

Impact of Chronic Disease on Labor Force Participation





Acknowledgment

- Based on previous work from Schofield et al., “Chronic disease and labour force participation among older Australians”. MJA 2008; 189 (8): 447-450
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- **Objective:** To examine the association between chronic disease and the probability of labour force participation among Canadians aged 45-64 yrs and the private and fiscal costs associated to the reduction of labour force participation because of chronic disease.

- **Data Source:** Statistics Canada's National Canadian Community Health Survey 2005 (CCHS)

- **Chronic Disease:** Self-reported.
 - ◆ Question: *'Now I'd like to ask about certain chronic health conditions which you may have. We are interested in "long-term conditions" which are expected to last or have already lasted 6 months or more and that have been diagnosed by a health professional'*



Canadian Community Health Survey (CCHS)

Data: An annual cross-sectional survey that collects information related to health status, health care utilization and health determinants for the Canadian population

Target Population: All Canadians aged 12 and over.

Sample Size: 130,000 observations

Year of Survey: 2005

There are 4 other surveys, however the 2005 survey is the most precise for the identification of the type of disease, (40 types)



Labour force participation definition

The dependent variable of our regression analysis is binary

In Labor Force

- Had a job - at work last week
- Had a job – absent from work last week
- Looked for work in past 4 weeks

Not in Labor Force (Inactive)

- Did not have a job last week
- Did not look for work in past 4 weeks
- Permanently unable to work

Our Sample

Table 1: Population estimation by gender, aged 45-65

	Male	Female	All
	n	n	n
45-49	1,152,182	1,156,117	2,308,299
50-54	1,001,613	1,032,140	2,033,753
55-59	875,602	885,600	1,761,202
60-64	701,038	698,603	1,399,641
Total	3,730,435	3,772,460	7,502,895

Table 2: Inactivity by age and gender

age	Male			Female			total		
	n	total	%	n	total	%	n	total	%
45-49	133,032	1,152,182	11.5	285,771	1,156,118	24.7	418,803	2,308,300	18.1
50-54	144,900	1,001,613	14.5	288,461	1,032,140	27.9	433,361	2,033,753	21.3
55-59	254,430	875,602	29.1	425,310	885,600	48.0	679,740	1,761,202	38.6
60-64	341,356	701,038	48.7	475,327	698,603	68.0	816,683	1,399,641	58.3
Total	873,718	3,730,435	23.4	1,474,869	3,772,461	39.1	2,348,587	7,502,896	31.3

In 2005, among the 7.5 millions Canadians aged 45 – 64, 2.3 millions (31%) were estimated not in labor force

Prevalence of long term health conditions among Canadians aged 45-64 and percent inactive by disease

Table 3 : Prevalence of long term health conditions among Canadians aged 45-64

Long-term health conditions	total		Inactive		Long-term health conditions	total		Inactive	
	n	%	n	%		n	%	n	%
Back problems (excl. Fibro. and arthritis)	1,787,069	23.8	682,024	29.0	Chronic fatigue syndrome	135,331	1.8	92,577	3.9
High blood pressure	1,616,846	21.5	654,652	27.9	Rheumatism	134,669	1.8	60,810	2.6
Other kind of health problem	1,231,305	16.4	487,501	20.8	Glaucoma	106,947	1.4	46,835	2.0
Osteoarthritis	920,339	12.3	447,353	19.0	Learning disability	99,171	1.3	52,013	2.2
Migraine headaches	815,319	10.9	302,589	12.9	Breast cancer	95,190	1.3	56,043	2.4
Thyroid condition	572,091	7.6	258,464	11.0	Stroke	78,409	1.0	52,800	2.2
Asthma	528,135	7.0	200,907	8.6	COPD	70,036	0.9	43,537	1.9
Diabetes	512,440	6.8	224,434	9.6	Emphysema	61,791	0.8	38,717	1.6
Mood disorder	503,029	6.7	256,181	10.9	Other kind of bowel disease	57,235	0.8	29,072	1.2
Heart disease	383,623	5.1	190,195	8.1	Skin cancer	56,985	0.8	22,911	1.0
Anxiety disorder	366,474	4.9	187,591	8.0	Other learning disability	43,903	0.6	28,335	1.2
Ulcer	289,851	3.9	128,672	5.5	Epilepsy	43,293	0.6	21,399	0.9
Rheumatoid arthritis	288,002	3.8	125,277	5.3	Colitis	42,988	0.6	16,930	0.7
Other cancer	253,927	3.4	119,961	5.1	Prostate cancer	33,050	0.4	16,795	0.7
Chemical sensitivities	245,468	3.3	121,273	5.2	Crohn's disease	32,726	0.4	11,647	0.5
Urinary incontinence	228,415	3.0	117,588	5.0	Colorectal cancer	30,996	0.4	20,879	0.9
Cataracts	210,090	2.8	116,545	5.0	Eating disorder	22,801	0.3	14,107	0.6
Chronic bronchitis	208,237	2.8	102,557	4.4	Schizophrenia	22,424	0.3	16,864	0.7
Irritable bowel syndrome	204,637	2.7	92,191	3.9	Bowel incontinence	11,069	0.1	8,642	0.4
Fibromyalgia	193,198	2.6	116,726	5.0	Alzheimer	7,130	0.1	6,421	0.3
Other kind of arthritis	149,910	2.0	66,683	2.8	ADHD	6,568	0.1	3,272	0.1



Income and taxes estimations

- Once we have determined the lost jobs because of chronic disease we estimate the annual earnings lost because of inactivity with the Survey of Labour and Income Dynamics, 2005 (SLID)
- Hypothesis: observation with long-term chronic conditions predicted to be inactive at the time of the survey are inactive for some period during the year.

With the SLID we predict earnings lost using Linear regression of income, federal taxes, provincial taxes and transfers on variables that are available in both data sets

- ◆ Gender, Province, Age and Education
- Earnings estimation with no long-term conditions :
 - ◆ Employed all year or unemployed all year or both
- Earnings estimation with long-term conditions
 - ◆ 3 estimations (sensitivity analysis)
 - Not in the labour force all year (52 weeks)
 - Not in the labour force at least 26 weeks
 - Not in the labour force at least 1 week

Logit regression of inactivity on Socio-demographic variables and chronic disease

Table 4 : Socio-demographic variables on inactivity

Socio-demographic variables	OP	P value	95% CI
Newfoundland	1.94	0.00	[1.48 ; 2.53]
Prince-Edward Island	1.19	0.24	[0.89 ; 1.61]
Nova-Scoatia	1.18	0.07	[0.99 ; 1.41]
New-Brunswick	1.39	0.00	[1.16 ; 1.68]
Québec	1.60	0.00	[1.42 ; 1.80]
Manitoba	0.80	0.02	[0.66 ; 0.96]
Saskatchewan	0.75	0.00	[0.62 ; 0.91]
Alberta	0.87	0.12	[0.73 ; 1.04]
British-Columbia	1.03	0.63	[0.91 ; 1.16]
Woman	1.15	0.06	[1.00 ; 1.33]
Age	0.53	0.00	[0.45 ; 0.62]
Age2	1.01	0.00	[1.01 ; 1.01]
Urban	0.92	0.06	[0.85 ; 1.00]
Spouse	0.59	0.00	[0.52 ; 0.67]
Spouse*woman	2.24	0.00	[1.89 ; 2.66]
No secondary diploma	1.59	0.00	[1.43 ; 1.76]
Secondary diploma	1.24	0.00	[1.11 ; 1.39]
college	1.19	0.02	[1.02 ; 1.39]
Languages	1.85	0.01	[1.16 ; 2.94]
Immigrant	0.88	0.03	[0.78 ; 0.99]
Unemployment	1.02	0.07	[1.00 ; 1.04]
Physical exercise - moderate	0.70	0.00	[0.63 ; 0.78]
Physical exercise - none	0.56	0.00	[0.51 ; 0.62]
Obesity	0.93	0.23	[0.84 ; 1.04]
Overweight	0.84	0.00	[0.77 ; 0.92]
Alcohol	1.00	0.00	[1.00 ; 1.00]

Logit results and Lost earnings, taxes and additional transfers because of disease (millions)

Table 5a : Long-term health conditions on inactivity

Long-term health conditions	OP	P value	95% CI		Lost	Lost (millions)		
					Workforce	Income	T & T	Total
Back problems (excl. Fibro. and arthritis)	1.26	0.00 [	1.15 ;	1.38]	71,792	3,011	948	3,249
Other kind of health problem	1.37	0.00 [	1.24 ;	1.52]	69,866	3,032	952	3,257
Mood disorder	1.78	0.00 [	1.53 ;	2.07]	55,098	2,310	728	2,486
Osteoarthritis	1.34	0.00 [	1.20 ;	1.50]	52,009	2,003	605	2,149
High blood pressure	1.14	0.01 [	1.04 ;	1.26]	39,295	1,576	488	1,700
Cancer	3.15	0.00 [	2.30 ;	4.30]	27,951	1,182	360	1,270
Anxiety disorder	1.37	0.00 [	1.15 ;	1.62]	21,872	873	281	943
Heart disease	1.34	0.00 [	1.13 ;	1.58]	20,330	860	268	930
Chronic fatigue syndrome	2.15	0.00 [	1.62 ;	2.85]	18,669	769	245	828
Diabetes	1.22	0.01 [	1.06 ;	1.40]	18,474	762	238	824
Fibromyalgia	1.63	0.00 [	1.27 ;	2.08]	17,766	694	210	741
Rheumatoid arthritis	1.37	0.00 [	1.16 ;	1.63]	17,064	684	207	738
Stroke	2.79	0.00 [	1.93 ;	4.03]	14,627	593	189	646
Cataracts	1.42	0.00 [	1.14 ;	1.77]	14,071	563	166	606
Ulcer	1.22	0.04 [	1.01 ;	1.48]	10,160	421	134	454
Other kind of arthritis	1.41	0.01 [	1.11 ;	1.80]	9,267	376	117	406
Chronic obstructive pulmonary disease	1.85	0.00 [	1.34 ;	2.56]	7,834	323	98	348
Learning disability	1.49	0.01 [	1.09 ;	2.02]	7,759	319	105	348
Schizophrenia	5.47	0.00 [	2.36 ;	12.70]	7,384	313	105	342
Epilepsy	1.88	0.01 [	1.21 ;	2.92]	4,666	198	65	214
Bowel incontinence	3.62	0.00 [	1.65 ;	7.93]	2,542	97	30	105
No chronic Disease					547,495	21,860	6,774	23,571

Chronic diseases with no impact on labour force participation

Table 5a : Long-term health conditions on inactivity

Long-term health conditions	OP	P value	95% CI
Migraine headaches	0.99	0.94	[0.87 ; 1.14]
Glaucoma	0.98	0.94	[0.67 ; 1.45]
Colitis	0.96	0.86	[0.61 ; 1.51]
Crohn's disease	1.09	0.71	[0.70 ; 1.69]
Irritable bowel syndrome	1.04	0.68	[0.85 ; 1.28]
Asthma	0.95	0.49	[0.81 ; 1.11]
Urinary incontinence	1.08	0.44	[0.89 ; 1.31]
Chronic bronchitis	1.10	0.39	[0.89 ; 1.35]
Emphysema	1.29	0.20	[0.88 ; 1.91]
Thyroid condition	1.13	0.09	[0.98 ; 1.31]
Other kind of bowel disease	1.33	0.08	[0.97 ; 1.83]
Rheumatism	1.31	0.07	[0.98 ; 1.75]
Chemical sensitivities	1.21	0.07	[0.99 ; 1.48]



Aggregate losses

**Table 6 : Sensitivity analysis
depending on sample used to
estimate earnings**

	Lost (millions)		
	Income	T & T	Total
52 weeks	22,310	6,935	24,068
At least 26 weeks	21,860	6,774	23,571
At least 1 week	20,550	6,331	22,120



Estimated losses and confidence intervals

Table 6 : Losses

Lost	mean	95 % Conf. Interval
Workforce	547,495	[459,852 ; 635,139]
Income (millions)	21,860	[18,025 ; 25,567]
Federal taxes (millions)	3,627	[2,975 ; 4,268]
Provincial taxes (millions)	1,436	[1,180 ; 1,692]
Transfer (millions)	1,711	[1,435 ; 1,987]
Total (millions)	23,571	[19,769 ; 27,373]
% du PIB*	1.72	[1.44 ; 1.99]

* GDP Canada 2005, 1 373 845 millions can\$

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