26.4 B 1.4%	\$10.8 B 0.6%	\$181.1 B 9.4%
Percent of GDP								
Per case			\$21,540	\$12,062	\$7,726	\$7,578	\$3,100	\$52,007

Benefits of an accessible and inclusive society

Table 1.
Total economic benefits of an accessible and inclusive Canada

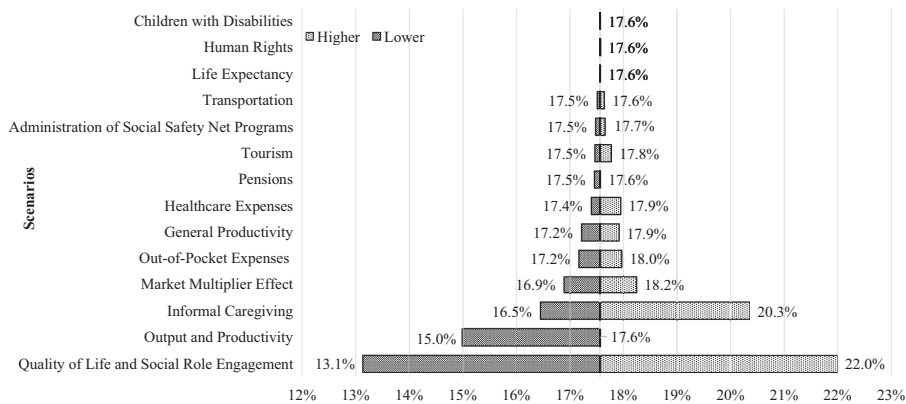


Figure 3.
Tornado diagram of
input parameter
sensitivity analysis
(% of the GDP)

Note(s): Details on the range of parameters considered for sensitivity analysis are provided in Appendix

burden based on a counterfactual scenario of no injury, illness or disease of the type being investigated. In a cost of exclusion study, one does not consider a counterfactual scenario of the absence of impairment or disability, but rather the absence of barriers to inclusion. Additionally, we only considered the benefits, as do cost of illness/burden of disease studies. Invariably, there will be expenses/costs incurred by the public sector and other stakeholders in executing legislation, regulation, policies, programs and practices targeted at improving accessibility and inclusiveness.

This is the first study that considers a broad range of social domains in an effort to monetize the benefits of an accessible and inclusive society. We considered 14 distinct domains, rather than focusing exclusively on labor-market output and productivity impacts as some previous studies have, therefore, it is difficult to compare our estimates with those found in the published literature. Metts estimated values for 207 countries ranging between 15 and 40% of GDP (Metts, 2000). By and large, the findings in his study are at the lower end of our estimates, with a few exceptions. However, comparability of those estimates with ours is an issue, as the methodological approach and domains included differ. Metts (2000) only considered healthcare costs and output and productivity losses of illness, disability and premature death. The reference years of the two studies are also different (1998 for Metts and 2017 for our study). During the time between the two reference years, many changes have occurred in the various social domains considered. Additionally, the definition of disability underlying survey data collection used for such studies has evolved over time. The most recent CSD, which was a key data source for our study, used a disability screening questionnaire that was developed just prior to the survey. Therefore, the number of persons with disabilities identified in 2017 through the CSD is not directly comparable to previous waves of the national survey.

In the study by Backup, losses related to the exclusion of persons with disabilities in paid employment across 10 developing countries were estimated at between 3 and 7% of GDP (Backup, 2009). Our results for the domain of output and productivity losses are quite comparable with these estimates (i.e. about 3.2% of GDP), partially due to the fact that we used a similar approach for estimating the impacts in this domain. Backup's estimates are limited to direct labor-market output losses, whereas we also considered market multiplier/spillover effects of increased consumption associated with higher earnings in a separate domain. Our market multiplier parameter of 1.57 adds substantially to the estimate of total

benefits (direct and indirect) associated with a more accessible and inclusive labor market. QOL is also improved for persons with disabilities due to more active and meaningful participation in the labor-market, but we did not parse out the QOL estimates attributable to different social roles, but rather estimated them as an aggregate value across all roles.

The study by [Kemper *et al.* \(2010\)](#) is one of the few studies that took into consideration the spillover effects, in this case the benefits of inclusion to retail, tourism and accessibility-focused businesses. They also considered the direct benefit to persons with disabilities in terms of access to higher education. Specifically, the authors reported on the potential economic impacts of accessibility standards for the province of Ontario, Canada, through which the AODA could be implemented, which ranged between \$600 and \$800 in GDP per capita ([Kemper *et al.*, 2010](#)). Though we consider similar impacts in our study, their estimates are not comparable with ours for several reasons. We did not estimate impact for specific sectors separately. We also did not estimate the impact of increased educational attainment separately. Rather, increased educational attainment was subsumed within several domains, primarily output and productivity increases associated with higher labor-force participation rates and labor-market earnings of persons with disabilities.

The search for appropriate data to estimate the contributions to the total benefits of each of the 14 domains of our conceptual framework presented some challenges. Although we were aware that for certain constructs there may not be good quality data available, at times we were surprised by the absence of some key values (e.g. number of children with disabilities). When data were lacking, or the quality was poor, alternative methods had to be explored to produce estimates. In the following paragraphs, we provide a list of data elements for which we struggled to identify a source, and which might be considered for inclusion in future data gathering efforts by federal and provincial bodies.

Prevalence of disability among children less than 15 years

We encountered a data gap in relation to identifying the number of children with disabilities in Canada for our reference year 2017. The most recent data available were from the PALS from 2006 ([Statistics Canada, 2006](#)). To adjust the 2006 information to 2017, we assumed that the prevalence of disability among children had remained the same since 2006 (i.e. that children with disabilities as a proportion of all children had remained the same). However, it is important to note that the disability screening questions used to identify disability in the PALS is not the same as in the CSD, so our estimate of the prevalence of disability among children aged less than 15 years in the reference year 2017 is based on a different definition of disability than was used to identify adults with disabilities for the CSD.

Life expectancy of persons with disabilities, by type of disability

Although some studies have found that persons with some types of disabilities have shorter life expectancies compared to persons without disabilities, this literature is modest at best and so does not provide a comprehensive understanding of the association between different types of disabilities and life-expectancy. More studies are needed on the relationship between disability and life expectancy stratified by sex, type and severity of disability (and possibly the age of onset), and other socio-demographic characteristics.

QOL and social role engagement of persons with disabilities

Despite the body of evidence examining the association between disability and QOL, there is no consensus across various disciplines on how QOL can best be conceptualized or measured for the purpose of quantifying the impacts of improvements in accessibility and inclusion. QOL of persons with disabilities is affected by many factors that may often interact in subtle

ways. A key factor is the level of engagement in various social roles. Other factors can include the type and degree of disability, the ability to accomplish everyday tasks or activities, satisfaction with social support, presence of a spouse or partner, attitude, coping skills and level of self-esteem (Power and Green, 2010). Due to the absence of a comprehensive approach for estimating impacts on QOL from improvements in accessibility and inclusion, we use an HRQOL measure, specifically QALYs as estimated via HUI, to approximate QOL impacts. Research is needed to develop a QOL measure that appropriately captures the impacts of relevance in this area for persons with disabilities. Nonetheless, it would be of great value to have one or more existing QOL scales included in periodic surveys that also include the current disability screening questions.

Out-of-pocket expenses of persons with disabilities

Although we drew on data from the CSD in 2012, which reported out-of-pocket expense incurred by persons with disabilities for assistance with activities of daily living (Giesbrecht *et al.*, 2017), we faced data limitation regarding other types of incremental out-of-pocket expenses incurred by persons with disabilities, including prescription and nonprescription drugs, purchase and maintenance of aids and specialized equipment, healthcare and social services, and transportation. To fill this data gap, we drew on Employment and Social Development Canada estimates (Roy and Chahin, 2016), but these estimates only include a particular age range, specifically children less than 14 years of age. This is not representative of the incremental out-of-pocket expense incurred by adults with disabilities. Out-of-pocket expenses are influenced by the individual circumstances of a person and are determined by factors such as the nature and severity of impairment, resources available, and physical and social environment factors including the access to goods and services. We need more detailed data on the range of incremental out-of-pocket expenses incurred by persons with disabilities stratified by age, sex, type and severity of disability, and other socio-demographic characteristics.

Healthcare expenses of persons with disabilities, by type of disability

Several Canadian studies provide evidence on the relationship between poverty and poor health of persons with disabilities, including PHAC (2004) and Morris *et al.* (2018). The 2018 study by Morris, based on the CSD in 2017, found that those with more severe disabilities are more likely to live below the poverty line. These findings have informed our conceptual framework and data analysis, but much more detailed information is needed on the relationship between disability and healthcare expenses, ideally stratified by key socio-demographic characteristics such as age, sex, region of residence, income, as well as by type and severity of disability.

Contributions

The primary contribution of our study is the advancement of a conceptual framework for the cost of exclusion/benefits of inclusion. Previous studies (e.g. Buckup, 2009; Walton, 2012; Kemper *et al.*, 2010) have considered a limited number of domains and related impacts, most commonly labor-force participation and labor-market earnings of persons with disabilities. We have attempted to be more comprehensive than previous studies, and thus have included 14 domains based on a review of the literature and discussions with experts. Our framework provides a basis for further development and refinement of a comprehensive framework.

Another key contribution is the implementation of our framework for the Canadian context, which provides invaluable information for governments, disability advocates, industry leaders and other stakeholders for prioritizing efforts and investments, such as

legislation, policies, programs and practices, directed at improving accessibility and inclusiveness. The results also provide important input values required for cost benefit and impact analyses of efforts and investments. The implementation of the framework for other reference years can also serve as an input for monitoring and evaluation of progress made by Canada over time. Similar monitoring and evaluation efforts by other countries are also warranted.

To implement the framework, we required data inputs from multiple public use sources, as well as creativity to address several critical data gaps. We had the benefit of a recent national survey of persons with disability, specifically the CSD in 2017, which provided data on key measures such as the prevalence of disability, demographics, employment and income profiles of Canadians with disabilities (Morris *et al.*, 2018). We also drew from international and domestic published literature to fill some data gaps, and undertook sensitivity analyses for key parameters whose values were uncertain. Our summary of key data gaps can inform future data collection efforts.

Conclusion

Drawing from international and domestic insights, and published studies, we built a complex and multidimensional model to estimate the cost of inclusion. Understanding the magnitude of the economic benefits, including both social and market/financial dimensions, of an accessible and inclusive society can be extremely useful for governments, community leaders, industry and other stakeholders as it provides invaluable information on the benefits of efforts, such as legislation, policies, programs and practices to improve the accessibility and inclusiveness of various domains in society and can help identify priorities and opportunities for action. Furthermore, estimating the economic benefits of accessibility and inclusion (or conversely the costs of exclusion) is an essential input into economic evaluations and impact analyses in this policy arena. The framework and methodology can also serve as an input for monitoring and evaluating progress made at the country level over time if it is executed periodically. We identified data gaps that might be considered in future data gathering efforts by federal and provincial bodies to help better measure key parameters in the framework.

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Benefits of an
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Appendix

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