

Toronto Transit Fare Equity Cost Benefit Analysis: Final Results

CANADIAN CENTRE FOR
ECONOMIC ANALYSIS

Overview

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- Background
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- Modeling parameters and results
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It is important to note that due to data limitations, the analysis was partially driven by assumptions and the results are more illustrative of the relative size of costs and benefits rather than a detailed cost/benefit analysis



Canadian Centre for Economic Analysis (CANCEA)

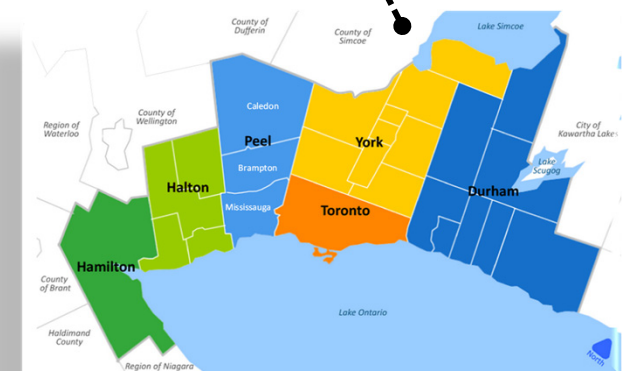
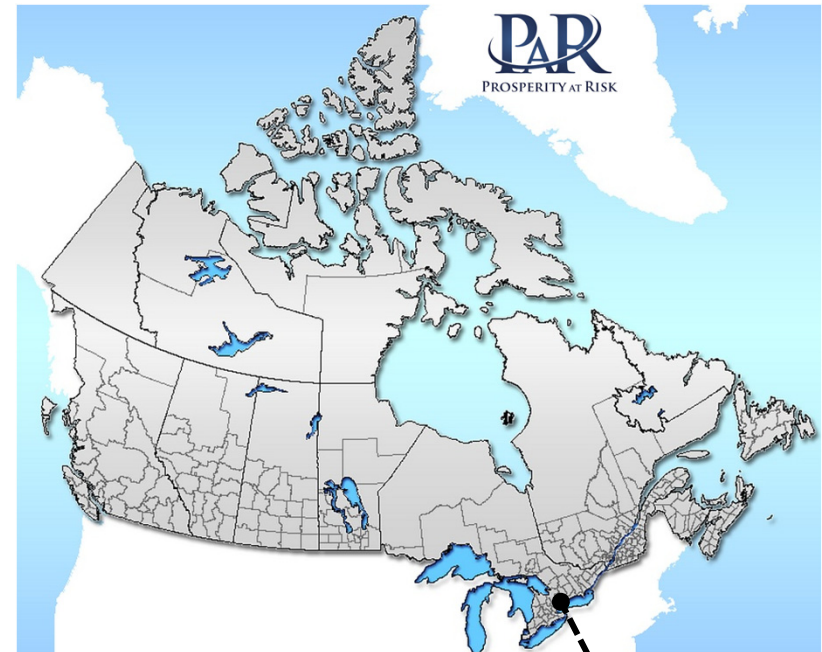
- RiskAnalytica: Since 2001
 - Intensive R&D in developing many data evaluation and insight platforms
 - *Investment of \$7+ million since 2008*
 - Healthcare, economics, infectious disease, market trading, infrastructure evaluation
- CANCEA: 2010 to current
 - **Agent-based platform** and **systems approach technology** matured: Prosperity at Risk
 - *investment of \$3+ million since 2011*
 - Superior real economy capabilities, Canada-wide down to 5,500+ municipalities
 - Infrastructure breakdowns, government fiscal finances (3 levels), private industries, labour markets etc.
 - 150+ evaluation projects, reports and studies completed
 - Recent major reports include studies of
 - Infrastructure investment in Ontario
 - Growth costs, benefits and risks for the Region of Peel
 - Social housing investment net benefits for Toronto Community Housing Corporation, the City of Toronto, Queen's Park and Ottawa
 - Housing Affordability -- first comprehensive report on the full range of demand and supply factors in several decades



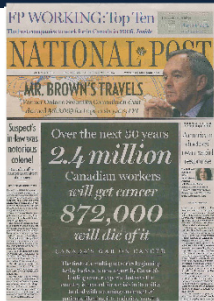
Prosperity at Risk (PaR)

Prosperity at Risk (PaR) is a modern and powerful simulation platform using agent-based modelling and a systems approach for geo-spatial socio-economic analysis:

- More than 36 Million simulated agents (individuals, corporations, governments & non-profit entities)
- 235 industries
- 440 commodities
- 850+ traits per agent
- Over 19 billion interaction measurements of agents in a year
- 5,500+ census areas across Canada

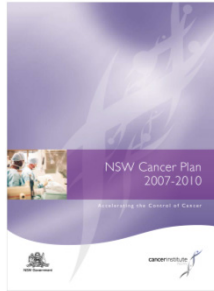


CANCEA's Economic and Health Policy Impact Highlights



Canadian Partnership Against Cancer (2006)

Life and Economic Burden of Cancer: 2002 to 2032



Cancer Institute NSW (2007)

Life and Economic Burden of Cancer, NSW, Australia 2007 to 2010



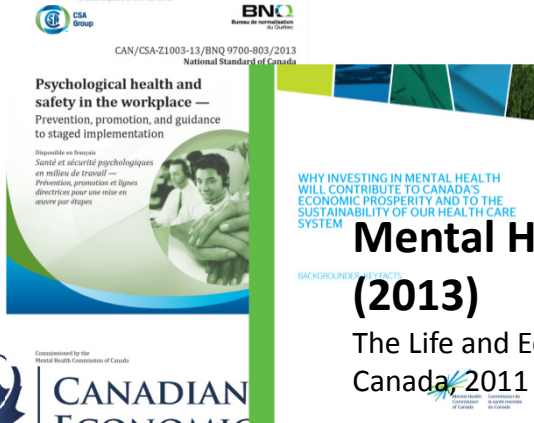
Alzheimers Society Canada (2010)

Life and Economic Burden of Dementia: 2010 to 2040



National Microbiological Lab, PHAC (2009)

Dr. Lindsay E. Nicolle Award 2010
Pandemic simulation



Mental Health Commission of Canada (2013)

The Life and Economic Impact of Major Mental Illnesses in Canada 2011 to 2041

Ontario Lung Association (2011)

Life and Economic Burden of Lung Disease in Ontario: 2011 to 2041



Arthritis Alliance of Canada (2011)

Life and Economic Burden of Osteoarthritis and Rheumatoid Arthritis 2010 to 2040

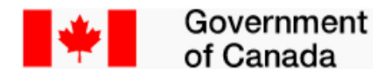


Fall, 2011



PaR: Selected Clients and Funding Partners

- PaR has been used for over 145 socio-economic projects and reports for a wide range of public, private and non-profit entities including those highlighted below



Transit Fare Equity: Background

- Transit equity is crucial for Canadians to reach places of employment, education, recreation, and necessary amenities such as health care and food
- As of 2010, over 23% of Toronto residents earn below the Low-Income Measure (LIM)
- Multiple government and non-government organizations recognize that a collaborative effort for transit fare equity is an important step towards poverty alleviation, including:
 - The Alliance for a Poverty Free Toronto
 - The Federation of Canadian Municipalities
 - CivicAction
 - The Toronto Women’s City Alliance
 - The Wellesley Institute

Background: Impacts of Transit Inequity

- Low-income groups:
 - Are more reliant upon public transit than other groups (local transit mode share is the highest of all income brackets)
 - Pay cash fares more frequently, and buy monthly passes less frequently than middle-income riders
 - Have unique transit usage and fare purchasing patterns
 - Travel shorter distances, but often have longer travel times
 - May forgo employment, certain medical appointments, and use of government and financial services due to cost and travel time
 - This may enforce poverty and adversely impact health, as well as the cost burden of health care utilization
 - Are at a high risk of economic and social exclusion when transit is inequitable



Objectives

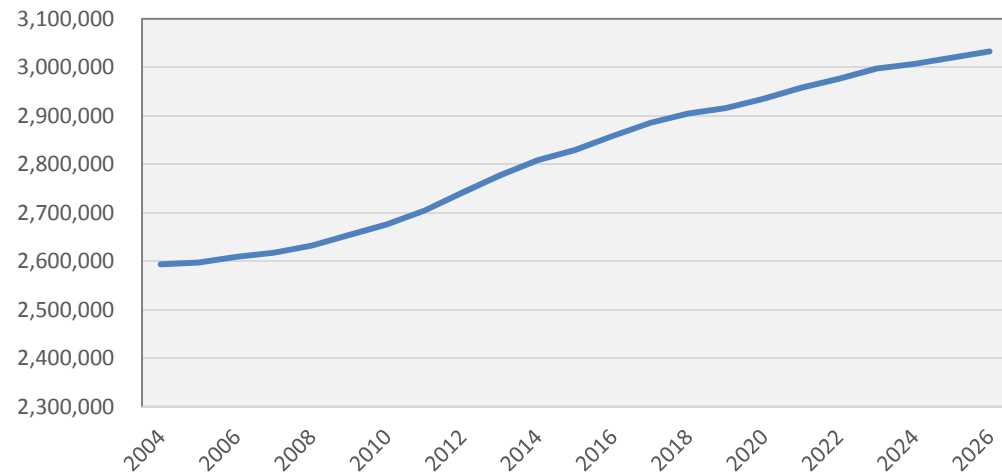
- Taking particular needs and behaviours of different income groups into consideration, the transit fare equity cost benefit analysis seeks to:
 - Model the change in health care utilization and associated costs of low-income transit riders who receive discounted fares
 - Estimate the economic impact of changes in employability and access to labour markets
 - Model the financial impact of the proposed transit fare equity program on the municipal accounts of the City of Toronto



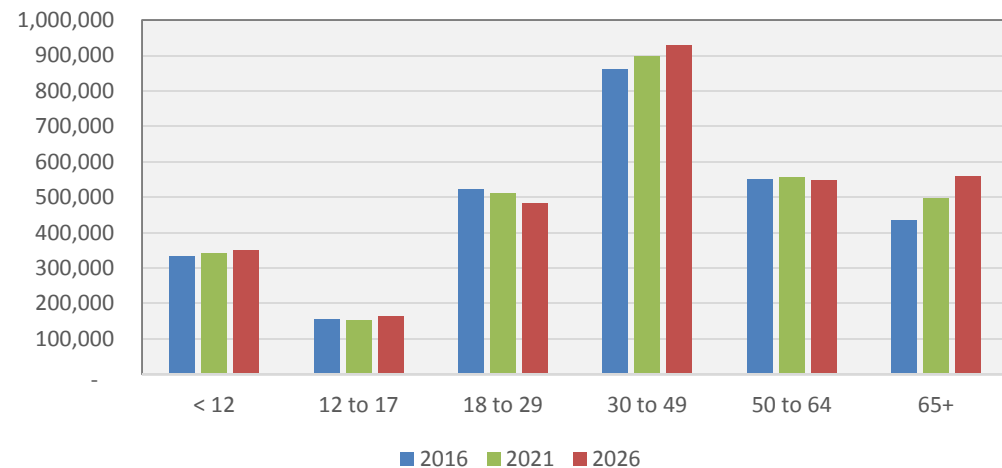
Toronto Population

- The population of the City of Toronto is expected to grow to over 3 million people in the next 10 years
- Ensuring that all people are able to access the growing labour market, health and social services, and leisure activities is important to maintain everyone's quality of life

Population of Toronto



Population of Toronto by Age



Demographic and Trip Pattern Modeling Parameters

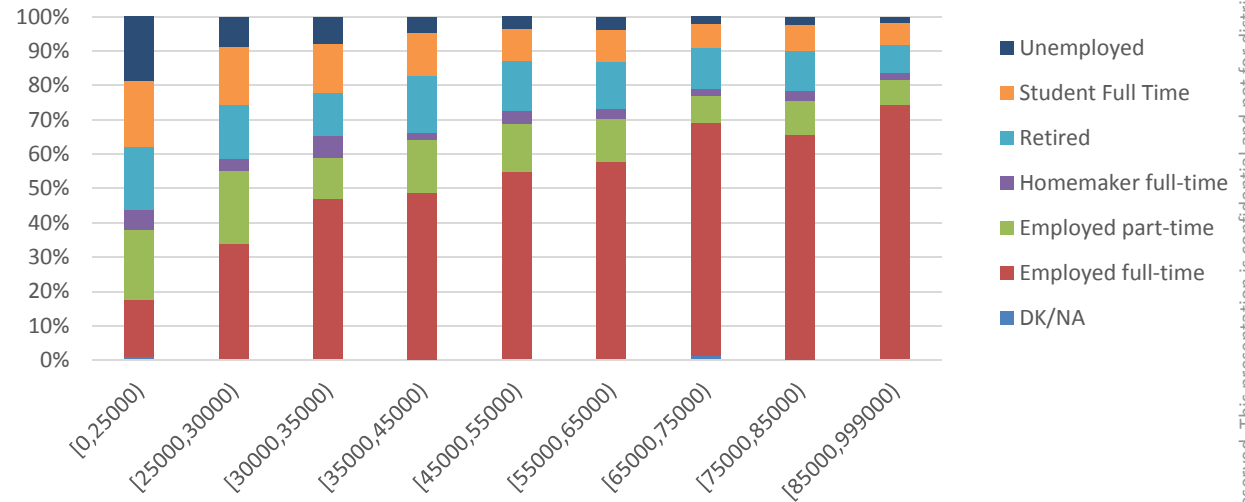
- TTC Survey Data provides a detailed description of regular TTC riders
 - Age/Sex
 - Household income level
 - Employment status of rider
- Complex fare options (tokens, weekly/monthly metropasses, MDP, senior/child/student discounts, PRESTO, etc.) make uptake decision of new discount pass difficult
 - Analysis runs sensitivity on uptake rate from 0% to 100% for the eligible population under the assumption that people will switch to the discounted pass if it would cost them less



Characteristics of TTC Riders

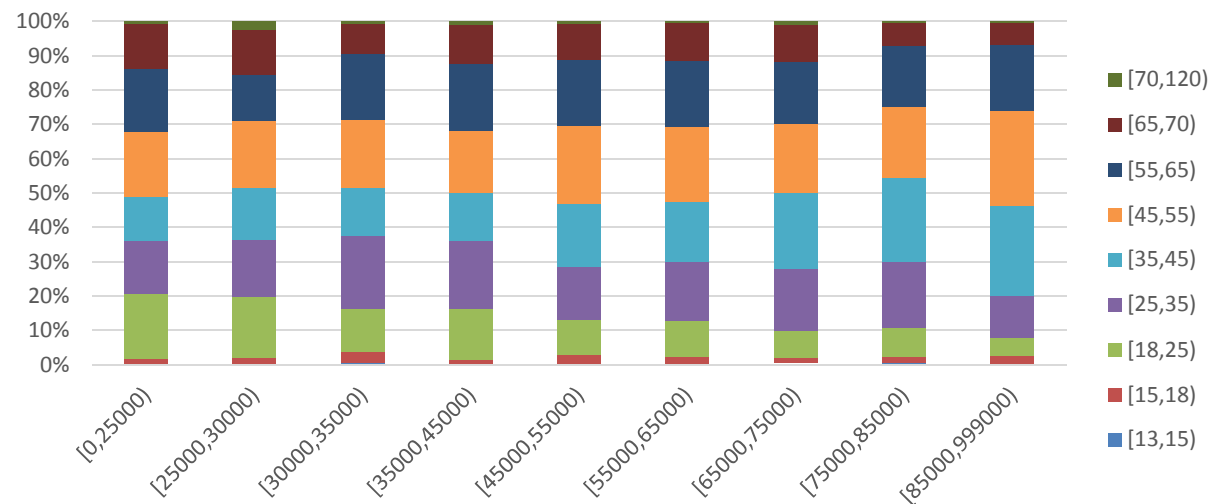
- Lower income brackets have a higher proportion of riders who are unemployed and employed part-time

TTC Ridership by Employment Status and Income

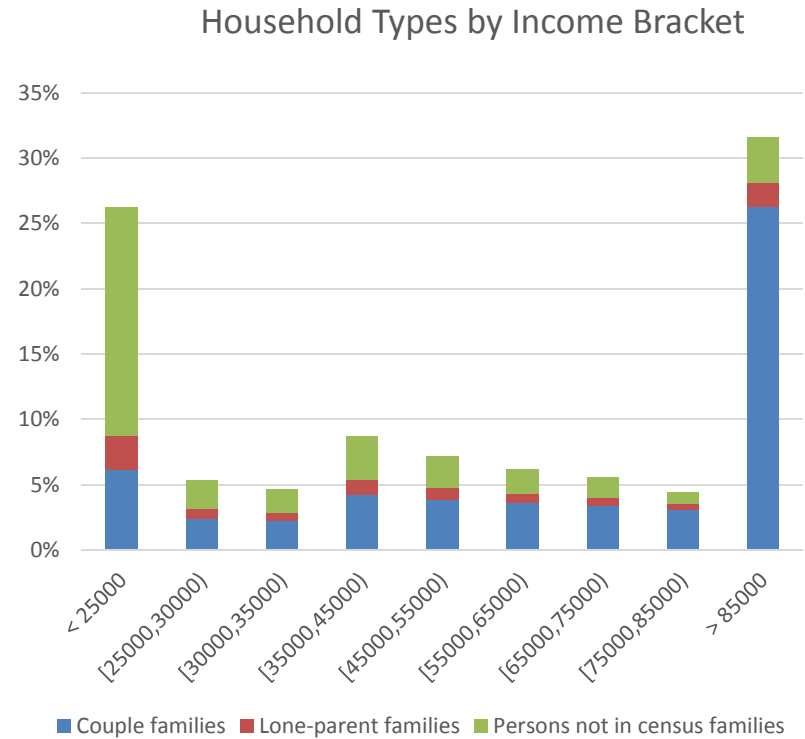
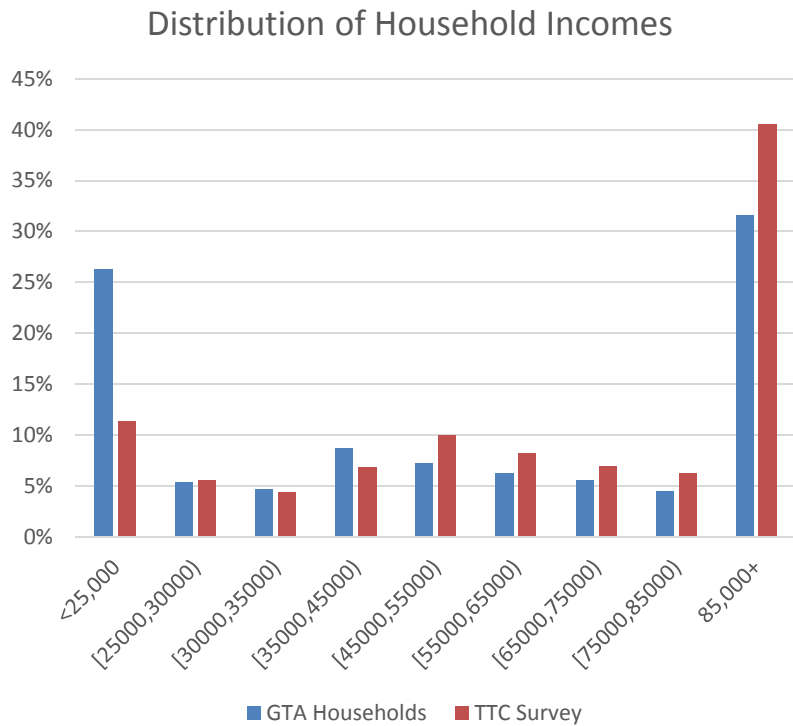


- TTC riders between ages of 35 and 55 tend to have the highest household incomes

TTC Ridership By Age and Income



Distribution of Household Incomes

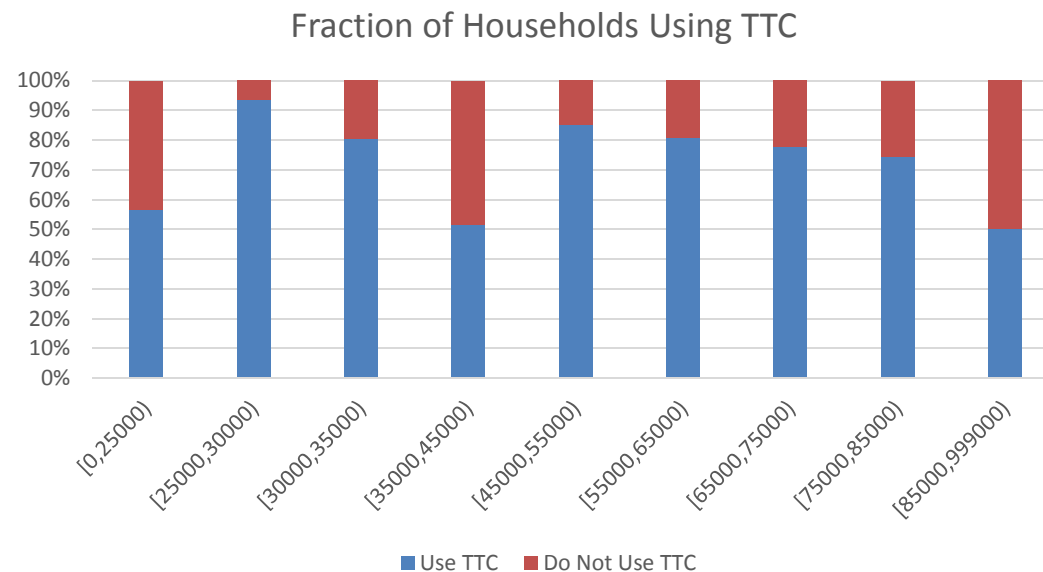


- Distribution of household incomes differ significantly for the lowest income group between the GTA households and the TTC survey
 - Unknown if a result of sampling bias or actual difference in behaviour driven by affordability or access
 - Note that single person households, and lone-parent households are a much greater fraction of low-income households which could result in under-sampling of low-income households and over-sampling of higher incomes in the TTC survey



TTC Usage By Household

- TTC Survey data give distribution of people given they use the TTC, but does not give an estimate of the absolute number of riders by age and income
- Note that the TTC survey data was adjusted for different household sizes and constrained to match the total number of annual rides (535M in 2014)



Eligibility of Transit Users

- Two eligibility scenarios are considered:
 - **Low Income Measure:** People are eligible for the transit fare discount if they belong to a household with an income below the low income measure
 - **Living Wage Threshold:** People are eligible for the transit fare discount if they belong to a household with an income below the living wage threshold
- Both of these thresholds depend on the type of household

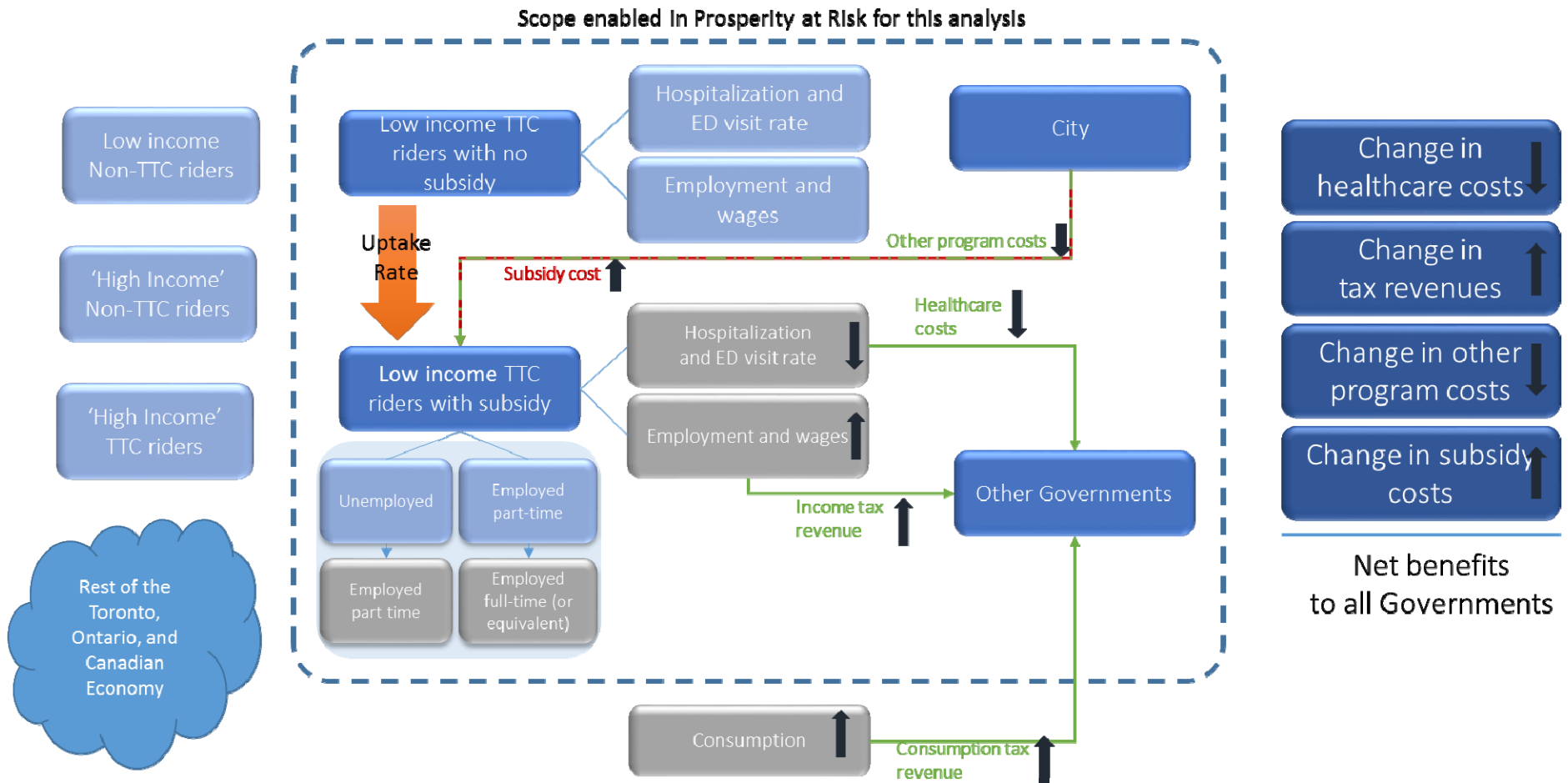
	Low Income Measure	Living Wage
Couple Families	\$43,000	\$75,000
Lone Parent Families	\$39,000	\$67,000
Individuals	\$25,000	\$43,000

Health Care Utilization Impacts

- Access to a family physician and continuity of care have a significant impact on emergency department (ED) visits and hospital admissions for patients with chronic conditions
 - Patients with fewer than 3 physician visits were 1.17 times more likely to have ED visits and 1.19 times more likely to be admitted to hospital
 - Patients with low continuity of care (walk-in clinics, various physicians) had 1.55 times more ED visits and 1.35 times more hospital admissions
- Recommendation of the study was to address shortage of GPs but could equally apply to ensuring patients are able to access regular primary care
- Based on the Calgary LIMTP data, the likelihood of attending medical appointments would increase from 64% to 75% if the person purchased a discounted transit fare

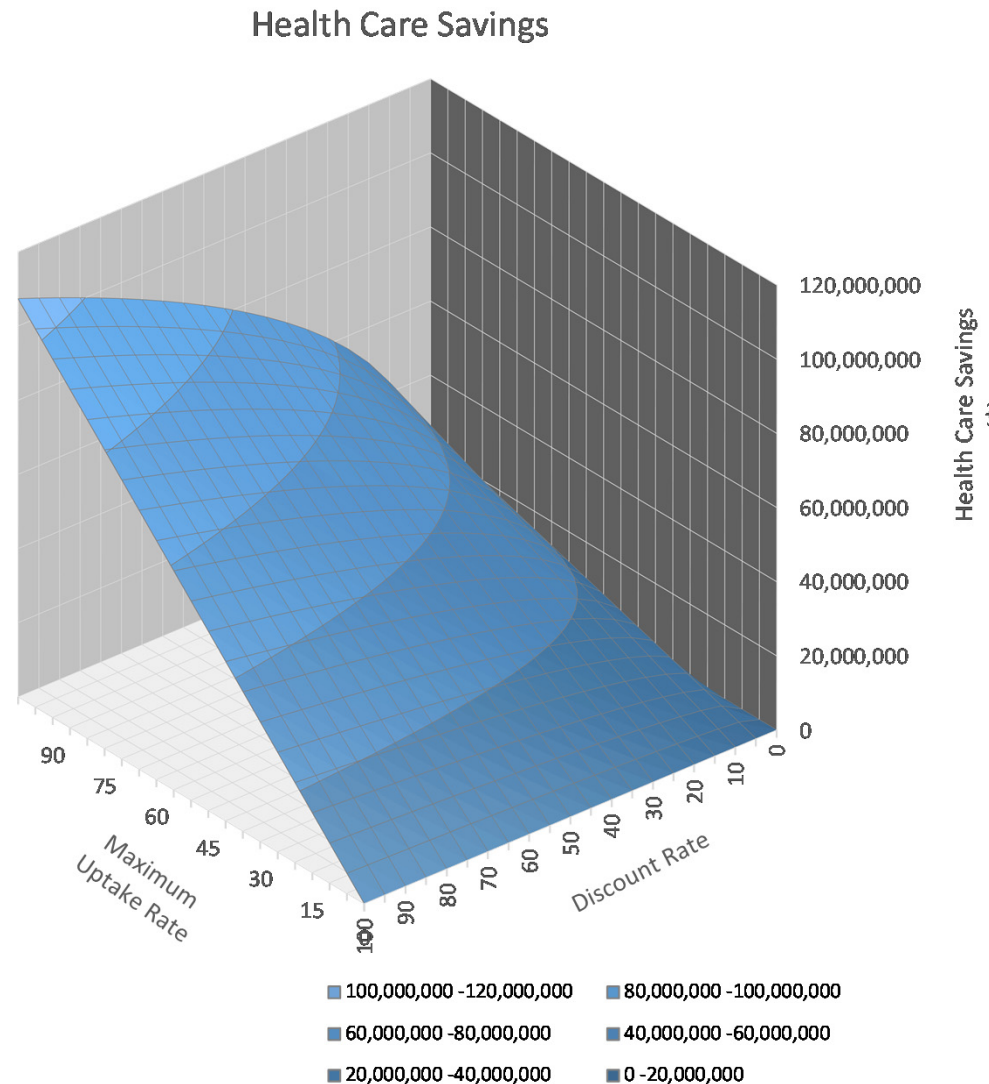


Prosperity at Risk – Transit Fare Sub-model Overview



Health Care Utilization Impacts

- The health care savings are considerable and primarily depend on uptake rate
- Over 5,000 hospitalizations and 45,000 ED visits could be prevented annually in Toronto in people with chronic conditions could have high continuity of care (at full uptake)
- Note that as the discount rate goes to zero, the benefits are reduced as no additional funds are available to the household



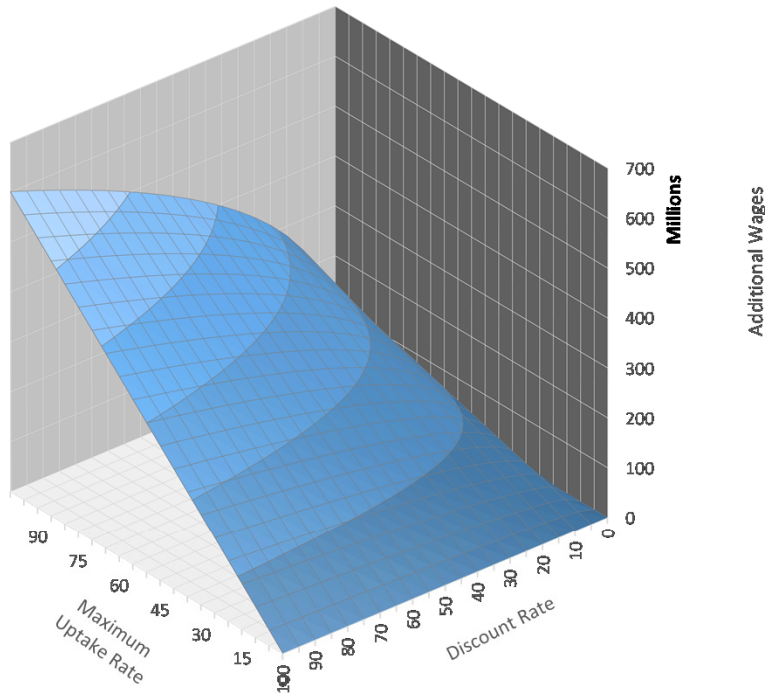
Employment Impacts

- From the TTC survey, almost 40% of respondents with incomes less than \$25,000 are unemployed or employed part-time
- Access to affordable transit can have a significant impact on employment opportunities and employability
 - From the Calgary LIMTP data, 49% said the transit subsidy allowed them to find or improve employment
 - In Hamilton, 75% indicated that the transit subsidy enabled them to keep their jobs
- We conservatively will assume that for people receiving the transit subsidy:
 - 25% of those unemployed will find part-time work at minimum wage and
 - 25% of those working part-time will find full-time (or full-time equivalent) work at minimum wage

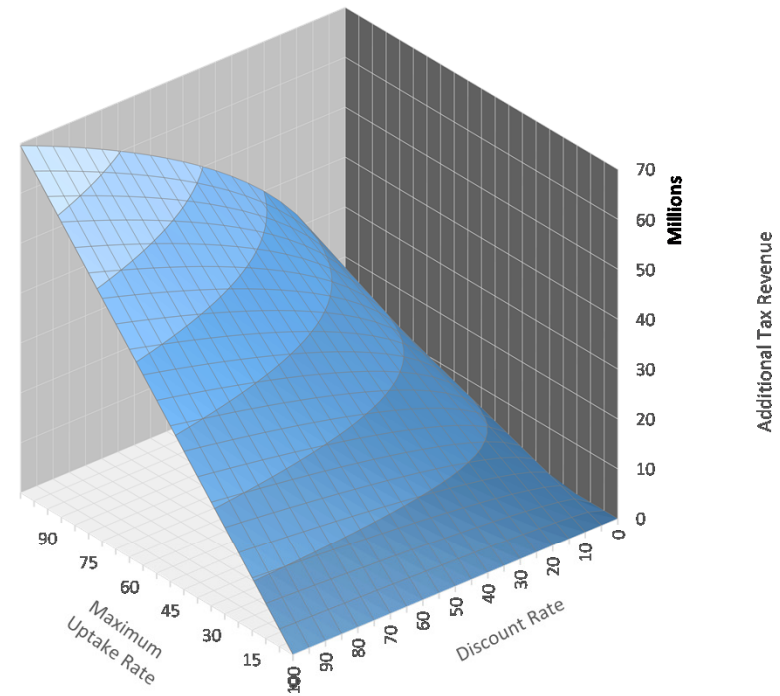


Employment Impacts

Additional Wages Earned



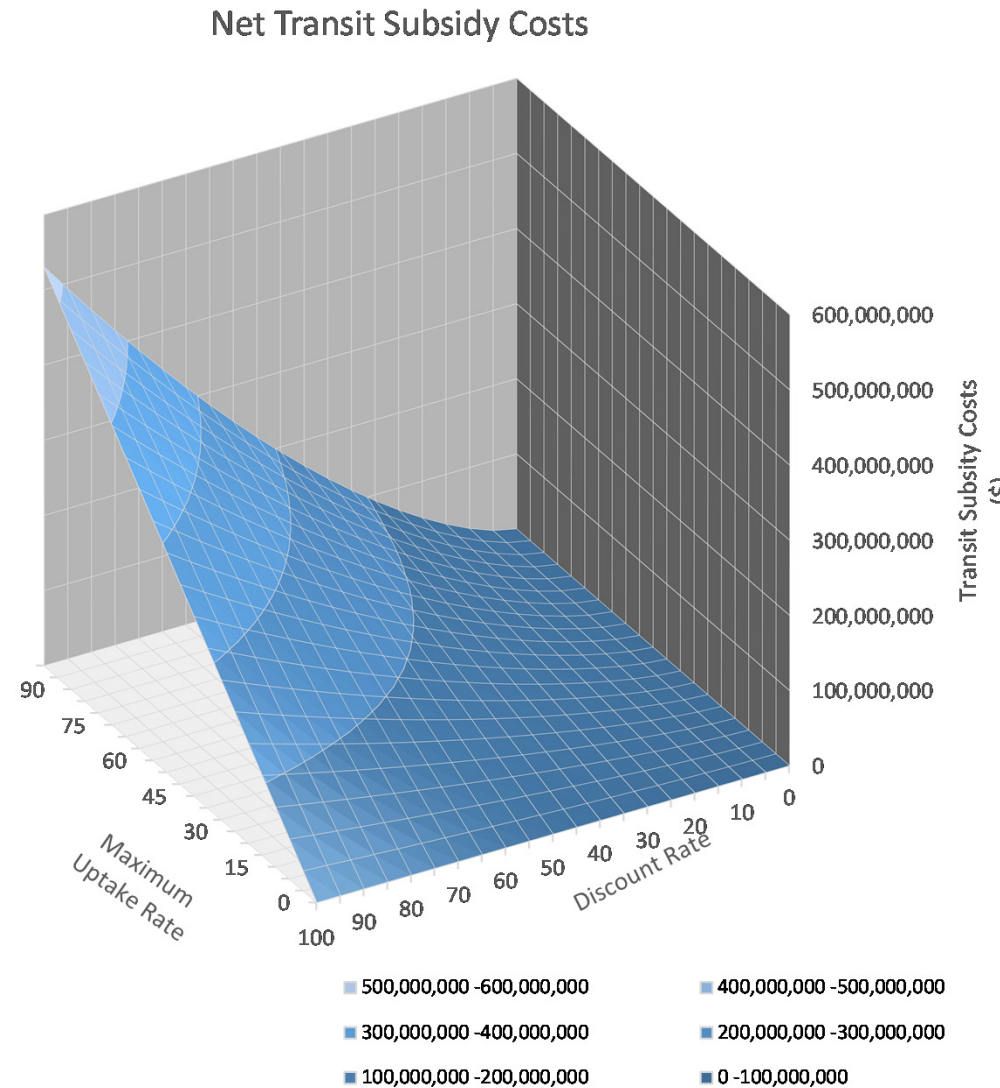
Government Tax Revenue



- For people in the lowest income brackets (below LIM), the additional wage does not result in additional tax revenue
- For people earning above the low income measure but less than a living wage, additional income is assumed to be taxed at the lowest rate

City of Toronto Financial Modeling Parameters

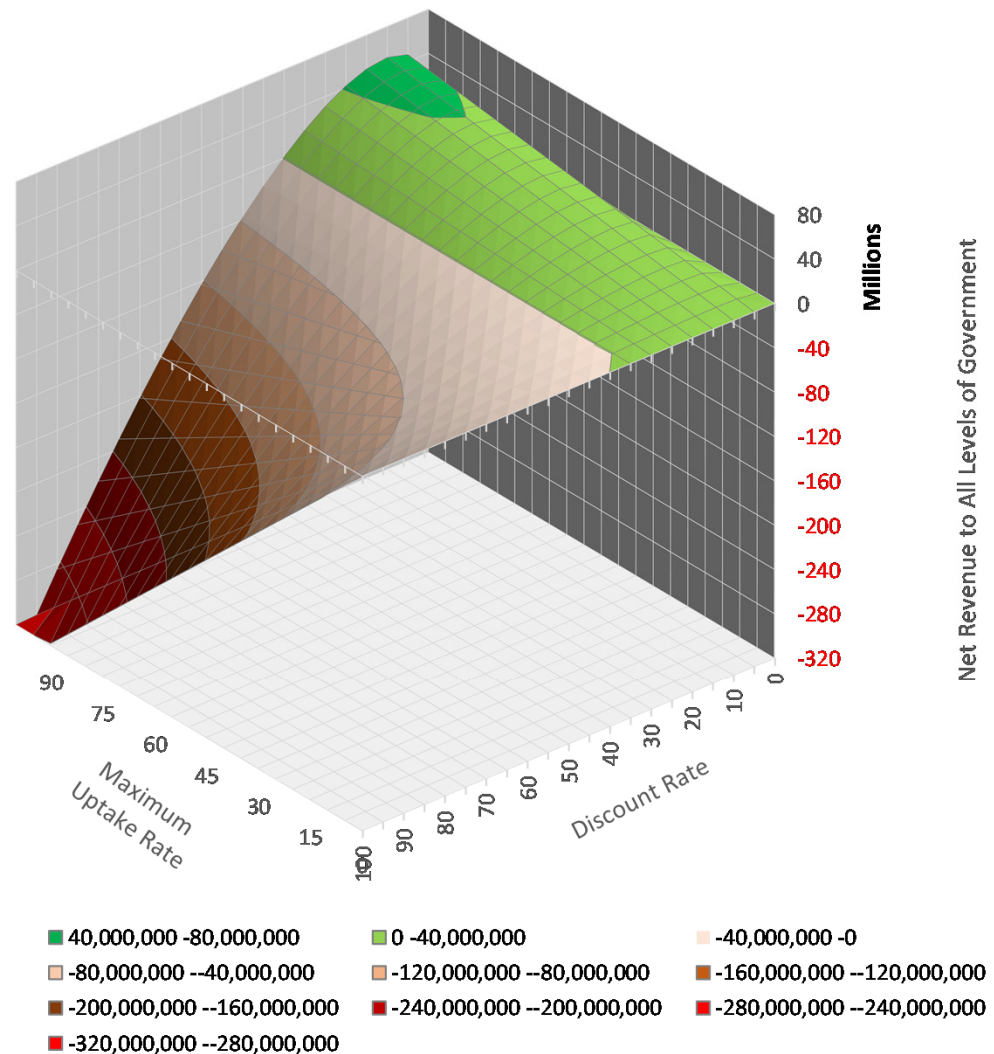
- The direct cost to the City of Toronto would be the transit subsidy given to eligible households.
- The total current expenditure by the city through various programs on transit is estimated to be about \$3.5M per year
- It is assumed that 50% of these costs could be avoided at full uptake



Net Benefits: LIM and Living Wage Eligible

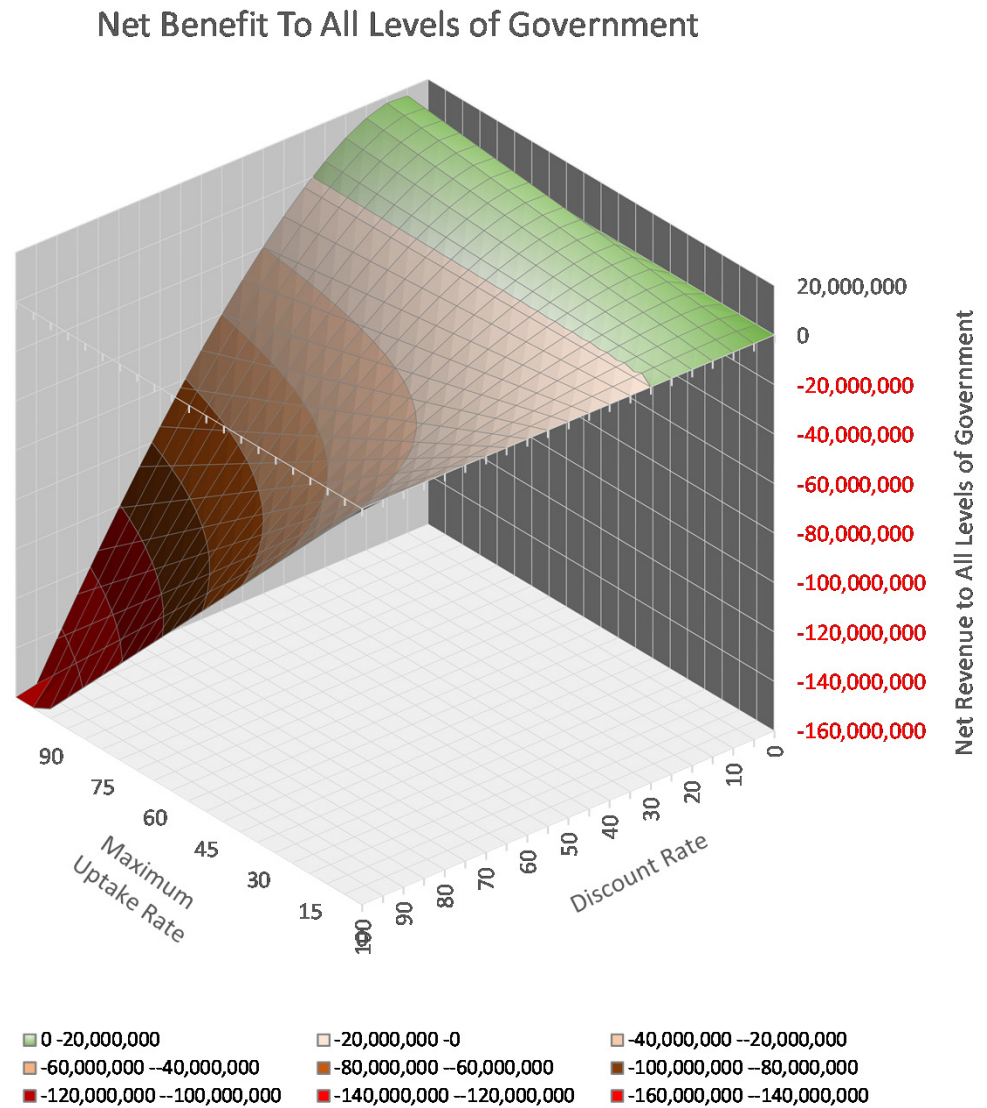
- Combining the benefits from reductions in health care utilization, additional tax revenue, and cost of the program, there is a significant net benefit for moderate discount rates of up to 40% and low risk if the uptake rate is low
- High discount rates with large uptake would result in the cost of the program exceeding the benefits captured in the model
- Green regions are positive net benefits

Net Benefit To All Levels of Government



Net Benefits: LIM Only Eligible

- The primary difference if only households with incomes below the low income measure are eligible is that additional employment will not generate additional income tax revenue
- This reduces the benefit of the program, but it still remains positive through smaller discount rates of about 30%





Additional Impacts

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Benefits to Community Agencies and Grant Programs

- City of Toronto provides funding to community agencies through diverse grants
- Offering low-income residents access to affordable transit fares could reduce expenses related to transit that are funded by these grants and allow:
 - Existing recipient agencies to reach more residents with their initiatives,
 - The City of Toronto to offer grants to more agencies,
 - Existing recipient agencies to increase the number social programs delivered.



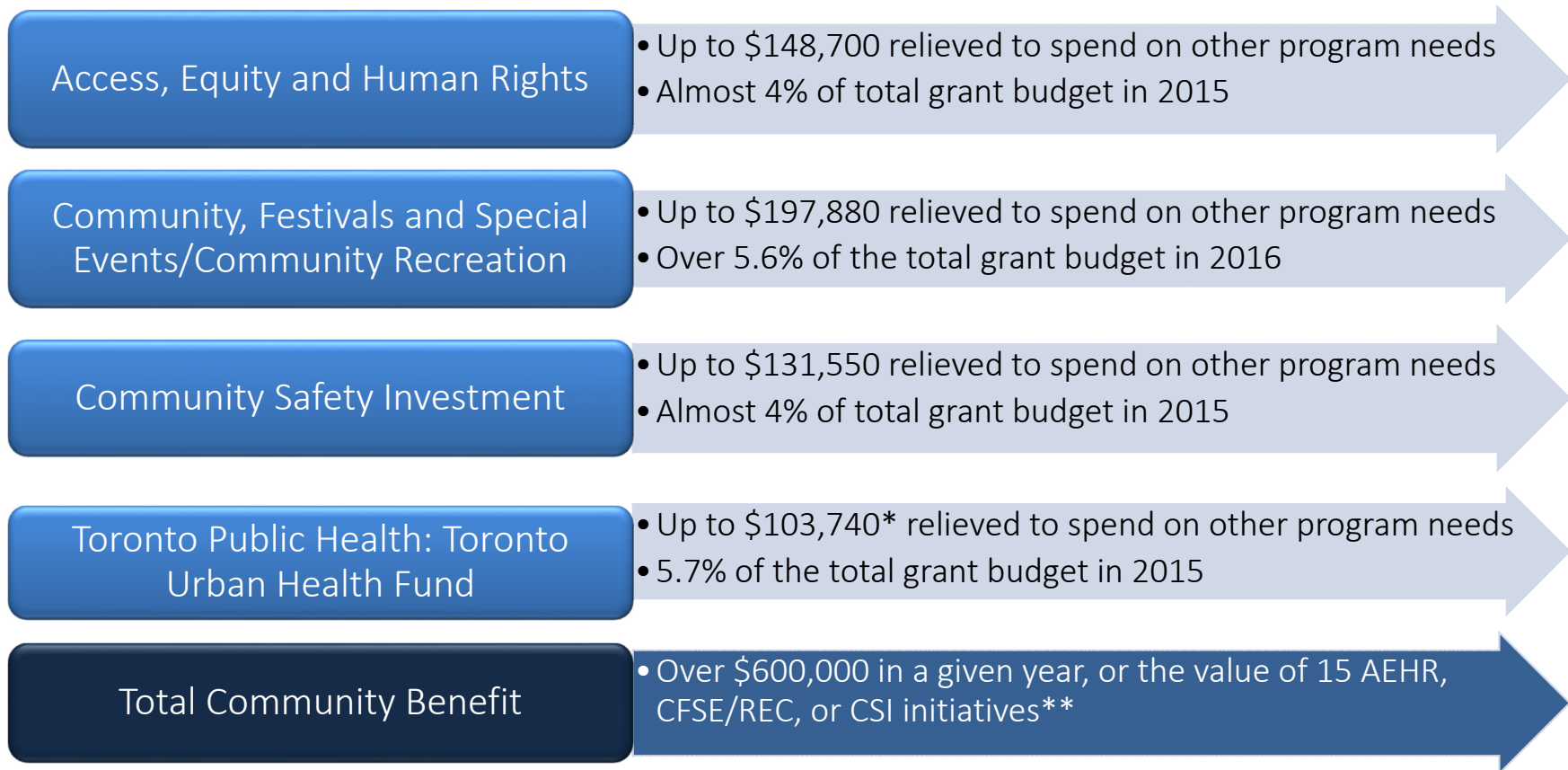
Community Agencies and Grant Programs Supporting Equity

- Toronto Public Health's Toronto Urban Health Fund
 - Funds programs dedicated to supporting community-based organizations' initiatives for HIV prevention, harm reduction and youth and child resiliency
 - TUHF also funds TTC expenditures related to initiatives under these programs
- Community agencies that partner with the City of Toronto receive significant funding for transportation expenses that also target many low-income residents and other vulnerable populations, through programs such as:
 - **Access, Equity and Human Rights:** support human rights, equity, and concerns of discrimination by improving food security, removing barriers to work, reintegrating formerly incarcerated individuals, promoting civic engagement, etc.
 - **Community, Festivals and Special Events:** supporting small, non-profit events and festivals to strengthen and connect communities
 - **Community Recreation:** support use of recreation to build skills, increase community participation, and in 2015, supported community members with mental and physical disabilities, families, and newcomers, etc.
 - **Community Safety Investment:** Supports the safety, access to information, and prevention of violence among vulnerable groups, including racialized minorities, victims of domestic violence, formerly incarcerated individuals, and others



Benefits to Community Agencies and Grant Programs

Based on amounts distributed to community agencies in 2015/2016 for TTC-related expenses, the City of Toronto and these recipient agencies could redeploy the following funds to program expansion, new initiatives or other avenues that support the community:



* Includes both amount funded by TUHF and unmet TTC cost. City of Toronto cost only.

** Based on average grant amount in 2015 of approx. \$40,000

Conclusions

- The benefits of a low income transit subsidy extend to all levels of government
- Under the assumed response to a transit subsidy, extending the subsidy to households below the living wage yields greater benefits than restricting it to the low income measure
- Data challenges exist surrounding:
 - the impacts of a low income discount
 - TTC ridership
- Due to the lack of rigorous data, the results are more illustrative of the relative size of costs and benefits rather than a detailed cost/benefit analysis



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Data sources: City of Toronto, Toronto Transit Commission, Metrolinx, Statistics Canada