Mortality following unemployment in Canada, 1991-2001

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Unemployment

Labour economists typically describe three ‘types’ of unemployment:

Frictional: the consequence of natural cycle of employer expansion and contraction

Cyclical: the influence of the business cycle

Structural: when an economic sector enters a period of decline (think of the east coast inshore fishery)

The duration of unemployment is typically shortest in conditions dominated by frictional employment

Unemployment

Across the developed economies, the rate of ‘natural unemployment’ varies substantially.

Canada and the US have relatively high ‘natural’ rates of unemployment. The northern European countries, with longstanding commitments to ‘full employment’ policies, have typically very low rates of unemployment.

Income security programs for unemployed persons vary substantially across the developed economies in benefit generousity, benefit duration and labour market training supports.

Unemployment and health

Research evidence from robust longitudinal observational studies has increasingly indicated that processes embedded in the experience of work are important causes of the pervasive occupational gradient in life expectancy — where workers in low-skill and low-wage occupations have higher mortality than workers in high-skilled, high wage occupations

A large body of work had consistently found the experience of unemployment to be associated with the risk of death in the period following the unemployment spell (see review by Lavis et al. 1998).

Unemployment and health: Methodological challenges

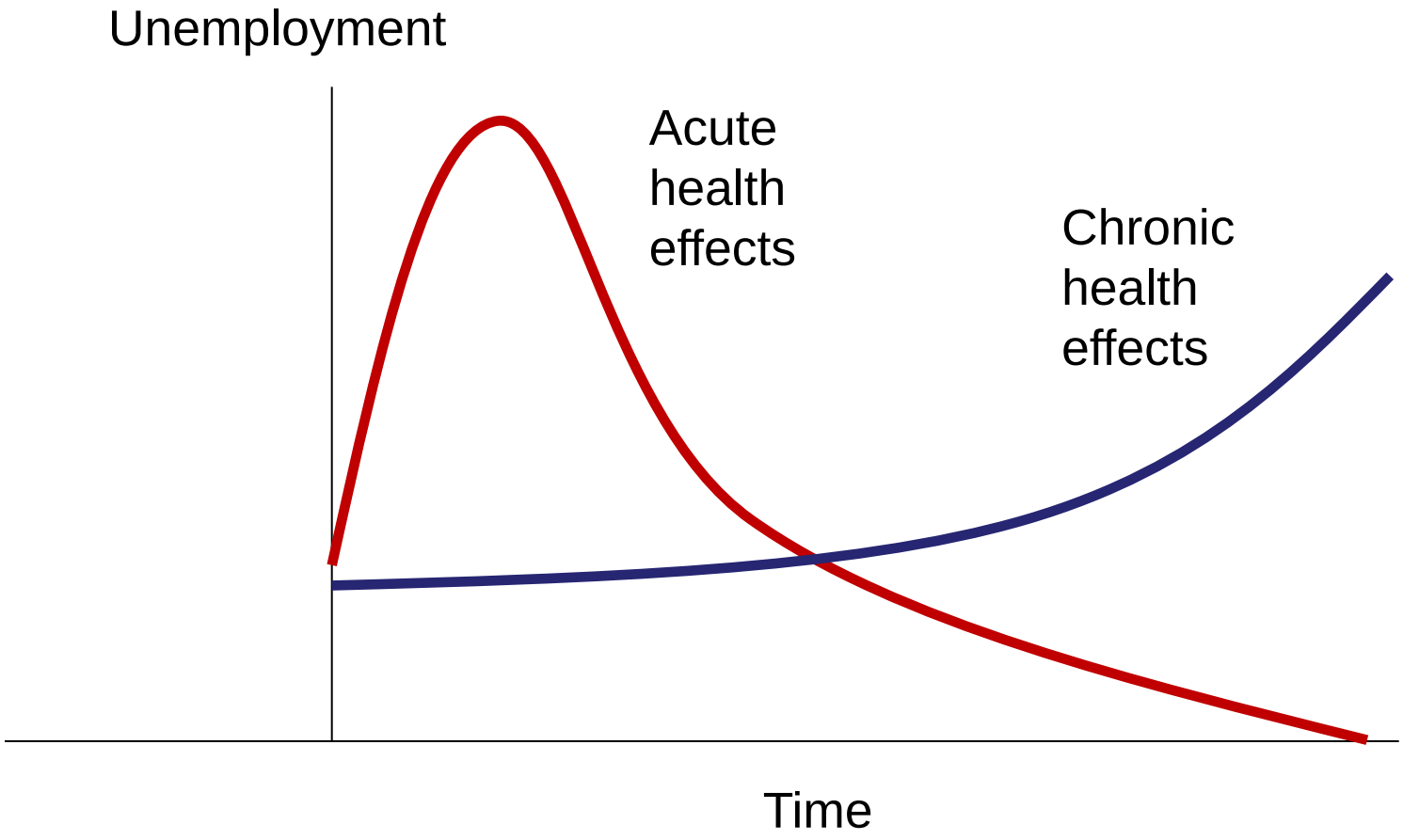
Important methodological challenges in estimating the causal effect of unemployment/ job loss on health and mortality:

Health selection: workers in poorer health may be more likely to become unemployed

Biological plausibility: are health effects due to an acute exposure more likely than health effects associated with chronic exposure

Dose/response: are health effects more pronounced among persons experiencing longer durations of unemployment

Cumulative exposure: are health effects more pronounced among persons with more unemployment episodes


Unemployment
Acute health effects
Chronic health effects
Time

Summary of Methods

A cohort study of mortality over an 11 year period among a broadly representative 15% sample of the non-institutionalized population of Canada at cohort inception.

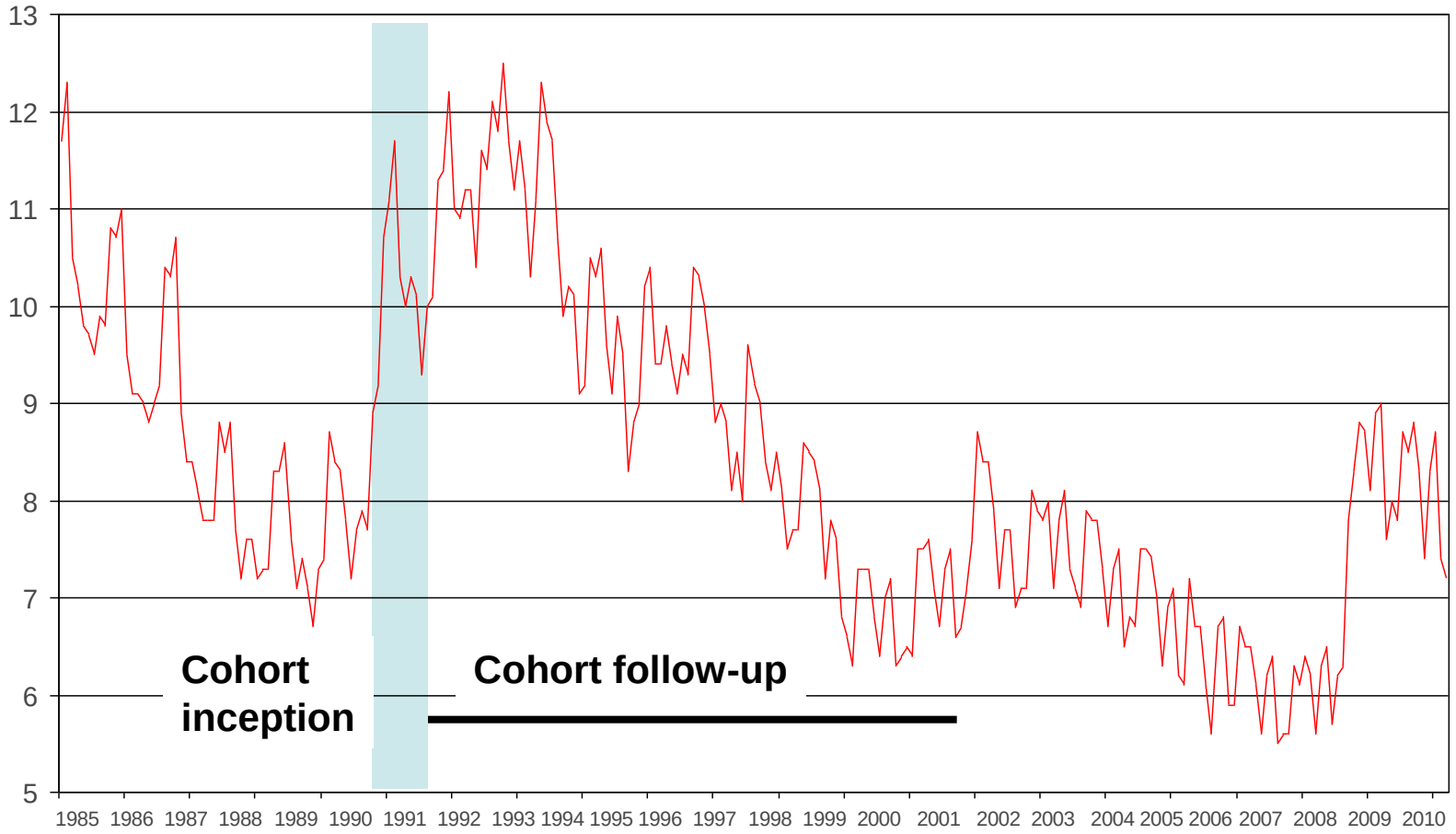
Age-standardized mortality rates and rate ratios were calculated for occupationally-active men and women.

The study sample of persons aged 30-69 at baseline represented 1,700,000 persons who were occupationally active of whom 7.4% were unemployed during the week of the 1991 census.

Details on the cohort are provided in:

Wilkins R, Tjepkema M, Mustard CA, et al. The Canadian census mortality follow-up study, 1991 through 2001. Health Rep. 2008;19(3):25-43.

Unemployment rate, Canada, 1985-2010



Study Hypotheses

1) Relative risk of all-cause mortality among the unemployed will be larger in the initial five year period following unemployment relative to the period 5-10 years following unemployment
2) Relative risk of mortality among the unemployed will be greater for causes of death associated with an acute consequence of exposure
3) There will be no age differences in the relative risk of mortality among the unemployed

Iversen L et al. Unemployment and mortality in Denmark, 1970-1980. British Medical Journal 1987:295;879-883

TABLE VII—*Estimated cause specific relative death rates for unemployed men and women (95% confidence intervals) by calendar period*

Cause of death	1970-5	1975-80	1970-80
	Men		
Cancer	1·25 (1·07 to 1·46)	1·40 (1·24 to 1·59)	1·33 (1·21 to 1·47)
Cardiovascular disease	1·35 (1·18 to 1·53)	1·25 (1·13 to 1·39)	1·28 (1·18 to 1·39)
Other diseases	2·24 (1·88 to 2·66)	2·30 (2·01 to 2·63)	2·26 (2·04 to 2·51)
Accidents	2·30 (1·83 to 2·89)	2·87 (2·27 to 3·62)	2·55 (2·17 to 3·00)
Suicide	2·92 (2·33 to 3·65)	2·13 (1·65 to 2·74)	2·51 (2·12 to 2·97)
All causes	1·63 (1·52 to 1·76)	1·56 (1·46 to 1·66)	1·58 (1·51 to 1·65)
	Women		
Cancer	1·25 (0·93 to 1·69)	1·08 (0·83 to 1·41)	1·15 (0·94 to 1·40)
Cardiovascular disease	1·60 (1·05 to 2·43)	1·31 (0·94 to 1·83)	1·41 (1·08 to 1·83)
Other diseases	2·99 (2·01 to 4·44)	2·32 (1·68 to 3·22)	2·55 (1·98 to 3·27)
Accidents	2·19 (1·21 to 3·99)	3·27 (1·96 to 5·46)	2·71 (1·83 to 4·00)
Suicide	2·46 (1·45 to 4·16)	2·44 (1·52 to 3·94)	2·45 (1·72 to 3·49)
All causes	1·71 (1·42 to 2·06)	1·50 (1·29 to 1·76)	1·58 (1·40 to 1·78)

Results

The baseline unemployment rate for men and women aged 30-69 in this cohort was 6.9%.

Unemployment increased with lower levels of occupational skill, lower levels of attained education and more recent immigration to Canada

Table 1
Person-years and percent unemployed in 1991, males ages 30-69 at cohort inception, Canada

Age	Person Years	Percent unemployed in 1991
30-39	3,768,710	7.76
40-49	2,984,020	6.05
50-59	1,784,940	6.49
60-69	657,370	7.26
Occupational Skill Level		
Professional	1,245,710	2.62
Managerial	1,436,590	2.93
Skilled/Technical/Supervisory	2,400,490	9.00
Semi-skilled	3,240,000	7.20
Unskilled	872,240	12.74

Table 1, continued
Person-years and percent unemployed in 1991,
males ages 30-69 at cohort inception, Canada

Industry	Person Years	Percent unemployed in 1991
Primary	779,450	8.74
Manufacturing	1,837,110	7.68
Construction	925,060	16.04
Transportation, storage, communication, utilities	1,042,830	5.19
Trade	1,310,150	5.48
Finance, insurance, real estate	897,990	4.51
Government	886,670	4.24
Other service industries	1,515,760	4.92

Results

The age-adjusted relative risk of all-cause mortality over the ten year follow-up period for persons unemployed on census day in 1991 was 1.37 for men (95% CI: 1.32-1.41) and 1.27 for women (95% CI: 1.20-1.35).

For both men and women, the age-adjusted relative risk of all-cause mortality in the first five years of follow-up was equivalent in the second five years of follow-up)

Hypothesis 1 is rejected

Relative risk of death among the unemployed, Controlling for age and for age and all other variables.

Ages 30-69 at cohort inception, Canada, 1991-2001

			Controlling for age		Controlling for age and all variables	
		Deaths	RR	95% CI	RR	95% CI
Males	1991-1996	17,923	**1.36**	1.29 -1.43	**1.22**	1.15 -1.28
	1997-2001	23,757	**1.37**	1.31 -1.43	**1.22**	1.17 -1.28
	1991-2001	41,680	**1.37**	1.32 -1.41	**1.22**	1.18 -1.26
Females	1991-1996	6,742	**1.27**	1.16 -1.39	**1.25**	1.14 -1.36
	1997-2001	9,342	**1.27**	1.18 -1.37	**1.23**	1.14 -1.32
	1991-2001	16,084	**1.27**	1.20 -1.35	**1.24**	1.17 -1.31

Adjusted for age, occupational skill level, education, marital status, year of immigration and industry

Results

For unemployed men and women, age-adjusted relative risks of mortality were elevated over the ten year follow-up period for deaths due to malignant neoplasms, circulatory diseases, respiratory diseases, accidents and violence and all other causes of death. Risk of death due to alcohol-related causes of death was also elevated relative to the employed.

Only moderate attenuation following adjustment for occupational skill level, education, marital status, year of immigration and industry of employment

Hypothesis 2 is rejected

Table 3
Relative risk of death among the unemployed, by cause of death,
Controlling for age and all other variables
Males aged 30-69 at cohort inception, Canada, 1991-2001

	1991-1996				1997-2001			
		Controlling for all variables (1)				Controlling for all variables (1)		
	Deaths	HR	95% CI		Deaths	HR	95% CI	
Total mortality	17,923	**1.22**	1.15	-1.28	23,757	**1.22**	1.17	-1.28
Malignant neoplasms	7071	**1.10**	1.01	-1.21	10,079	**1.17**	1.09	-1.26
Circulatory diseases	5,474	1.09	0.98	-1.20	7,208	**1.13**	1.03	-1.23
Diseases of the respiratory system	406	1.34	0.95	-1.87	974	1.22	0.98	-1.52
Alcohol-related diseases	400	**1.54**	1.15	-2.07	526	**1.84**	1.43	-2.37
Other diseases	2,590	**1.33**	1.17	-1.51	3,382	**1.36**	1.22	-1.53
Accidents & violence	2,382	**1.59**	1.40	-1.80	2,114	**1.51**	1.32	-1.72

Table 4
Relative risk of death among the unemployed, by cause of death,
Controlling for age and all other variables
Women aged 30-69 at cohort inception, Canada, 1991-2001

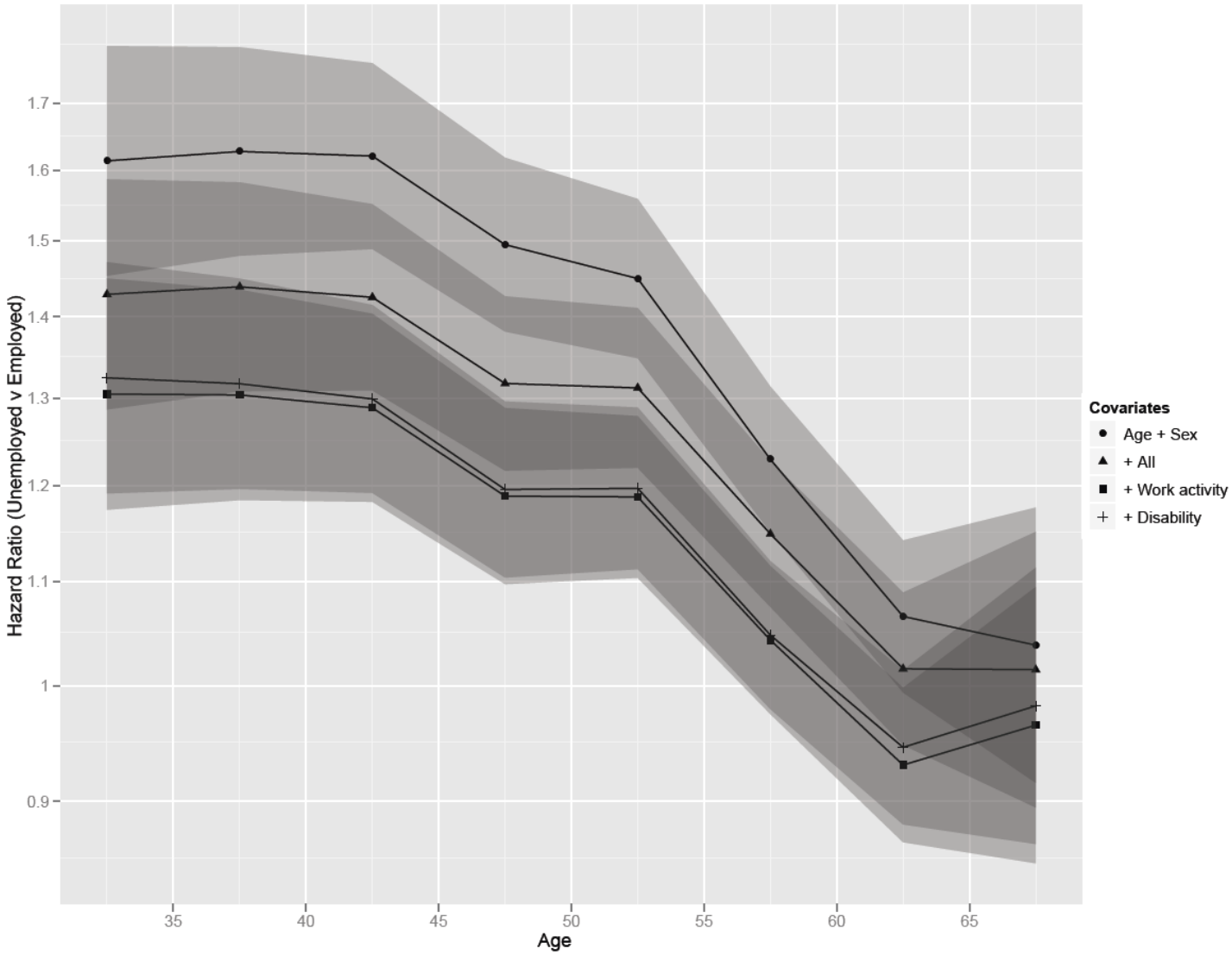
	1991-1996				1997-2001			
		Controlling for all variables (1)				Controlling for all variables (1)		
	Deaths	HR	95% CI		Deaths	HR	95% CI	
Total mortality	6,742	**1.25**	1.14	-1.36	9,342	**1.23**	1.14	-1.32
Malignant neoplasms	4,168	1.11	0.99	-1.25	5,576	1.08	0.97	-1.19
Circulatory diseases	1,152	1.22	0.98	-1.51	1,732	**1.39**	1.18	-1.64
Diseases of the respiratory system	163	**1.29**	0.74	-2.24	335	**1.65**	1.17	-2.35
Alcohol-related diseases	95	**1.82**	0.98	-3.35	112	**2.17**	1.29	-3.67
Other diseases	699	**1.55**	1.22	-1.98	1,176	**1.50**	1.24	-1.82
Accidents & violence	560	**1.88**	1.46	-2.42	523	**1.42**	1.06	-1.91

Results

Approximately 12% of deaths to men and 15% of deaths to women in this cohort occurred to the 40% of persons aged 30-39. Conversely, approximately 30% of deaths to men and 20% of deaths to women occurred to the 7% of persons aged 60-69.

The age-specific hazard of death among unemployed persons is greatest at young ages. At ages 6-69, the fully adjusted hazard of death for the risk of all-cause mortality among the unemployed was no different from that of the employed.

Hypothesis 3 is rejected


Hazard Ratio (Unemployed v Employed)
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
35
40
45
50
55
60
65
Age
Covariates
Age + Sex
+ All
+ Work activity
+ Disability

Discussion

Hazard of death among both unemployed men and women was elevated relative to the employed. While minor differences were observed, the cause specific relative risks for men and women were similar.

Consistent with results reported from other long-duration cohort studies, we observe elevated risk for causes of death consistent with acute exposure effects (accidents) and causes of death with longer latency (circulatory diseases)

Discussion

The persistency of an elevated mortality risk over the ten year follow-up for conditions assumed to arise from an acute exposure to unemployment and conditions generally assumed to have long latency is paradoxical.

On the one hand, a persistent elevated risk of mortality does not suggest a strong effect of health selection.

On the other hand, the persistency of an elevated risk of mortality across many causes of death suggests that the exposure to unemployment observed in 1991 was not a single event, and may mark persons at risk of cumulative socioeconomic hardship

Discussion

All-cause mortality observed in this cohort of Canadian was lower than reported from a 1970 cohort in Denmark.

Why?

Unemployment in Denmark was 1.5%, compared to 7% in Canada

Perhaps the age distribution of unemployment was different between the two countries?

Perhaps a period effect, where the health status of the Canadian cohort was better than the Danish cohort

Thank You!

Please contact me directly for further information

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