

Human Diversity and the Director of the 'Healthy the Nation Survey'



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uOttawa

Outline

- Introduction
- Current Research
- Theoretical Content
 - Human Development
- Research Questions
- Methodology
- Results
- Future Directions



Introduction



- ~ 230,000 immigrants / year (0.7% pop)
- Currently ~18% pop. (Census 2001)
- 2015: > 25% Canadian pop.
- 1940-1980: Western, Eastern Europe
- 1980-Pres: Asia, Mid East, Africa, Caribbean
- 55% settle in Toronto, Montreal, Van.

Review of Literature

- Immigrants face special health challenges due to differences in:
 - Knowledge of services (Wen et al., 1996)
 - Access to care (Stephenson, 1995; Pomerleau & Østbye, 1997)
 - Exposure to infectious disease (Cowie, 1998)
 - Language (Globerman, 1994; Saldov, 1991)
 - Culture (Cook, 1994)
 - Income (Dyck, 1995)
 - Social support (Noh & Avison, 1996)
 - Discrimination (Bentham et al, 1995)
 - Racism (Krieger, 2003)



“Healthy Immigrant Effect”

1. More favourable health profile on arrival
 - Pre-migration factors (Chen et al 1996)
 - Health screening (Health Canada, 1999)
 - ↑ education, occupation (Laroche, 2001)
 2. Health of immigrants **appears to** converge
 - ↳ towards Canadian levels
 - Time since immigration (Cairney & Østbye, 1999)
 - < 10 years: Rapid ↳ health, ↑ chronic cond. (Ali, 2002; Muenning & Fahs, 2002)
- ✗ The vast majority of this work is X-sectional
- ✗ Processes of change are largely ignored

Human Development

- “The improvement of the human priorities so that people live longer, healthier and fuller lives”

(Ranis & Stewart, 2000)

- “Personal capabilities and freedoms”

(Sen, 1987, 1999)

- Human Development Index (HDI)

1. Longevity (Life expectancy)
2. Capability (Gross National Product (\$PPP))
3. Knowledge (Adult literacy / Child enrollment)



Why Human Development?



United Kingdom

HD Index: 0.936

HD Rank 2004: **12th**

LE: 78.1 years

Adj-GDP: 26,150 US\$



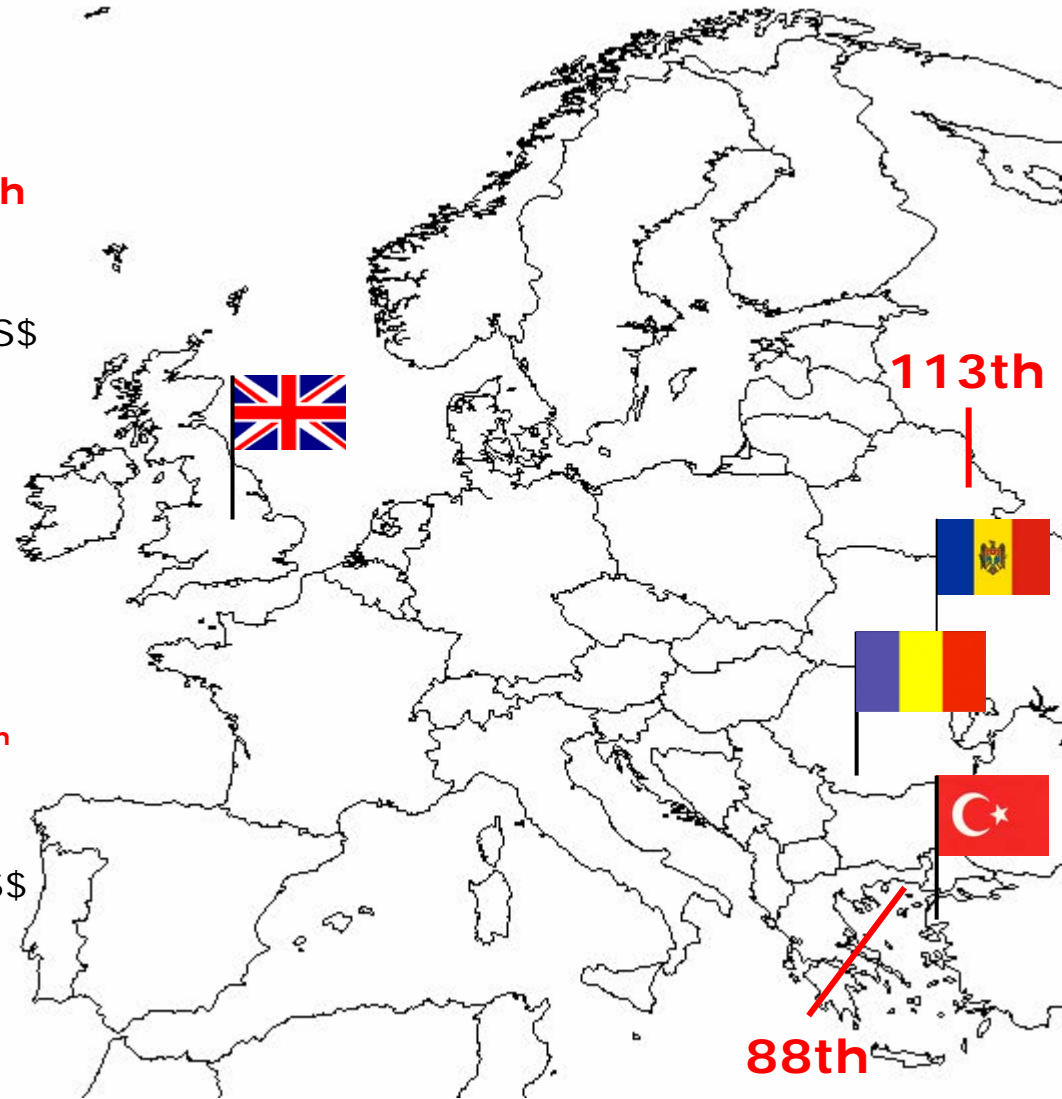
Romania

HD Index: .778

HD Rank 2004: **69th**

LE: 70.5 years

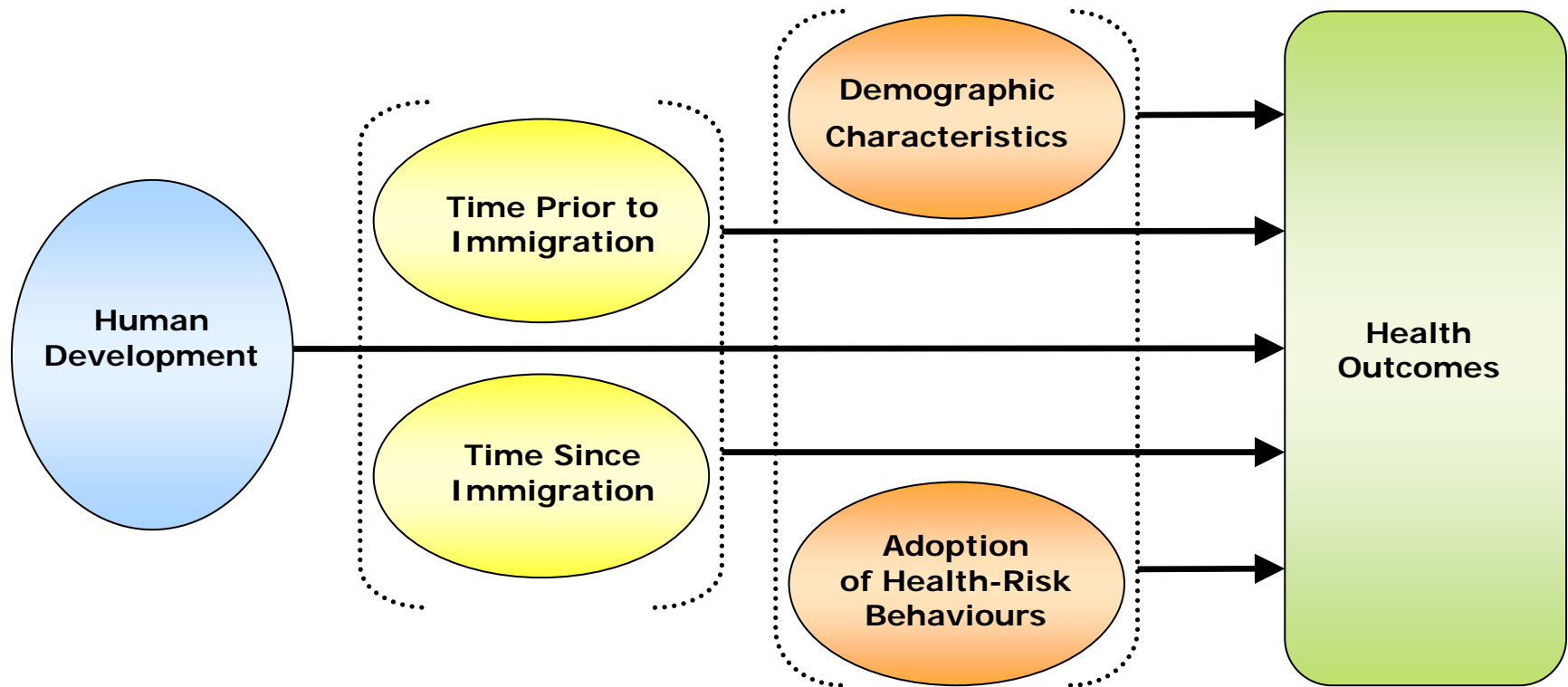
Adj- GDP: 6,560 US\$



Research Questions

1. Does the **longitudinal trajectory** of health among immigrants follow that which is observed in cross-sectional designs?
2. To what extent does the **level of human development** in the country of birth affect changes in health status among immigrants to Canada?

Theoretical Model of Immigrant Health



Methods

- Longitudinal National Population Health Survey (NPHS) (1994, 1996, 1998, 2000)
- 79.6% sample retention (1994-2000)
- Total 4-Wave longitudinal sample (20 years+): N=10,949
- Canadian-born: 9,488 (87%)
- Immigrants: 1,455 (13%)



NPHS Content

□ Demographic

- Age
- Gender
- Income
- Marital status
- Rural / Urban
- Province of residence

□ Immigration

- Immigrant status
- Time since immigration
- Country of birth
- Year of immigration

□ Adoption of Health-Risk Behaviours

- Alcohol use
- Smoking status
- Physical activity status
- BMI

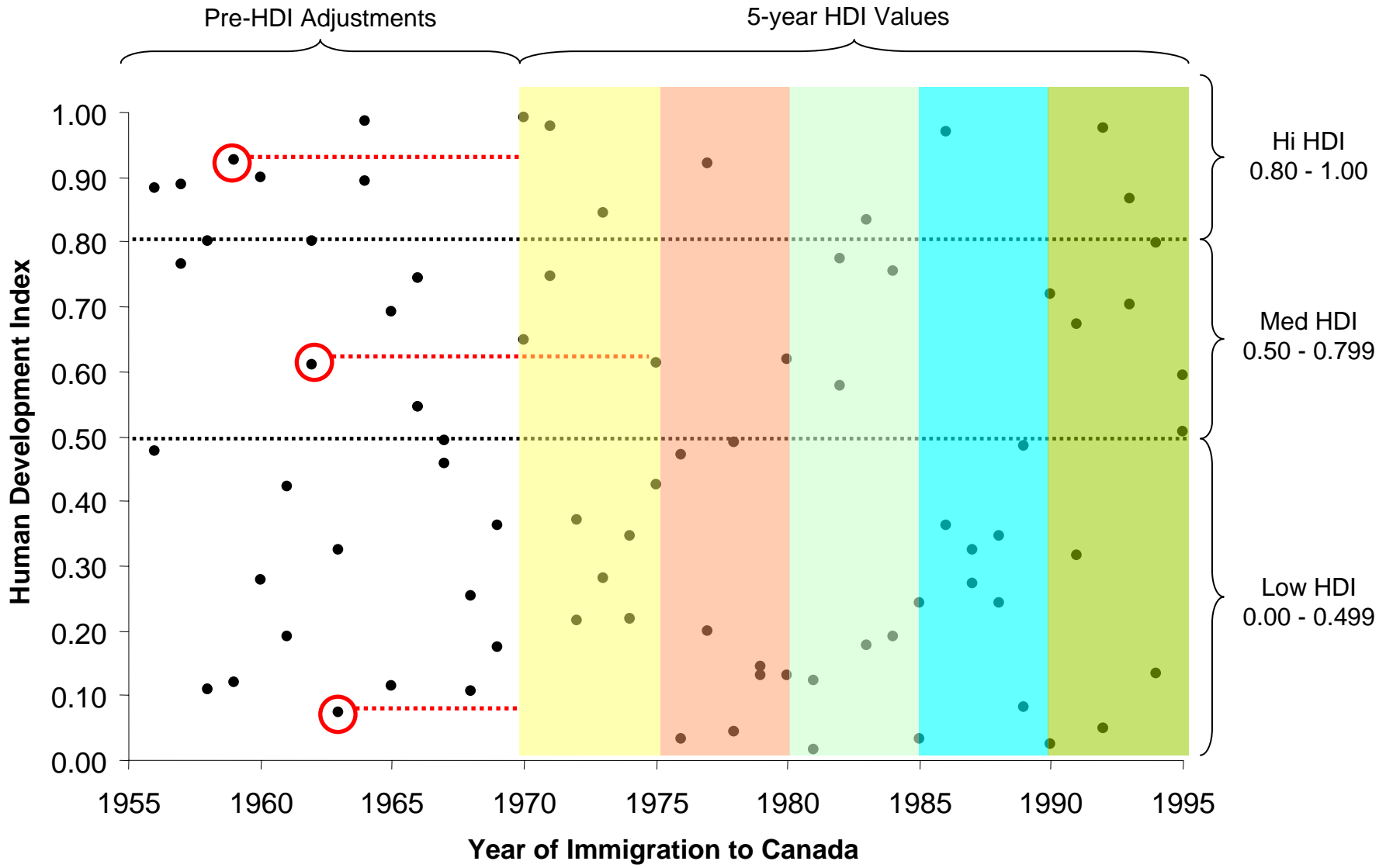
□ Health Outcomes

- 6-item Distress Scale
- Health Utility Index-3
- Self-Rating of General Health

UNDP Human Development Data

- Data from historical records
- Pre-1970 immigrants use most recent year available
- 1,455 NPHS immigrants linked to HDI by:
 - Country of birth
 - Year of immigration to Canada





NPHS-UNDP Database Linkage

	Theoretical HDI Range	Number of Countries	Mean HDI	SD	Sample
Highly developed countries	.80 - 1.0	44	.852	.021	869
Medium developed countries	.50 - .79	49	.690	.090	483
Low developed countries	.00 - .49	34	.398	.093	103
Total		127	.772	.061	1,455

HDI: Human Development Index

Analytical Strategy

- Weighted to 1994 Canadian population
- Bootstrap resampling procedure (Statistics Canada)
- Performed using Stata 8

1. Descriptive analysis of differences in health outcomes:

- By Immigrant Status: t-test

$$H_0: \mu_{Can} = \mu_{Imm}$$

- By Level of Human Development: ANOVA (Bonferroni)

$$H_0: \mu_{Can} = \mu_{HD1} = \mu_{HD2} = \mu_{HD3}$$

2. Panel Regressions: $y_{ti} = \beta_0 + \beta_1 x_{ti} + \dots + \beta_k x_{ti} + e_{ti}$

- XTGEE: Generalized Estimating Equations
 - Wooldridge test for serial correlation
 - AR-1 correlation structure
- 'Block' entry of predictor variables



High-risk Behaviours

Weekly Alcohol Use (# of drinks)

Cigarette Smoking (# per day)

Body Mass Index (kg/m^2)

Physical Activity (METs)

Health Outcomes

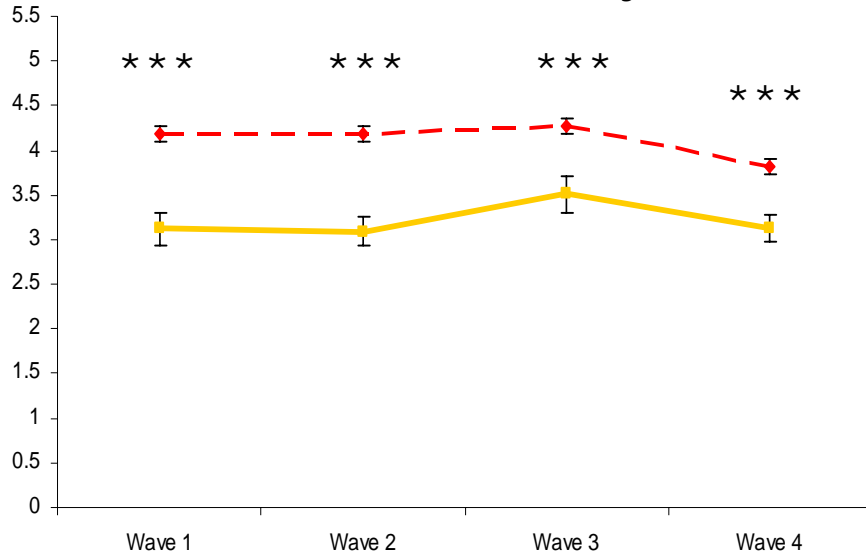
Psychological Distress (0-24)

Health Utility Index 3 (-0.396 – 1.00)

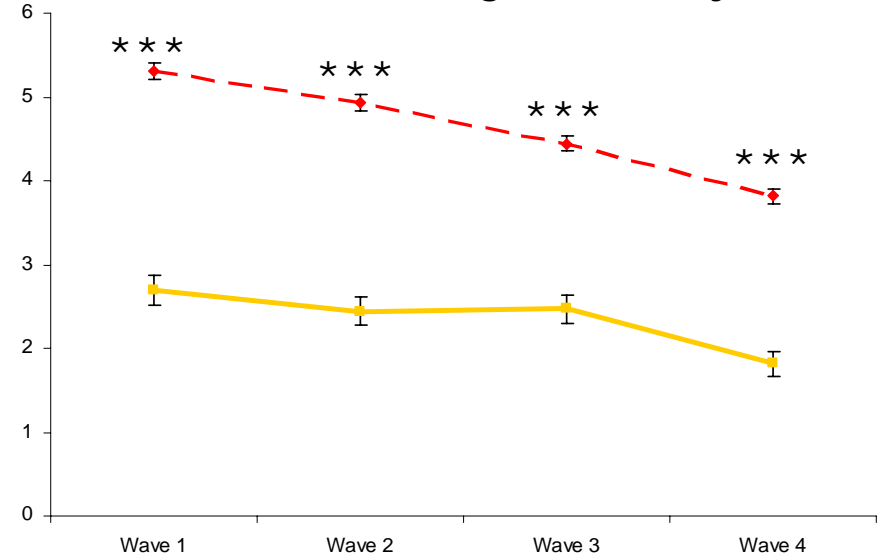
Poor Self-Rated Health (0,1)

Health-Risk Behaviours: Immigrant

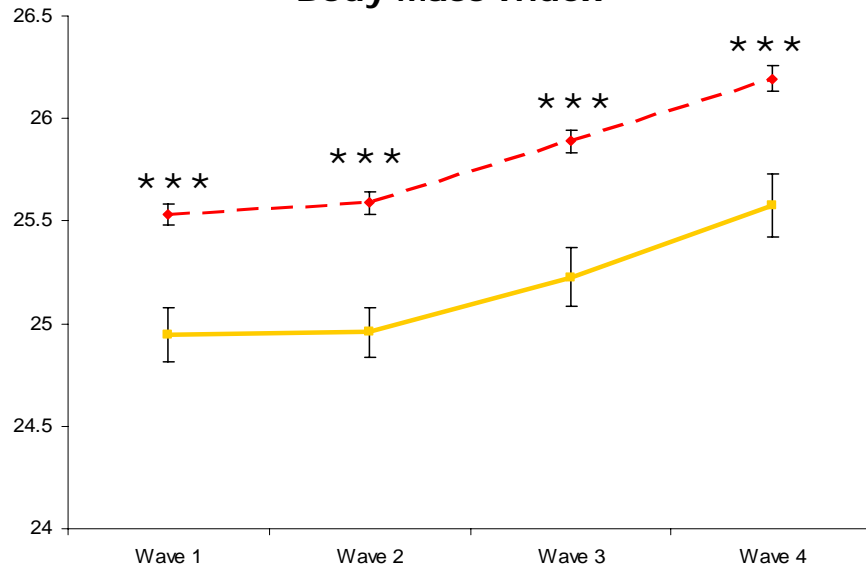
Alcohol Use Weekly



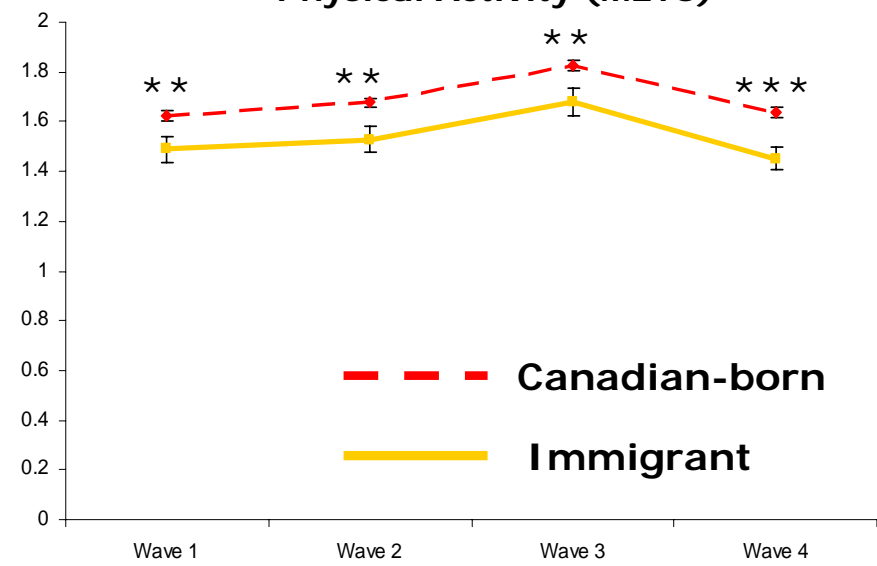
Number of Cigarettes Daily



Body Mass Index



Physical Activity (METS)

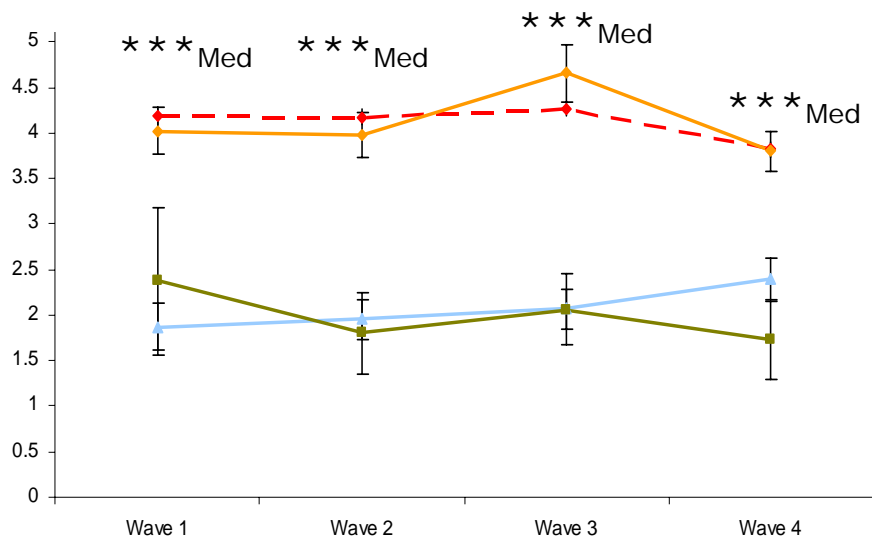


- - - Canadian-born
— Immigrant

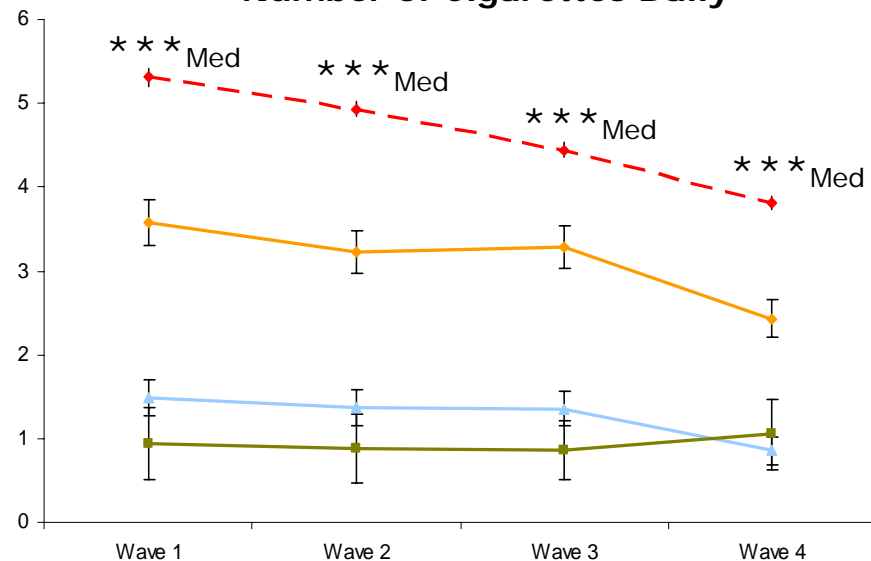
* p<0.05; **p<0.01, *** p<0.001 from Canadian-born group (referent) Note: Error bars represent standard errors

Health-Risk Behaviours: Hum Dev

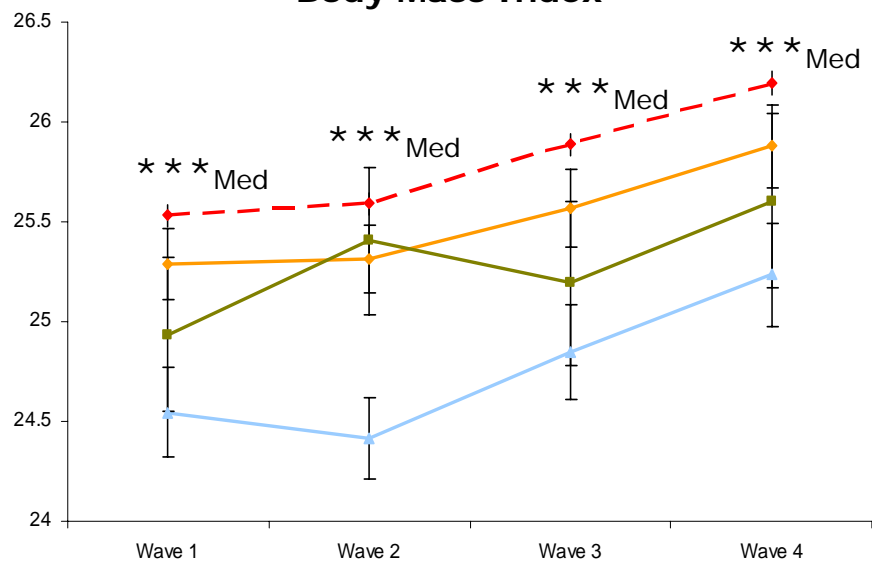
Alcohol Use Weekly



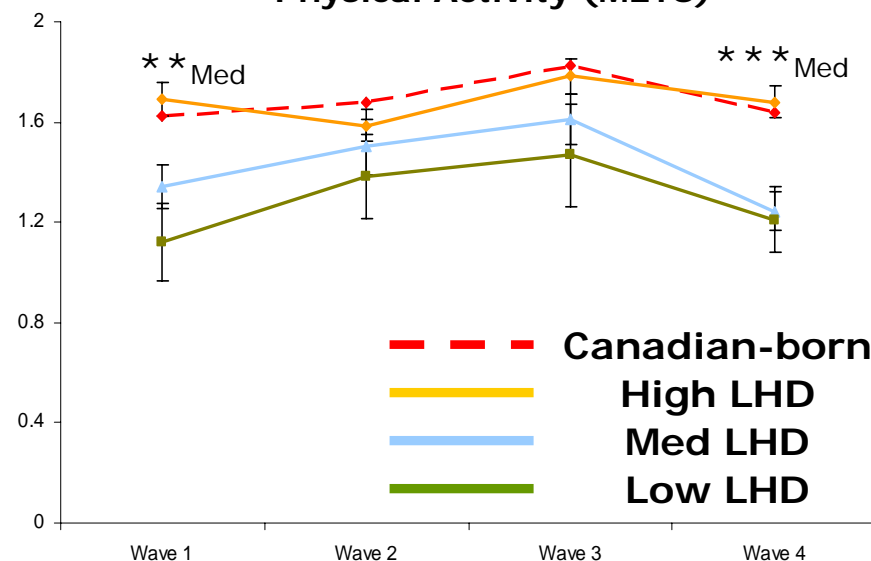
Number of Cigarettes Daily



Body Mass Index

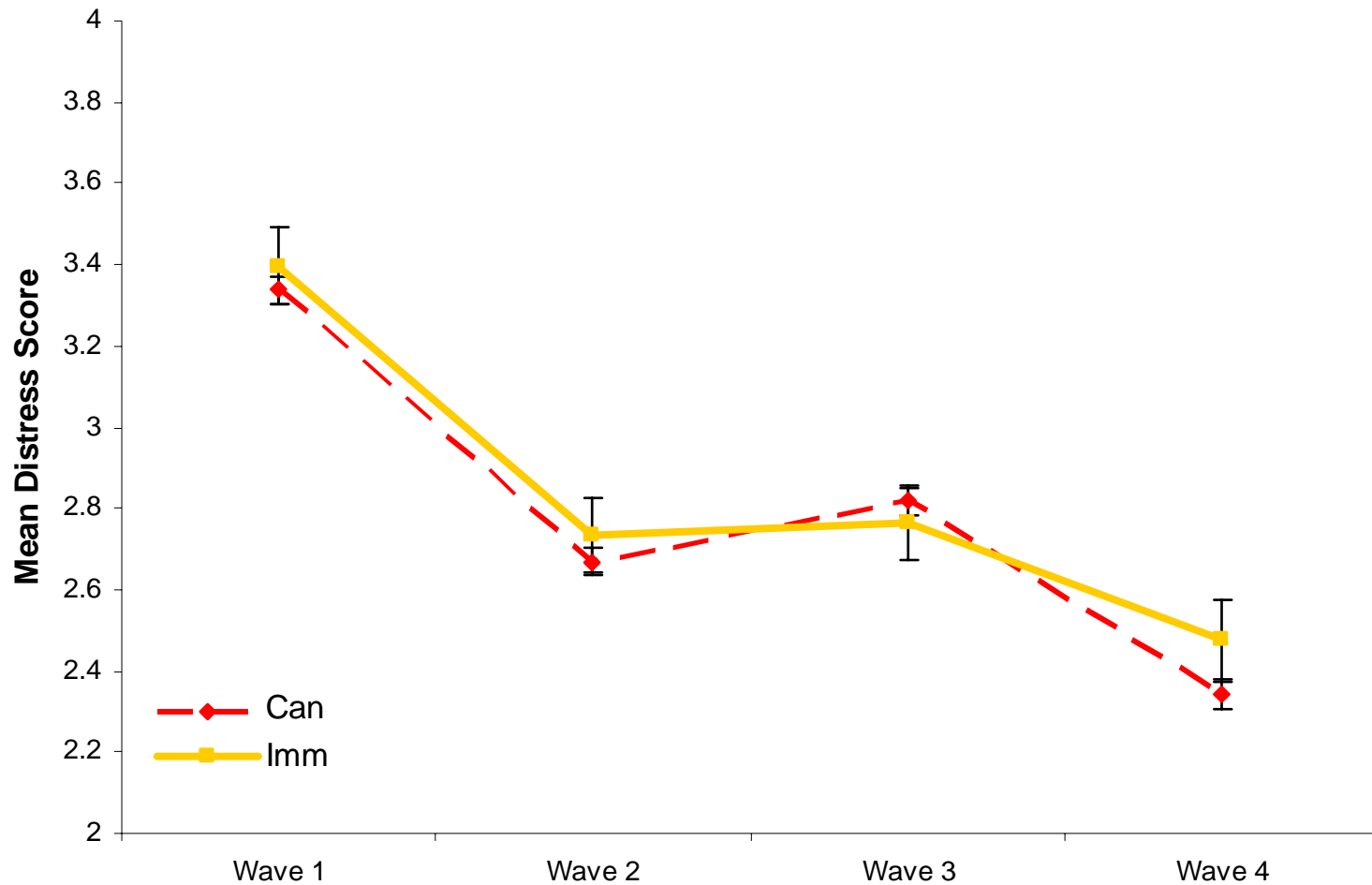


Physical Activity (METS)



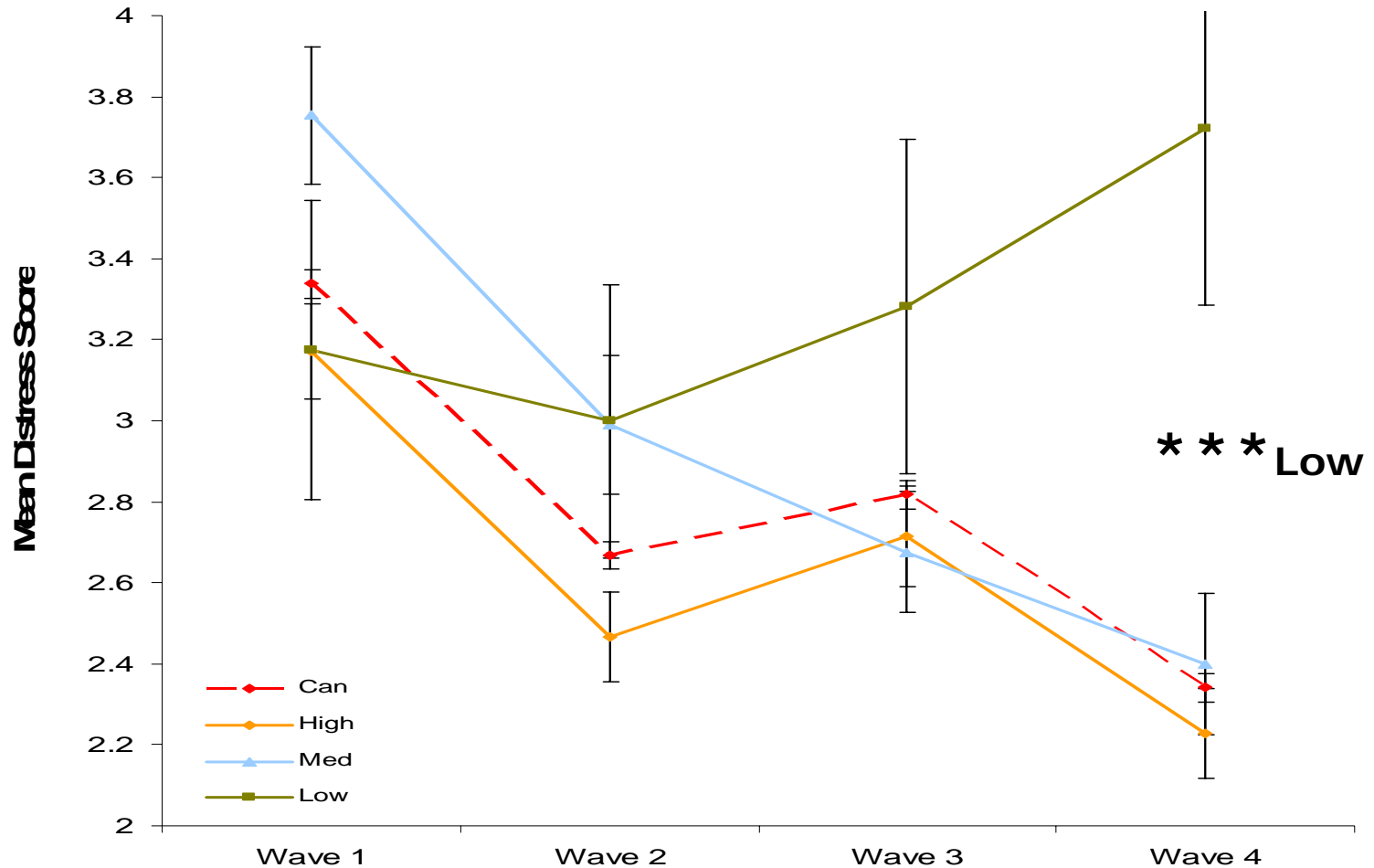
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Psychological Distress



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Psychological Distress



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Psychological Distress

*Values are unstandardized

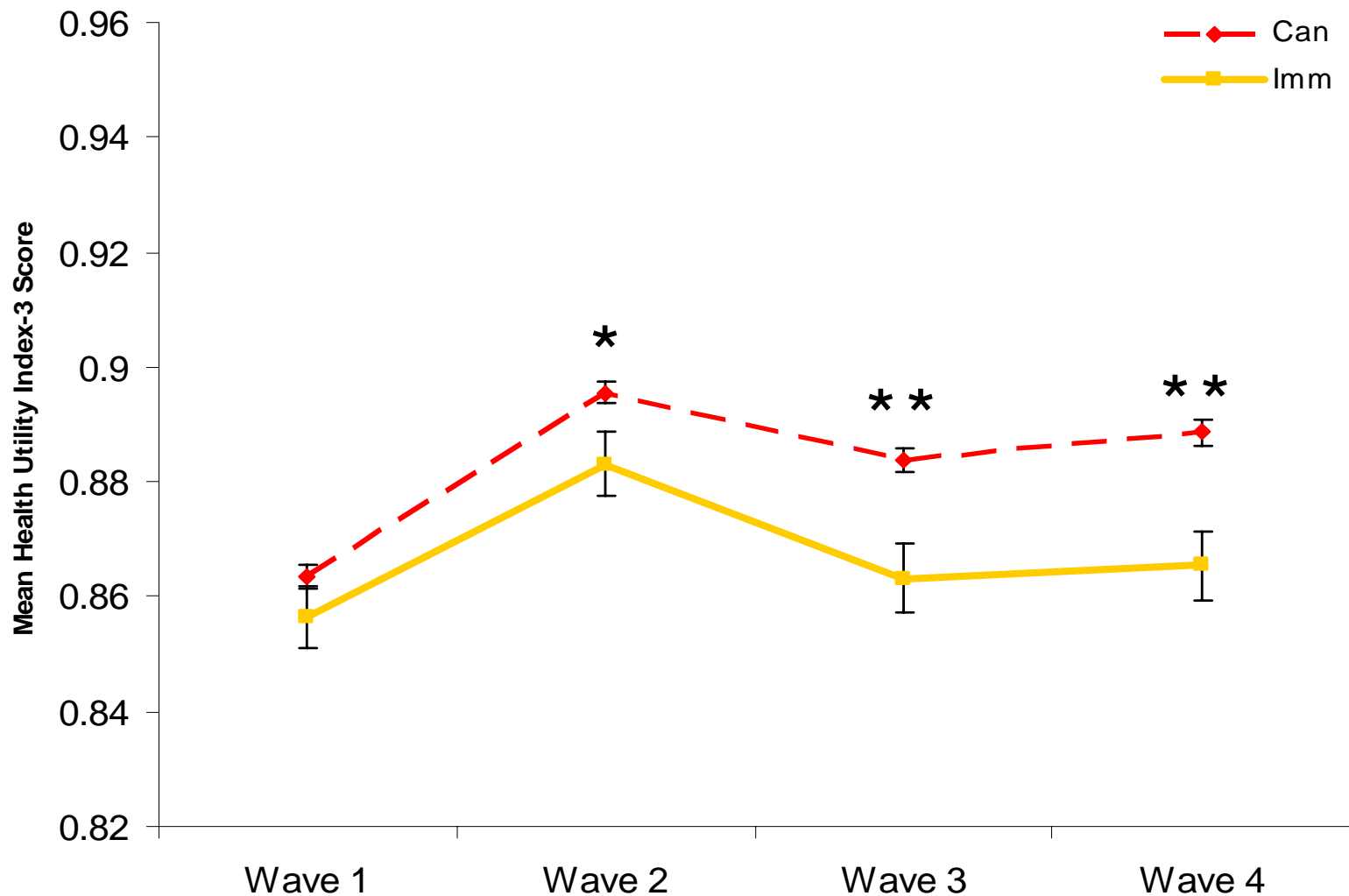
<u>Block</u>	<u>Variable</u>	<u>Imm</u>	<u>Hum Dev</u>
Immigrant Status	Immigrant ^a	0.08	-
Level of Human Development	High	-	-0.26 *
	Medium	-	0.07
	Low	-	0.41
Gender	Male ^b	-0.57 **	-0.68**
Age	Age at baseline ^c	-0.02 **	-0.02**
Immigration variables	Time prior to immigration ^d	-0.02 **	- 0.02 **
	Time since immigration ^e	-0.02 **	- 0.01
Health-risk behaviours	Number of alcoholic drinks weekly		
	Body Mass Index		
	Physical activity energy expenditure		
	Number of cigarettes smoked daily		
Demographic	Single/Sep/Div/Widowed ^f		
	5 - Highest income ^g		
	4 - Upper middle income ^g		
	3 - Middle income ^g		
	2 - Lower middle income ^g		
	Rural residence ^h		
	Intercept		
	N (unweighted)		

Psychological Distress

*Values are unstandardized

<u>Block</u>	<u>Variable</u>	<u>Imm</u>	<u>Hum Dev</u>
Immigrant Status	Immigrant ^a	0.06	-
Level of Human Development	High	-	-0.09
	Medium	-	0.42
	Low	-	-0.03
Gender	Male ^b	-0.57 **	-0.58**
Age	Age at baseline ^c	-0.02 **	-0.02**
Immigration variables	Time prior to immigration ^d	0.00	0.00
	Time since immigration ^e	0.01	0.01
Health-risk behaviours	Number of alcoholic drinks weekly	0.01 *	0.01*
	Body Mass Index	0.00	0.00
	Physical activity energy expenditure	-0.07 **	-0.07**
	Number of cigarettes smoked daily	0.03 **	0.03**
Demographic	Single/Sep/Div/Widowed ^f	0.51 **	0.51**
	5 - Highest income ^g	-1.52 **	-1.51**
	4 - Upper middle income ^g	-1.34 **	-1.33**
	3 - Middle income ^g	-1.09 **	-1.08**
	2 - Lower middle income ^g	-0.45	-0.45
	Rural residence ^h	-0.21 **	-0.20**
	Intercept	4.96 **	4.95**
	N (unweighted)	9366	9366

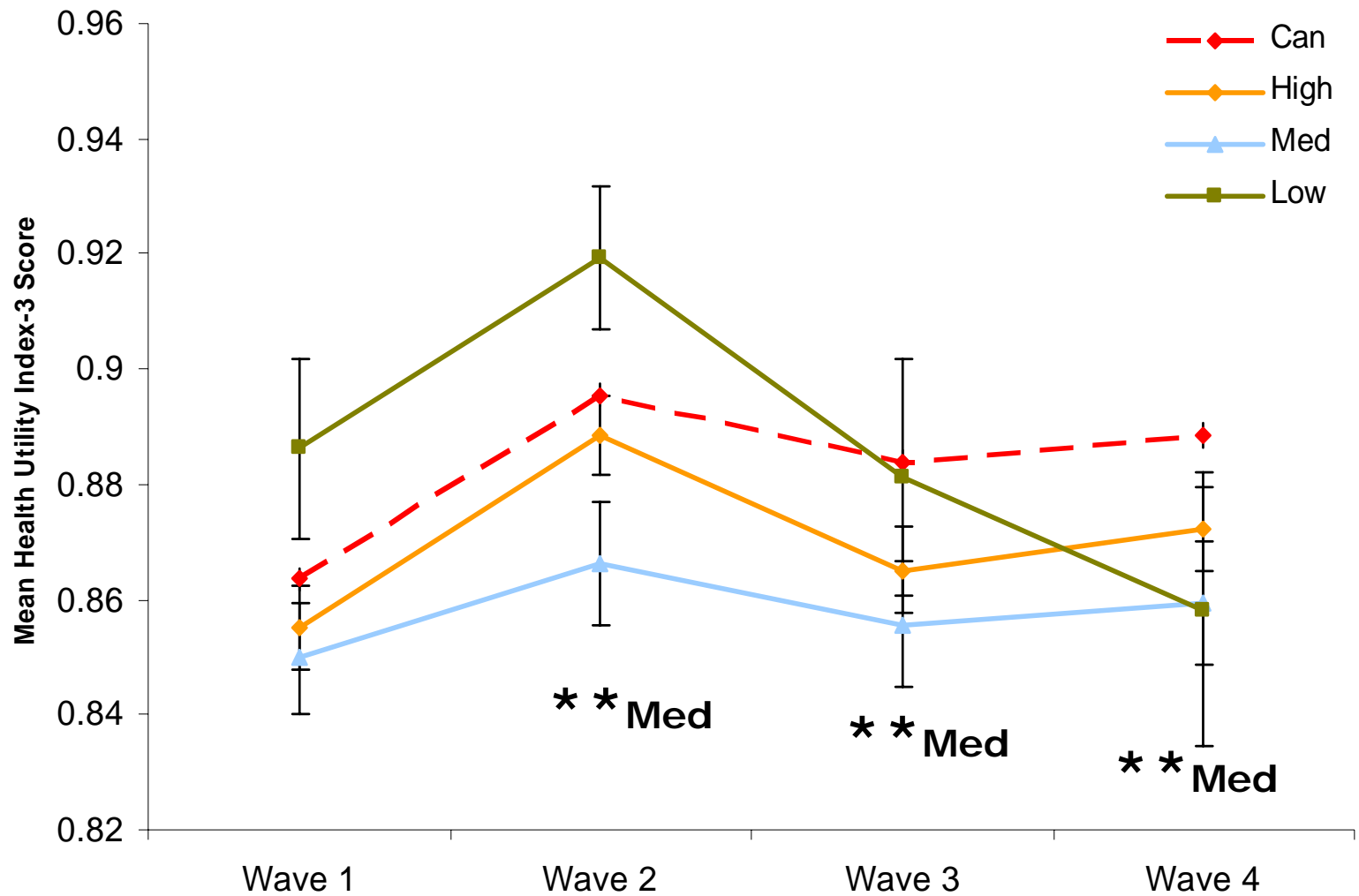
Health Utility Index-3



* $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$ from Canadian-born group (referent)

Note: Error bars represent standard errors

Health Utility Index-3



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Health Utility Index-3

*Values are unstandardized

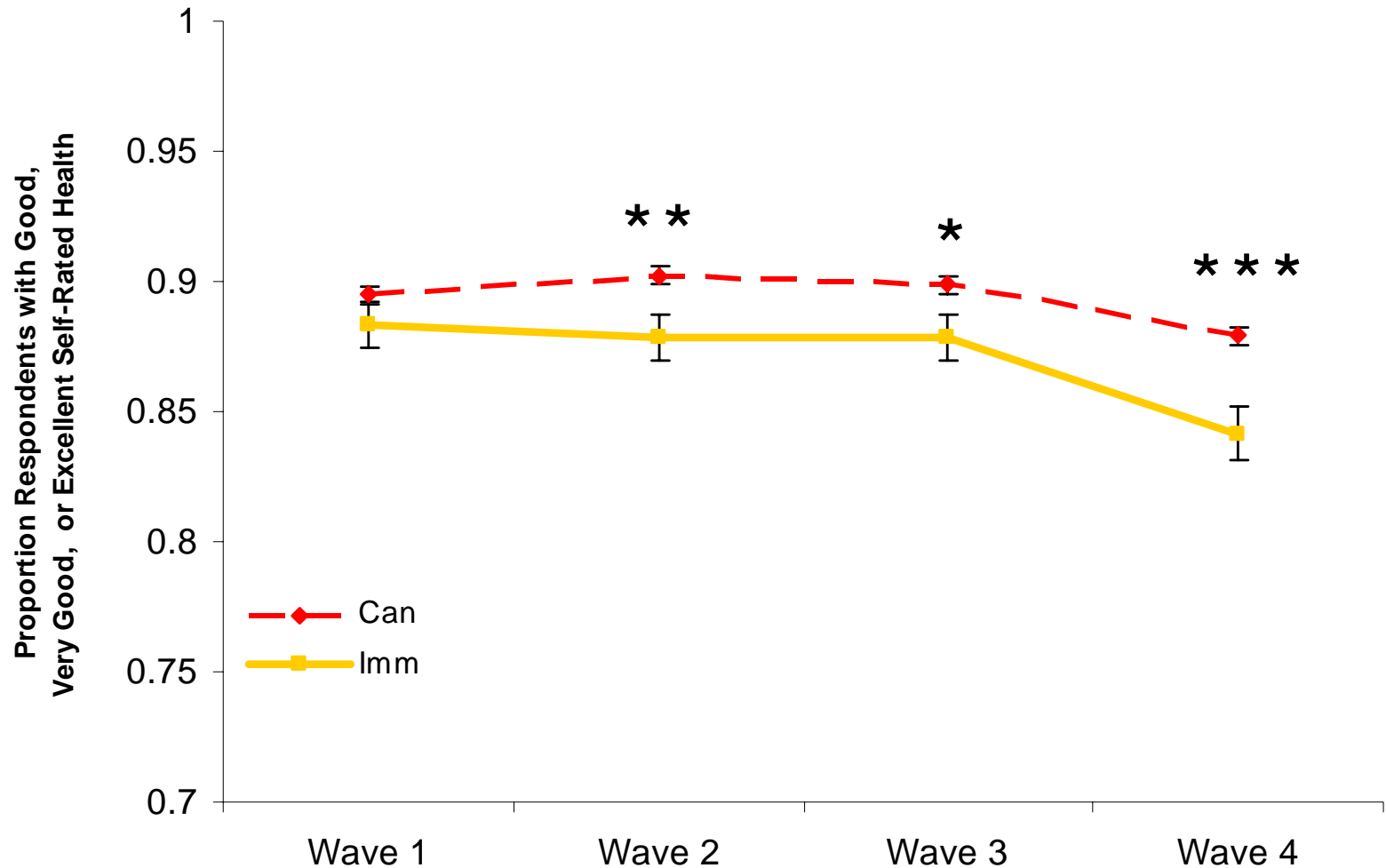
<u>Block</u>	<u>Variable</u>	<u>Imm</u>	<u>Hum Dev</u>
Immigrant Status	Immigrant ^a	-0.04 **	
Level of Human Development	High		-0.03 **
	Medium		-0.06 **
	Low		-0.05 ***
Gender	Male ^b	0.01 **	0.01*
Age	Age at baseline ^c	-0.003**	-0.002***
Immigration variables	Time prior to immigration ^d	-0.01 **	-0.01 ***
	Time since immigration ^e	-0.01 **	-0.01 ***
Health-risk behaviours	Number of alcoholic drinks weekly		
	Body Mass Index		
	Physical activity energy expenditure		
	Number of cigarettes smoked daily		
Demographic	Single/Sep/Div/Widowed ^f		
	5 - Highest income ^g		
	4 - Upper middle income ^g		
	3 - Middle income ^g		
	2 - Lower middle income ^g		
	Rural residence ^h		
	Intercept		
	N (unweighted)		

Health Utility Index-3

*Values are unstandardized

<u>Block</u>	<u>Variable</u>	<u>Imm</u>	<u>Hum Dev</u>
Immigrant Status	Immigrant ^a	0.006	
Level of Human Development	High		0.01
	Medium		-0.01
	Low		0.02*
Gender	Male ^b	0.01	0.01*
Age	Age at baseline ^c	-0.002**	-0.002***
Immigration variables	Time prior to immigration ^d	0.00	0.00
	Time since immigration ^e	0.00	0.00
Health-risk behaviours	Number of alcoholic drinks weekly	0.00	0.00
	Body Mass Index	-0.002**	-0.002***
	Physical activity energy expenditure	0.003**	0.003***
	Number of cigarettes smoked daily	-0.001**	-0.001***
Demographic	Single/Sep/Div/Widowed ^f	-0.02**	-0.02***
	5 - Highest income ^g	0.05**	0.05***
	4 - Upper middle income ^g	0.04**	0.04***
	3 - Middle income ^g	0.03**	0.03***
	2 - Lower middle income ^g	0.003	0.00
	Rural residence ^h	0.004	0.004
	Intercept	0.99**	0.99***
	N (unweighted)	9622	9622

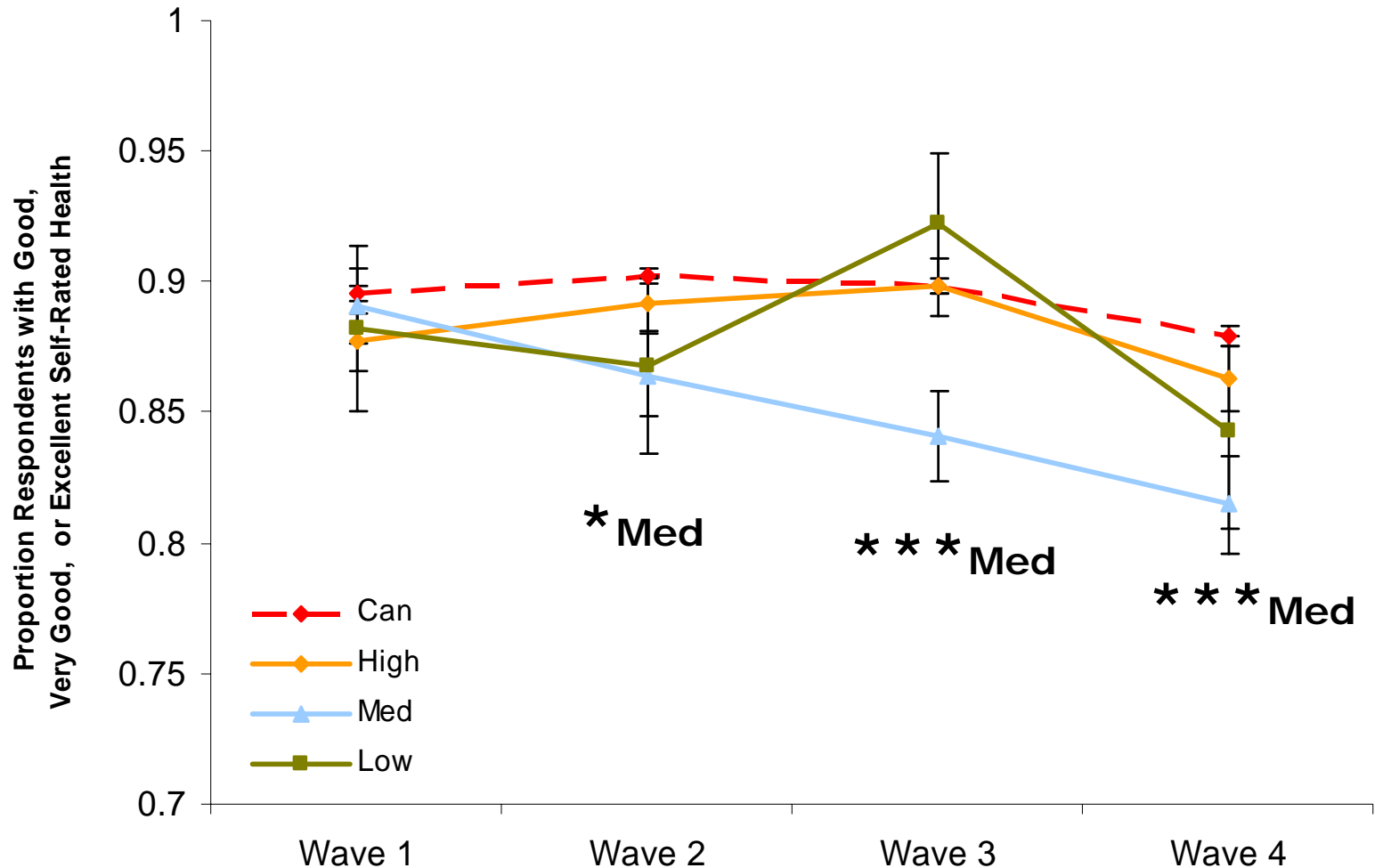
Overall Self-Rated Health



* $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$ from Canadian-born group (referent)

Note: Error bars represent standard errors

Overall Self-Rated Health



* $p < 0.05$; ** $p < 0.01$, *** $p < 0.001$ from Canadian-born group (referent)

Note: Error bars represent standard errors

Poor Self-Rated Health

* Values are Odds Ratios

<u>Block</u>	<u>Variable</u>	<u>Imm</u>	<u>Hum Dev</u>
Immigrant Status	Immigrant ^a	1.33 **	-
Level of Human Development	High	-	1.08
	Medium	-	1.69 **
	Low	-	1.67 **
Gender	Male ^b	0.85 **	0.88
Age	Age at baseline ^c	1.04 **	1.05 **
Immigration variables	Time prior to immigration ^d	1.04 **	1.04 **
	Time since immigration ^e	1.04 **	1.04 **
Health-risk behaviours	Number of alcoholic drinks weekly		
	Body Mass Index		
	Physical activity energy expenditure		
	Number of cigarettes smoked daily		
Demographic	Single/Sep/Div/Widowed ^f		
	5 - Highest income ^g		
	4 - Upper middle income ^g		
	3 - Middle income ^g		
	2 - Lower middle income ^g		
	Rural residence ^h		
	N (unweighted)		

Poor Self-Rated Health

* Values are Odds Ratios

<u>Block</u>	<u>Variable</u>	<u>Imm</u>	<u>Hum Dev</u>
Immigrant Status	Immigrant ^a	1.30	-
Level of Human Development	High	-	0.78
	Medium	-	1.65 *
	Low	-	1.19
Gender	Male ^b	0.89	0.88
Age	Age at baseline ^c	1.05 **	1.05 **
Immigration variables	Time prior to immigration ^d	0.99	0.99
	Time since immigration ^e	1.00	1.01
Health-risk behaviours	Number of alcoholic drinks weekly	0.99	0.99
	Body Mass Index	1.07 **	1.07 **
	Physical activity energy expenditure	0.86 **	0.86 **
	Number of cigarettes smoked daily	1.02 **	1.02 **
Demographic	Single/Sep/Div/Widowed ^f	1.12	1.12
	5 - Highest income ^g	0.25 **	0.25 **
	4 - Upper middle income ^g	0.43 **	0.43 **
	3 - Middle income ^g	0.51 **	0.51 **
	2 - Lower middle income ^g	1.09	1.08
	Rural residence ^h	0.95	0.96
	N (unweighted)	9635	9635

Summary of Results

- ❑ Varying patterns of health-risk behaviours across levels of human development
- ❑ Considerable variation in health status is masked by binary 'immigrant' variable
- ❑ 'Time' variables fully mediated by covariates
- ❑ Differences in health status across levels of human development **are not** fully attributable to behavioural, demographic covariates

Conclusions and Implications

- 'Healthy Immigrant Effect' observed in longitudinal design (Ali, 2002; Muenning & Fahs, 2002)
- 'HIE' fully mediated by Behav, Demog factors
 - ↑ Age, gender, income, BMI, physical activity, smoking
 - ↓ Rural residence, alcohol use
- Level of human development exerts a powerful influence on post-migration health status
- Further use of aggregate 'immigrant' term is unwarranted in health research
- Health care system / public health of urban centres must focus on immigrant sub-groups

Limitations and Considerations

- ❑ NPHS is a sample of Canadians, not immigrants
- ❑ Unable to identify class of immigrant (independent, family, refugee, other) for each respondent in the NPHS
- ❑ Unknown how cultural / linguistic factors influence self-reporting of health



Future Directions



- Representative sampling of immigrant persons
- Larger, cross-national studies using pooled samples
- Cross-cultural studies to validate self-report health status measures
- Better measures of within-country variation in levels of human development
- Health and social policy must examine broader definitions of 'immigrant' in promotion

Merci ~ Thank You



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